Universitat Autònoma de Barcelona

Institutional Antecedents of Green Entrepreneurship and Sustainable Development in Saudi Arabia

Wafa Alwakid

Institutional Antecedents of Green Entrepreneurship and Sustainable Development in Saudi Arabia

Doctoral Thesis

Author: Wafa Alwakid

Supervisors: David Urbano and Sebastian Aparicio

International Doctoral in Entrepreneurship and Management

Bellaterra (Cerdanyola del Valles), September 2021

Table of Contents

List of Tables

List of Figures

Acknowledgements

First, all praises and thanks be to Allah, the Almighty, for helping me to finish my study and for giving me the strength, ability, and opportunity to undertake this research and to persevere and complete it satisfactorily. Without his blessings, this achievement would not have been possible.

I am grateful to the Saudi Government and to Jouf University for the scholarship, which enabled me to undertake a PhD at the UAB. My deepest gratitude and honour are due to my supervisors, Prof. David Urbano and Dr Sebastian Aparicio, for their enduring support, patience, and encouragement. Their valuable comments have made a great impact on the progress of my PhD research during all its stages. Without their richness of experience, encouragement, and continuous follow-up, this research would never have been completed. No words are enough to say thank you.

From the bottom of my heart, I would like to thank sincerely my dear Dad, Dr Naif Alwakid, and my lovely deceased Mum, Nawal Alghalib, who died last August, for their great role in my life. I am extremely grateful to them for providing me with unfailing support and loving encouragement throughout my master's study and for always believing in me. This accomplishment would not have been possible without them, and I owe them my special thanks.

I would like to say a big thank you to my sweetest sisters, Safa, Ghadah, and Wiam, and my kindly brothers, Ibrahim, Jamal, and Waleed, for all the support they have shown me throughout this research and for their encouragement towards the successful completion of my dissertation.

Abstract

Sustainable entrepreneurship is a subject that has attracted growing research interest. Bringing together the three pillars of sustainability – society, the environment, and the economy – sustainable entrepreneurship is considered by scholars to be a practical and feasible path towards the meaningful integration of people, profit, and planet. In the context of Saudi Arabia, this study analyses the influence of formal and informal institutions on green entrepreneurial activities and their impact on sustainable development. Institutional economics was adopted to frame the hypotheses and analysis. The methodology used was quantitative (regression and panel data models), and the data were obtained from the annual reports of the Authority for Meteorology and Environmental Protection and the General Authority for Statistics (2012–2018). The main findings of this study show that institutions (such as property rights and culture) contribute positively to green (vs. non-green) entrepreneurship, with a positive influence on sustainable development, in Saudi Arabia. The results also demonstrate that green entrepreneurship contributes positively to the economic, social, and environmental components of sustainable development, whereas non-green entrepreneurship has no effect. This research has both theoretical and practical implications. In terms of the theoretical debate, the study provides empirical evidence highlighting the relevance of formal and informal institutions to green entrepreneurial activities and their influence on sustainable development. Thus, policymakers who are constantly creating strategies can take into consideration that any policy implemented affects green entrepreneurship, generating effective solutions and opportunities in green infrastructure and support for their use by governments, private companies, and all the relevant stakeholders.

Keywords: green entrepreneurship; sustainable development; institutional conditions; formal institutions; informal institutions; property rights; culture; Saudi Arabia.

Chapter 1

General Introduction

1. General Introduction

1.1 Problem Statement and Research Objectives

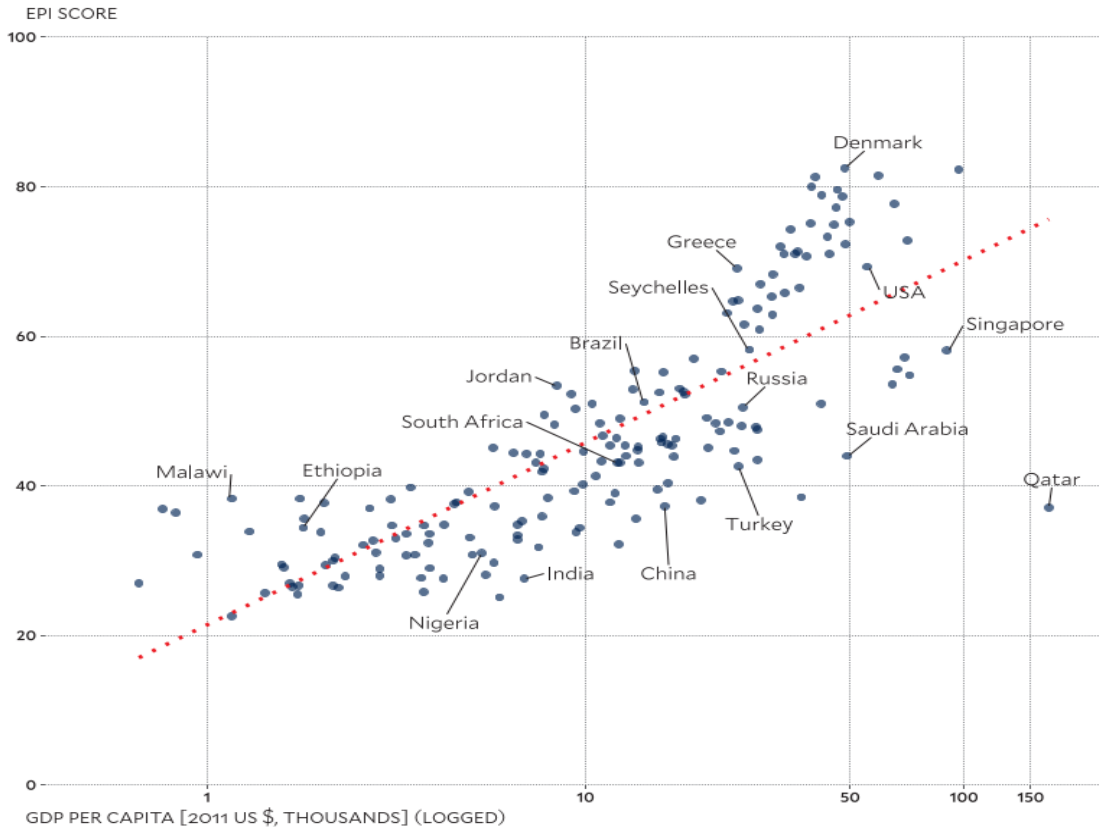
This research has a specific focus on Saudi Arabia, which is a strategic and important nation in the Middle East and the world (Al Rajhi et al., 2012; Cleron, 2020; Niblock, 2015; Niblock & Malik, 2007). Saudi Arabia is the largest economy in the Middle East and the richest Arab country in the region. The standard of living is one of the highest in the Middle East, with a GDP per capita of more than USD 20,000 (Cleron, 2020; El Mallakh, 2015; Tok, 2021). Saudi Arabia is the 23rd largest exporter of goods and the 31st largest import market in the world. Foreign trade represents 62% of its GDP (2020), as detailed by Al Rajhi et al. (2012), Cleron (2020), and Niblock (2015). Petroleum products represent a large majority of its exports (77% of the total exports in 2019), followed by petrochemical products (around 14% of the total) (Cleron, 2020; Niblock, 2015; Organization of the Petroleum Exporting Companies (OPEC), 2021). Machinery and electrical equipment account for the largest share of imports, followed by automobiles, chemicals, and metal products (Al Rajhi et al., 2012; Cleron, 2020; Niblock, 2015; Niblock & Malik, 2007). The policy of large-scale public works undertaken by the authorities and foreign direct investment mean that the Saudi Arabian Government needs to provide supportive policies for green entrepreneurial activities and sustainability. These are supported and promoted with the aim of reducing the economy's overreliance on oil.

Vision 2030 (2020) and the 2020 National Transformation Program take this situation into account by providing Saudi Arabia with defined goals and critical measures for the nation's long-term survival, sustainable development, and balanced growth (Rana & Alayed, 2018). These strategic programmes provide comprehensive objectives and goals capable of transforming the country into a sustainable and diverse economy positioned at the heart of international trade (Rana & Alayed, 2018; Taylor, 2021). Vision 2030 has a strong emphasis on and sets out expectations for improving sustainable development, aiming to reduce the overdependence on oil and contribute to the efforts to reduce global carbon emissions (Albanawi, 2015; Rana & Alayed, 2018). The proactive steps that the Saudi Government has taken include transformative plans to achieve a sustainable

economy, generate green jobs, promote environmentally friendly businesses, and establish socially inclusive organizations (Rana & Alayed, 2018). The success of these supportive government policies depends on the effective involvement and empowerment of all the relevant stakeholders at all levels in Saudi Arabia (Albanawi, 2015; Rana & Alayed, 2018; Taylor, 2021; White, 2013), in addition to the development of comprehensive strategies and green entrepreneurial policies and mechanisms to guide progress towards effective and efficient sustainability (Amirabadi Farahani et al., 2021; Amran et al., 2020; Nurunnabi, 2017).

In 2020, Yale University described the relationship between the 2020 Environmental Performance Index (EPI) score and the GDP per capita for different countries, as depicted in Figure 1.1. This shows a strong positive correlation between countries' GDP per capita and their EPI. Saudi Arabia currently has an EPI of 44 (Yale University, 2020).

Figure 1.1: Environmental Performance Index compared with the GDP of selected nations (source: Environmental Performance Index)



Green entrepreneurial activities represent a common shared vision of the process of creating a society that is just, safe, clean, and sustainable for humanity (Vogt & Weber, 2019). Sustainability has been defined as the ability of the present generation to meet its needs without compromising the ability of future generations to meet their needs (Brundtland et al., 1987; Caradonna, 2014; Taylor, 2021; White, 2013). Sustainability in the modern world reflects a shared common vision of contributing to a secure and sustainable society for humanity (Albanawi, 2015; Rana & Alayed, 2018). This means that resources, technological advancements, entrepreneurial factors, and investments are utilized in a manner that enhances the current generation without jeopardizing the ability and potential of future generations to meet their needs and aspirations (Albanawi, 2015; Rana & Alayed, 2018; Taylor, 2021; White, 2013). Green entrepreneurship in Saudi Arabia seeks opportunities to reduce the spread of greenhouse gases, pollution, and global warming and address other related issues with harmful effects and consequences (Albanawi, 2015; Rana & Alayed, 2018).

The typical strategies and government policies employed in Saudi Arabia to improve green entrepreneurial activities include encouraging all the relevant stakeholders to support and develop a greener infrastructure through educational initiatives (Al Rajhi et al., 2012; Albanawi, 2015; Ali & Al-Aali, 2012; Amirabadi Farahani et al., 2021). Education promotes and highlights the benefits of sustainability and green entrepreneurial activities in Saudi Arabia (Al Bawaba, 2014; Albanawi, 2015; Amirabadi Farahani et al., 2021; Taleb & Sharples, 2011). Another strategy and government policy is to train all the relevant stakeholders, including government agencies, businesses, and local and international staff, on green technologies, entrepreneurial activities, and sustainable planning and construction (Al Rajhi et al., 2012; Albanawi, 2015; Ali & Al-Aali, 2012; Amirabadi Farahani et al., 2021; Rana & Alayed, 2018). This includes green building training and implementing accreditations such as Leadership in Energy and Environmental Design (LEED), as detailed by Albanawi (2015). The Saudi Government encourages all developers to meet the established noise, water, and air pollution requirements in accordance with national standards and international accreditation specifications (Al Rajhi et al., 2012; Albanawi, 2015; Ali & Al-Aali, 2012; Amirabadi Farahani et al., 2021; Rana & Alayed, 2018).

These initiatives are intended to facilitate the transition to green entrepreneurial activities and sustainability in Saudi Arabia (Al Bawaba, 2014). Studies have unequivocally shown that solid waste management, electricity generation, and the agriculture industry are the sectors in the country that produce the highest amounts of greenhouse gases. The Saudi Government is trying to encourage investors to find new, innovative methods of providing the same services in a greener manner. This appeal to technological industries is very effective since the government offers subsidies and grants to innovative investors and inventors (Coad, 2012).

In the context of Saudi Arabia, this study analysed the influence of formal and informal institutions on green entrepreneurial activities and their impact on sustainable development. Institutional economics was adopted to frame the hypotheses and analysis. The methodology used was quantitative (regression and panel data models), and the data were obtained from the annual reports of the Authority for Meteorology and Environmental Protection and the General Authority for Statistics (2012–2018).

Despite the Saudi Arabian Vision 2030 and the greater emphasis placed on domestic sustainability and greener enterprises, the nation continues to lag behind its developed competitors in the global market in terms of greener, sustainable business. Therefore, as government agencies commit extensive resources to developing and supporting green entrepreneurs, additional evidence is needed to determine the effectiveness of their investments and the role of varying institutional support structures in facilitating greener sustainable development. This study presents a novel interpretation of the Saudi Arabian problem, focusing on emergent green entrepreneurship and its role in shaping the normative systemic values and practices of enterprises in a nation that has historically depended on the exploitation of natural resources for its economic development.

The specific objectives of the research are outlined below, with each objective corresponding to a different research phase:

1) To explore the content and evolution of the institutional antecedents of green entrepreneurship and the consequences for sustainable development.

    a. This phase of the research involved assessing the constitutional elements of the definition of green entrepreneurship and the effects of sustainable development principles in shaping business innovation and development strategies.

2) To analyse the influence of supportive government policies on green entrepreneurial activity in Saudi Arabia.
    a. This phase of the research involved assessing specific governmental policies in Saudi Arabia and their effects on entrepreneurial activities (both supportive and reductive) to determine the viability of driving long-term green entrepreneurial activities.

3) To examine the influence of cultural factors (i.e., environmental actions, environmental consciousness, and temporal orientation) on green entrepreneurial activity in Saudi Arabia.
    a. This phase of the study weighed the effects of indirect variables on green entrepreneurship, considering the motives, agendas, and value systems shaping business development in Saudi Arabia.

4) To analyse the influence of green entrepreneurship on the sustainable development of Saudi Arabia in terms of the role of formal institutions.
    a. This phase of the study applied institutional theory to the critical assessment of the productive role of green entrepreneurship in shaping sustainable development outcomes and best practices throughout Saudi Arabia.

5) To assess the role of property rights and traditions as antecedents of green entrepreneurship and sustainable development in Saudi Arabia.
    a. This final phase of the research explored and weighed the role of traditions in supporting or detracting from green entrepreneurial practices in Saudi Arabia and the burgeoning private sector, which is critical to long-term national development.

1.2 Institutions, Green Entrepreneurship, and Sustainable Development in Saudi Arabia

Previous academic work has shown a positive impact of entrepreneurship on economic development (Urbano et al., 2019a). Furthermore, entrepreneurship encourages an economy to improve through creative strategies (Saberi & Hamdan, 2019). In general, the more active the entrepreneurship, the more positive the influence on economic growth (Saberi & Hamdan, 2019; Urbano et al., 2019b). In addition, the actions of entrepreneurs are considered to be an indication of the vital determinants of localized economic progression (Dvouletý et al., 2018). Indeed, policymakers expect entrepreneurship to have a positive influence on a country's wealth and employment (Dvouletý et al., 2018). Likewise, several scholars have argued that, when institutions do not work properly, the influence of entrepreneurship might be negative (Dvouletý et al., 2018).

Indeed, this is the case of developing countries (Dvouletý et al., 2018). Accordingly, Saudi Arabia is enjoying a global economic boost, relying at present on oil but with ambitious strategies to diversify the economy away from this natural resource and towards the promotion of entrepreneurial expansion (McAdam et al., 2018). Currently, Saudi Arabia is experiencing a significant social and economic renaissance, guiding itself confidently towards a lucrative future as well as creating a diversified and sustainable financial backbone by attracting knowledge-based investors (Alessa & Alajmi, 2017). As it grows, corporate business is adopting forward-looking strategies, necessitating the close monitoring of entrepreneurship.

Due to the worldwide tendency to rely on the economy as the basis on which to support the state's competitive prowess, through close attention to youth creativity, the Saudi Government has actively supported entrepreneurship to establish a competitive and sustainable nation (Alessa & Alajmi, 2017). In Saudi Arabia, there are many obstacles and constraints that entrepreneurs must face, including the lack 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 in the World Trade Organization concluded with several failed endeavours that were unable to compete with international initiatives

and resources (Alessa & Alajmi, 2017). Despite this, the Saudi Government envisions a shift to green entrepreneurship among the younger generation (Soomro et al., 2019). Hence, Saudi Arabia has encouraged its youths to enhance free business by offering scholarships, such as the 100 Fastest Growing Companies Award, the Prince Salman Award for Entrepreneurship, and the Most Competitive Youth Award (Zaydane, 2011). This level of encouragement and innovative progression clearly motivates entrepreneurs to pursue green activities (Zaydane, 2011).

Vision 2030 states that opportunities should be offered that can stimulate the economy while generating revenues for other sectors (Thompson, 2017). It is for this reason that the country is embracing environmental, innovation, and entrepreneurship policies that can assist companies in promoting green entrepreneurial activity. Government policies have been implemented that require businesses or companies to comply with the green standards within a certain period of time or risk the possibility of closure. The regulations are wide ranging, but the reality is that businesses must use clean and green energy and minimize their carbon emissions to ensure their sustainability (Thompson, 2017). The objective of the environmental policy is to encourage businesses to operate in an environment that is safe and healthy, which is important for the sustainability of any business and guarantees a competitive advantage over others.

Certainly, these types of policies can impose barriers on entrepreneurial activity, at least initially. Nevertheless, entrepreneurship requires continuous movement out of the comfort zone, which may encourage people to discover new ideas that can be used to make businesses flourish over time. In this way, new business ideas are created while firms experience exponential growth. Alongside these environmental initiatives, Saudi Arabia now has innovation policies that are intended to help entrepreneurs while stimulating growth to achieve a competitive edge (Nalband et al., 2016). To support innovation and entrepreneurship policies, Vision 2030 is used as a mechanism to promote the growth of small and medium-sized enterprises (SMEs) as they play a critical role in the economy.

The government also has a platform, called the Meras programme, that offers government and private sector services to would-be entrepreneurs. The General Authority for SMEs has implemented strategies that remove obstacles to facilitate company funding. Therefore, the

positive changes inspired by Vision 2030 help different sectors to initiate programmes aimed at attaining accelerated growth (Thompson, 2017). As part of encouraging entrepreneurship in the SME sector, the Saudi Arabian Government established venture capital companies that have stimulated the private sector to ensure that it has access to funds and to reduce the equity gap (Pillai, 2012). Additionally, the Saudi Arabian entrepreneurship ecosystem appreciates that the systems may be changing. For instance, it now allows crowdfunding platforms, which essentially increase people's access to financing. Furthermore, the Saudi General Investment Authority (SAGIA) is now accepted as playing a critical role in ensuring that entrepreneurship is more inclusive, which is consistent with the recent results from Aparicio et al. (2020a). This study supports the idea that certain institutions (i.e., culture and policies) help entrepreneurial activity to contribute to inclusive growth.

It seems, therefore, that initiatives that support entrepreneurial activity are highly necessary. In this regard, entrepreneurship policies in Saudi Arabia also include government efforts aimed at strengthening e-commerce, e-payments, and e-customs projects (Suboh, 2015). This proactive approach has been critical in simplifying and digitizing the procedures used for customs, which have, in turn, improved the supply chain and made it easier for businesses to procure goods. An important part of this approach includes policies for the creation of information and communication technology (ICT) business incubators, which fall under the Badir programme (Suboh, 2015). The growth of these incubators and accelerators has encouraged the innovation and growth of businesses within the green entrepreneurship strategy adopted by the country.

Saudi Arabia has recently introduced entrepreneurship policies that are coordinated by the Ministry of Education to develop programmes for SMEs and start-ups. Under such programmes, through organizations such as the King Abdullah University of Science and Technology (KAUST), the country has intensified its scientific research and innovation with a view to making its workforce and businesses competitive within and outside its borders. It has also established quasi-governmental institutions that have helped in defining and implementing programmes aimed at transforming businesses (Khan, 2013). These entrepreneurship policies and training now play a critical role in enhancing entrepreneurs' skills, creating a culture that is adopted by these entities when they join the workplace. However, the most compelling position is that the programmes

embrace universally accepted best practices that may help to ensure that the businesses are sustainable.

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 (Ashri, 2019). Part of this success can be attributed to the use of green entrepreneurship, which has allowed businesses to appreciate that running a business involves environmental, economic, and social factors. Therefore, these businesses seek innovative solutions regarding 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 economy. According to Vision (2030), the Saudi Arabian economy should offer opportunities that can stimulate the economy while at the same time generating revenues for other sectors (Thompson, 2017).

1.3 Research Contribution

This research has both theoretical and practical implications. In terms of the theoretical debate, it provides empirical evidence for the relevance of formal and informal institutions to green entrepreneurial activities and their influence on sustainable development. By focusing on the topic of green entrepreneurship in the nation of Saudi Arabia, where natural resource dependency has characterized decades of economic growth and government investment, this study highlights the contrast between institutional inertia and private sector development. From entrepreneurial motivations to business development strategies to government support systems, the underlying theories and concepts introduced during this study affirm a new, productive pathway for developing nations seeking to limit their dependency on traditional, high-impact resource streams like oil and gas. Thus, policymakers who are constantly creating strategies can take into consideration the fact that any policy implemented affects green entrepreneurship, generating effective solutions and opportunities in green infrastructure and support for their use by governments, private companies, and all relevant stakeholders. Concretely, this study contributes to the country’s effective and efficient achievement of Vision 2030 and the National Transformation Program by identifying typical obstacles and proffering solutions and

opportunities for green entrepreneurial activities and sustainability. This is important as the growth in income and employment experienced in Saudi Arabia in the future should be driven by capital investments that aim to reduce carbon emissions and pollution and enhance energy and resource efficiency. Most importantly, this study identifies and promotes green entrepreneurial initiatives that can prevent the loss of biodiversity and ecosystems. This study can therefore contribute to a process through which Saudi Arabia can build and transform its institutions to realize green and sustainable benefits by highlighting supportive government policies for green entrepreneurial activities and providing an integrated plan for implementing support policies.

1.4 Conceptual Framework

1.4.1 Institutional Economics and Green Entrepreneurship

To comprehend the possible mechanisms behind the relationship between supportive government policies and green entrepreneurship in Saudi Arabia, we used institutional economics (North, 1990, 2005). North (1990) explained that institutions are vital in understanding the developmental differences across regions and countries, which are rooted in the formal and informal rules that exist in every society. According to this theory, formal institutions consist of contracts, regulations, and procedures, whereas informal factors are related to the culture, values, or social norms within a particular society. Formal and informal institutions, and their interdependencies, create a context that can be decisive in determining and directing organizational behaviour and setting the business agenda and practices of corporate social responsibility and green-ness (Peng et al., 2009). This institutional context shapes the conditions and constraints for businesses and is hindered by higher levels of corruption as well as weaker property rights (Urbano et al., 2019a). From this perspective, in terms of institutions, we draw on this approach since it facilitates an understanding of the differences across regions and countries, which can explain the formation and growth of green entrepreneurial activity (Alwakid et al., 2020; Meek et al., 2010) as well as other types of entrepreneurship (Urbano et al., 2019b).

Institutional economics has increasingly been used as a theoretical lens for entrepreneurship research (Bruton et al., 2010; Thornton et al., 2011; Urbano et al., 2019b; Welter, 2011). Elaborating on this viewpoint, scholars have explored institutions as antecedents of entrepreneurial activity and their relationship with economic growth (Aparicio et al., 2016; Bjørnskov & Foss, 2016; Bosma et al., 2018; Urbano & Aparicio, 2016). Generally, the extant literature has suggested that entrepreneurship functions within a concrete institutional landscape and that its behaviour is shaped by this context (Aidis et al., 2008; Urbano et al., 2019c). Even though informal institutions function on a deeper level and are more pervasive than formal bodies, the latter may heavily influence and shape the former (Williamson, 2000).

Although it has been suggested that informal institutions may be more conducive to entrepreneurial activity than formal ones (Aparicio et al., 2020a), policy and regulatory changes may constitute the first step in encouraging a particular activity. In this regard, an initial exploration may suggest that formal institutions are expected to be contingent on green entrepreneurship. Since the government bears the responsibility for boosting entrepreneurial development, several scholars have considered that providing resources is also part of the government's function (Obaji & Olugu, 2014). Government policies include regulations conducive to an environment that is capable of promoting green entrepreneurship. From this perspective, the issue becomes more complex when competing institutions are formed around sustainability issues. In this regard, government policies may refer to setting up conditions for boosting entrepreneurship that is environmentally friendly but may simultaneously include provisions for funding policies (Dai & Si, 2018). Therefore, the need for development, which is boosted by entrepreneurship, must be balanced with the need to preserve the opportunity for future generations to have a high quality of life and environment. This is what the Saudi Arabian Government is trying to achieve.

1.4.2 Overview of Green Entrepreneurial Activities

Kazzi (2014) noted that establishing and consolidating the links between green activities, initiatives, and environmental factors with economic strategies in most Arab nations is a key challenge. This consideration has experienced an upsurge amongst the member states in the region (Al Rajhi et al., 2012; Albanawi, 2015; Ali & Al-Aali, 2012; Amirabadi Farahani et al., 2021;

Rana & Alayed, 2018). This agrees with observations made by the United Nations Conference on Sustainable Development of achievements in this area, especially those related to improving education and access to basic health facilities and the general betterment of living standards (UNCSD, 2020). Governments need to support policies and initiatives aiming to achieve a "green economy in the context of sustainable development and poverty eradication" in the region (Albanawi, 2015; Alwakid et al., 2020; Kaysi & Chaaban, 2013; Khoday et al., 2015; Raouf & Luomi, 2015; UNCSD, 2020). Integrating green activities, initiatives, and environmental factors into economic policies and working towards green growth at the national and regional levels can facilitate an increase in economic growth, green entrepreneurial activities, and job initiatives, improved social equity, and sustainable use of natural resources (Alwakid et al., 2020; Capasso et al., 2019; Kazzi, 2014; Lorek & Spangenberg, 2014; Rana & Alayed, 2018). An important starting point in evaluating the conceptual framework for initiating, implementing, and monitoring green entrepreneurial activities in Saudi Arabia is the fact that green growth does not take over the role of sustainability; green growth is not opposed to the principles of free trade but provides an additional avenue for achieving sustainability (Organisation for Economic Co-operation and Development (OECD), 2011). Kazzi (2014) noted that green growth and entrepreneurial activities provide a new economic paradigm for Saudi Arabia. From a regional perspective, there is a need for a unified approach and positioning for the development, implementation, and monitoring of green entrepreneurial activities and initiatives. Most importantly, these strategies should ideally be linked to sustainable development (Alwakid et al., 2020; Capasso et al., 2019; Hamdouch & Depret, 2010; Kazzi, 2014; Lorek & Spangenberg, 2014; Rana & Alayed, 2018). The transition to a green growth model has several advantages for Saudi Arabia. The primary strength of this conceptual framework is derived from the intersections of green entrepreneurship with institutional theory in the context of broad-scale sustainability effects in national systems and industrial complexes like Saudi Arabia that have not traditionally embraced sustainable development practices. Accordingly, green entrepreneurs are both a driving force for sustainability and a support structure for various adaptive governmental initiatives that are seeking to achieve and sustain such practices over the full scope of Saudi Arabian industry. From knowledge spillovers to economies of scale to resource investments, the institutional role of entrepreneurs in this pathway to systemic sustainability has been evaluated critically over the course of this novel investigation.

1.4.3 Purported Benefits of Supportive Government Policies for Green Entrepreneurial Activities in Saudi Arabia

Government policies that support the promotion of green entrepreneurial activities in Saudi Arabia provide tremendous opportunities to diversify energy sources and the national economy and the basis for stimulating a new sector (Alwakid et al., 2020; Capasso et al., 2019; Cleron, 2020; El Mallakh, 2015; Hamdouch & Depret, 2010; Kazzi, 2014; Lorek & Spangenberg, 2014; Rana & Alayed, 2018; Tok, 2021). Most importantly, the move towards green entrepreneurial activities represents a considerable effort to mitigate the adverse impacts of greenhouse gases and climate change (El Mallakh, 2015; Kazzi, 2014; Lorek & Spangenberg, 2014). This requires a paradigm shift and transition to help preserve the economic capital of the nation, reduce poverty, and create the green jobs required for the implementation and monitoring of these initiatives (Alwakid et al., 2020; Capasso et al., 2019; Rana & Alayed, 2018). UNEP (2012) provided evidence of a direct link between the drive towards a green economy and an increase in investments capable of alleviating poverty. Despite the purported benefits detailed above, the green growth model has associated risks and challenges considering that this is an ambitious project involving all the sectors of the economy (Alwakid et al., 2020; Capasso et al., 2019; Cleron, 2020; El Mallakh, 2015; Hamdouch & Depret, 2010; Kazzi, 2014; Lorek & Spangenberg, 2014; Rana & Alayed, 2018; Tok, 2021). There are inherent difficulties and gaps in terms of knowledge and experience. These include providing targeted support in the context of education and cooperation for development by integrating green growth, mobilizing stakeholders, and raising awareness about these initiatives (Albanawi, 2015; Alwakid et al., 2020; Kaysi & Chaaban, 2013; Khoday et al., 2015; Raouf & Luomi, 2015; UNCSD, 2020). Important factors include obtaining support from the private sector, mobilizing new sources of capital, using technological innovations, and promoting fair trade, green investment innovations, a new mode of green, and the “green” and sustainable consumption of resources in Saudi Arabia (Alwakid et al., 2020; Lorek & Spangenberg, 2014; Rana & Alayed, 2018). The introduction of green policies should focus on strengthening the skills and green growth model for the nation.

1.5 Structure of the Research

The current research is divided into four phases and seven sections (in addition to the general introduction and conclusions). To identify the trends and discussions within the green entrepreneurship field, this study begins with a literature review (Section 2), which explores the extant literature at the theoretical and empirical levels of analysis. Motivated by some of the gaps found, phase 2 (Section 3) focuses on the role of supportive government policies in green entrepreneurial activity in Saudi Arabia. In phase 3 (Section 4), the influence of cultural factors on green entrepreneurial activity is examined. In phase 4 (Section 5), the influence of green entrepreneurship on sustainable development is discussed. Finally, in phase 5 (Section 6), the role of property rights and traditions as antecedents of green entrepreneurship and sustainable development is assessed.

Phase 1: Literature review and empirical evidence regarding the institutional determinants of green entrepreneurship and its link with sustainable development

By synthesizing disparate strands of the literature over the period January 2002 to December 2020, Section 2 identifies an emergent stream of research that sheds light on the institutional factors that shape green entrepreneurship and their effect on sustainable development. This integrative analysis spans a broad spectrum of the literature. The findings of this section enable a broader comprehension of green entrepreneurship, allowing an analysis of the interactions between institutions, green entrepreneurship, and sustainable development.

Phase 2: Supportive government policies for green entrepreneurial activity in Saudi Arabia: An institutional analysis

Section 3 introduces the proactive steps that the Saudi Government has taken, including transformational plans to achieve a sustainable economy, generate green jobs, promote environmentally friendly businesses, and establish socially inclusive organizations. The section provides the research aims and objectives, the research contribution, and the conceptual framework.

Section 3 identifies the trends and key critical discussions focusing on supportive government policies and explores their influence, considering regional and institutional economics, to understand how these policies may affect green entrepreneurial activities in Saudi Arabia.

Phase 3: Cultural antecedents of green entrepreneurship in Saudi Arabia: An institutional approach

Section 4 identifies the trends and key critical discussions focusing on green entrepreneurship and culture in Saudi Arabia and examines the influence of cultural factors (i.e., environmental actions, environmental consciousness, and temporal orientation) on green entrepreneurial activity.

Phase 4: The influence of green entrepreneurship on the sustainable development of Saudi Arabia: The role of formal institutions

Section 5 discusses the influence of green entrepreneurship on the sustainable development of Saudi Arabia and the role of formal institutions, such as entrepreneurship policies, in this relationship. Institutional economics was used to frame the analysis. Section 5 presents the findings and discussions focusing on the antecedents of green entrepreneurship and sustainable development in Saudi Arabia.

Phase 5: Property rights and traditions as antecedents of green entrepreneurship and sustainable development in Saudi Arabia: An institutional approach

Section 6 assesses the role of property rights and traditions as antecedents of green entrepreneurship and sustainable development in Saudi Arabia and explores the extent to which green entrepreneurial activity affects sustainable development and the role of formal and informal institutions (property rights and traditions). Institutional economics was used to frame the analysis.

The main phases of the research are presented in Figure 1.2.

Figure 1.2: Structure of the research

Chapter 2

Institutional Antecedents of Green Entrepreneurship and its Consequences for Sustainable Development: A Systematic Literature Review

2. Institutional Antecedents of Green Entrepreneurship and its Consequences for Sustainable Development: A Systematic Literature Review

2.1 Introduction

Entrepreneurship has long been considered a fundamental component of economic development (Lans et al., 2014; Munoz & Cohen, 2018). From an institutional economics point of view (North, 1990, 2005), institutions are classified as formal (i.e., constitutions, contracts, common law, or government policy) or informal (i.e., attitudes, values, norms, beliefs, or, in broader terms, the culture of a society). Generally, institutions can be viewed as the rules within society that shape human interaction (North, 1990, p. 3). Although a number of studies have analysed formal institutions as initial steps towards entrepreneurial activity (for thorough literature reviews, see Bjørnskov & Foss, 2016; Urbano et al., 2019b; Zhai et al., 2019), it has been argued that informal institutions are more influential within society (Su, 2020; Urbano & Aparicio, 2016; Urbano et al., 2019b). Informal institutions limit the influence of formal bodies and vice versa (Urbano & Aparicio, 2016).

The role of entrepreneurs in society centres on opportunity creation, which is typically economic in nature but has more recently broadened to incorporate social and environmental contributions (Kraus et al., 2018). Fundamentally, entrepreneurs are considered to be valuable to society, but, in recent years, there has been a shift away from the focus of entrepreneurship being purely on wealth creation to encompass broader social and environmental measures (Gast et al., 2017). This has led to the development of a number of sub-themes in the entrepreneurship literature, including social entrepreneurship and environmental entrepreneurship. This chapter focuses on providing a critical systematic literature review of sustainable entrepreneurship (SE), a term defined as "the process of discovering, evaluating, and exploiting economic opportunities that are present in market failures which detract from sustainability, including those that are environmentally relevant"

(Dean & McMullen, 2007, p. 58) and, according to Terán-Yépez et al. (2020), a specific niche of entrepreneurship that incorporates economic, social, and environmental benefits.

From a theoretical perspective, a number of prominent journals have encouraged research on SE; they have argued that there is still much to understand in relation to SE in terms of its development, organization, and synthesis as well as its integration with meaningful practical activity (Criado-Gomis et al., 2017). Likewise, from a practical perspective, prominent bodies such as the United Nations (UN) have attempted to conceptualize SE in the Sustainable Development Goals (SGDs), which have been widely and enthusiastically embraced by a growing number of public and private organizations as part of the 2015 development agenda (Horne et al., 2020). Arguably, what distinguishes SE from other subclassifications of entrepreneurship is that SE attempts to evaluate the impact of policy and change within society, seeking to establish what practical measures need or ought to be adopted to ensure the availability of resources for future generations (Volkmann et al., 2019).

Terán-Yépez et al. (2020) noted that it is now a little over 20 years since the concept of SE was first articulated in the *Journal of Organizational Change Management*, and, during this time, there has been not only an increasing research and practitioner focus on the importance of sustainability more broadly but also technological and social developments that have shifted the interpretation of what sustainability, and more specifically SE, means. Linnenluecke et al. (2020) contended that, within any academic discipline, it is important that periodic systematic analyses and critical reviews are undertaken with the purpose of monitoring and providing insights into trends and developments and offering an opportunity for reflection and critical synthesis with the benefit of a broader range of input. Systematic literature reviews on the subject of SE have attracted the attention of a number of scholars, including Aghelie et al. (2016), Gast et al. (2017), Levinsohn (2013), and Munoz and Cohen (2018). Each chapter, in its own way, has made a contribution to advancing the understanding with respect to SE, but, arguably, these chapters have their limitations, most of which consist of an overt focus on attempting to align SE interpretations with predominantly economic interests.

In contrast, Sarango-Lalangui et al. (2018) and Terán-Yépez et al. (2020) attempted to perform bibliometric evaluations of the development of SE and the organic adoption of SE by researchers and society. Sarango-Lalangui et al. (2018) made advances in this area by conducting a systematic keyword interpretation in recognition of the fact that SE is a construct that is often treated interchangeably with other sub-constructs of social and environmental entrepreneurship. Terán-Yépez et al. (2020) recognized Sarango-Lalangui et al.'s (2018) contribution but argued that their chapter lacked visual illustration, making it difficult to conceptualize the development and interrelationship of SE terms and constructs, and one of these difficulties consisted of challenges in elucidating the international growth of the field. This systematic literature review is up to date and incorporates chapters published as recently as the end of December 2020, and the recommendations presented in the summaries of these chapters are taken into account.

2.2 Definitions of Sustainable Entrepreneurship

Sustainable entrepreneurship is a subject that has attracted rapidly increasing research interest. Many authors have defined sustainable entrepreneurship from different points of view. Table 2.1 presents further details about the definitions of sustainable entrepreneurship.

Table 2.1: Definitions of sustainable entrepreneurship

Definition	Authors	Year	Journal
Sustainable entrepreneurship refers to the search, discovery, creation, and exploitation of entrepreneurial opportunities that positively impact sustainability by producing social and environmental gains for society and its members.	Shepherd and Patzelt	2011	*Entrepreneurship Theory and Practice*
Sustainable entrepreneurship [is] the discovery and exploitation of economic opportunities through the generation of market disequilibria that initiate the transformation of a sector towards an environmentally and socially more sustainable state.	Hockerts and Wüstenhagen	2010	*Journal of Business Venturing*
Sustainable entrepreneurship expanding the concept of the sustainable entrepreneur from [the] discoverer of an opportunity in extant economic structures to the structural agent who develops institutions to change the "rules of the game" and thereby drives sustainable behaviors.	Pacheco, Dean, and Payne	2010	*Journal of Business Venturing*
The process of discovering, evaluating, and exploiting economic opportunities that are present in market failures which detract from sustainability, including those that are environmentally relevant.	Dean and McMullen	2007	*Journal of Business Venturing*
[SE refers to how] opportunities to bring into existence future goods and services are discovered, created, and exploited, by whom, and with what economic, psychological, social, and environmental consequences.	Cohen and Winn	2007	*Journal of Business Venturing*

The concept of opportunity creation is central to the definition of sustainable entrepreneurship and entrepreneurship in its general sense.	Harms et al.	2009	*International Journal of Entrepreneurial Venturing*
Sustainable entrepreneurship can be described as an innovative, market-oriented, and personality-driven form of creating economic and societal value by means of breaking through environmentally or socially beneficial markets and through the product or institutional innovations exceeding the start-up phase of a company.	Schaltegger and Wagner	2011	*Business Strategy and the Environment*
Sustainable entrepreneurship is entrepreneurship which encompasses the social, economic, and environmental concerns of relevant internal and external stakeholders.	Kuckertz and Wagner	2010	*Journal of Business Venturing*

2.3 Delineating Sustainable Entrepreneurship

To understand the development of the SE literature and research, it would be helpful to present a concise yet critical overview of the literature to date, highlighting the evolution of the interpretation of entrepreneurship and its shift from being pure wealth creation to incorporating social and environmental benefits. It is fair to suggest that early theoretical interpretations of entrepreneurship in the late 20th century largely overlooked the role of entrepreneurs in terms of societal and environmental development (Bygrave & Hofer, 1992), and these researchers may have chosen to ignore the fact that very early entrepreneurs in the 18th century were often philanthropists as well as wealthy industrialists (Berglann et al., 2011). A resurgence of this interpretation can be found in chapters from the early 21st century, such as the work of Gibbs (2006) and Schaltegger and Wagner (2011), who confirmed that there had been a swing in the societal interpretation of entrepreneurs towards embracing social and environmental concerns.

Some forward-thinking scholars, such as Schaltegger and Wagner (2011), posited that the purpose of entrepreneurship should be to align economic, social, and environmental concerns, thus implicitly suggesting a relationship between entrepreneurship and what was then known as corporate social responsibility (CSR) – now more popularly referred to as environmental and social governance (ESG). Other scholars, such as Shepherd and Patzelt (2011), supported this interpretation, also arguing that, to be considered as successful, entrepreneurs should ensure that they balance the tripartite aspects of profit, people, and the planet. These views led to attempts to quantify the impact of entrepreneurship in terms of economic, social, and environmental initiatives, and scholars and practitioners concluded through their actions that entrepreneurship has come to be interpreted as more than purely wealth creation and instead must also incorporate demonstrable social and environmental benefits (Urbaniec, 2018).

In parallel with this line of research enquiry, another branch of research focused on the interrelationship of sustainable development and entrepreneurship. Building on the premise of triple-bottom-line (TBL) accounting (first promoted by Elkington, 1994), a term that has now fallen out of popular use, Cohen and Winn (2007) and later Belz and Binder (2017) began to explore evidence of organizations incorporating environmental, social, and economic performance. A number of both quantitative and qualitative studies established evidence of the intertwining of sustainable development entrepreneurship with a growing sense of the role of entrepreneurs as change agents, driven by an increased societal interest in the importance of sustainability more broadly (Gundry et al., 2011; Partzsch & Ziegler, 2011). There can be confidence in this interpretation on the basis of literature drawn from organizational sustainability research, which also confirmed a societal shift in the interpretation of the term sustainability away from pure long-term financial sustainability towards the inclusion of social and environmental considerations (Brown et al., 2019).

A practical problem arising from these important but divergent areas of study is that the term SE now has a number of possible definitions and interpretations and, in the opinion of Terán-Yépez et al. (2020), is often conflated or used interchangeably with a wide variety of similar phrases. Some of these can be attributed to the rapid pace of development in this area of research, but the

result is the lack of a systematic framework or indeed a clear theoretical explanation. Whilst there is no shortage of contemporaneous empirical evidence confirming the role and contribution of SE in an increasing variety of settings (Haldar, 2019b), there continue to be gaps in the understanding of the systematic replication of SE and its conceptualization. To elucidate this problem, at present, it can be suggested that there are two broad schools of thought in terms of attempts to define SE with clarity. One definition is grounded in the belief that entrepreneurs see sustainable opportunities; it is considered that SE should be understood as "the continuing commitment by businesses to behave ethically and contribute to economic development while improving the quality of life of the workforce, their families, the local and global community as well as future generations" (Crals & Vereeck, 2005, p. 12). Arguably, this interpretation has some philosophical implications in terms of the inferred responsibility of entrepreneurs to consider future impacts whilst holding people, the planet, and profit in balance.

By contrast, those scholars who grounded their research in accounting and economic principles have suggested that SE should be defined as "the examination of how opportunities to bring into existence 'future' goods and services are discovered, created, and exploited" (Cohen & Winn, 2007, p. 35). This view can be considered as far more pragmatic in its interpretation, with clear origins linking the definition to the role of entrepreneurs as value generators and making trade-off decisions regarding the short-term and long-term impacts of resources. Contemporaneous interpretation indicates the necessity of synthesizing both of these perspectives in some way, not only recognizing the reality of trade-off decisions in terms of entrepreneurial activity but also striving to secure future improvements. In the opinion of Larsson et al. (2016), this is more consistent with the UN interpretation of the SDGs and is more likely to have the desired outcomes of aligning responsible entrepreneurial activity with minimal environmental harm and delivering societal benefits.

Doh et al. (2019) argued that these two different schools of thought with regard to the development of SE prompted the proliferation of terms used to describe entrepreneurial activity that moves beyond pure wealth creation or economic benefit. For example, popular terms in the recent literature to describe predominantly environmental but implied sustainable entrepreneurship have included green entrepreneurship, eco-entrepreneurship, environmental entrepreneurship, and

social entrepreneurship. Terán-Yépez et al. (2020) reasonably suggested that green, eco-, and environmental entrepreneurship can all be classified in a similar manner, and they clearly imply entrepreneurial activity that either has an environmental purpose or minimizes adverse environmental impacts. Social entrepreneurship, on the other hand, is more often associated with charitable, not-for-profit community ventures that need not necessarily generate financial benefits (Lumpkin & Bacq, 2019). As such, it can be determined that there is a clear delineation between environmental and social entrepreneurship, which again differ from SE, which proactively attempts to synthesize economic, social, and environmental aspects.

Institutional theory suggests that both formal and informal institutions may influence the adoption of sustainable business practices (North, 1990). In particular, formal institutional factors could indirectly affect the safety and quality of life by promoting socially conscious development. Furthermore, governments may foster specific cultural and social norms that correspond to a bidirectional relationship between formal and informal institutions in the framework of institutional economics (North, 2005). Proper social conditions are necessary for the development of green entrepreneurship (Domańska et al., 2018). It is also worth noting the clear distinction in the literature between CSR activity and SE activity. CSR often has a sense of being a retrospective exercise, such as policies and measures that are put in place after the fact to mitigate or offset organizational activity undertaken with an economic focus to the detriment of society or the environment (Marchildon, 2016). In contrast, SE is proactive and implies that the organization has social, environmental, and economic governance at its core from the outset (Markman et al., 2019). Another way of considering the development of SE is to view it as part of the culture or ethos of an organization, something that might also tacitly be associated with the next generation of entrepreneurs, who recognize the necessity of environmentally and socially responsible business if they are themselves to benefit from entrepreneurial activity in the future, solving, in the words of Markman et al. (2019, p. 373), the “grand problems” of today. As such, the current state of knowledge can be summarized as follows: SE represents a distinct area of research, in which entrepreneurial activity explicitly combines social, environmental, and economic value generation. Moreover, the characteristics of firms displaying SE include a discrete SE mindset or ethos that is proactive and deeply embedded in them from their core (Gu et al., 2020).

For the purpose of the current study, the term green entrepreneurship is defined as follows:

> *Entrepreneurial activities that apply a pragmatic lens of sustainability and environmental awareness to the creation, operation, and expansion of value-added contributions to a targeted economic system.*

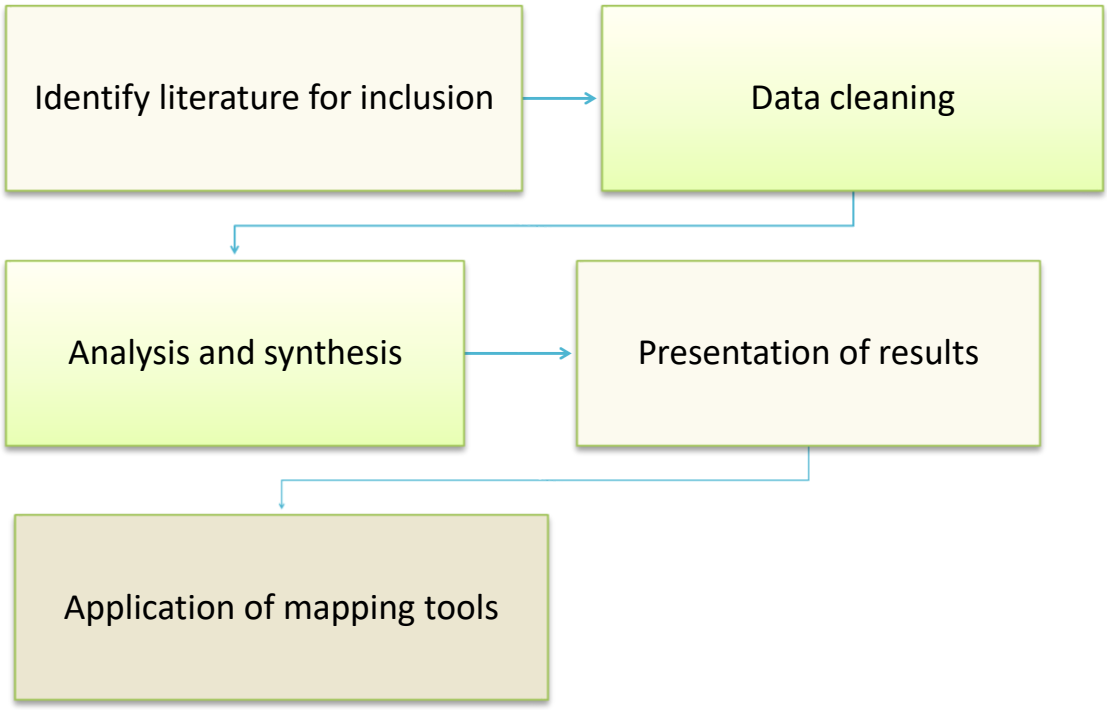
In the context of business development and investment strategies, the term sustainable development is defined as follows:

> *Selective and strategic value-added initiatives that employ environmentally responsible, sustainable, and green practices to the development of enterprises with minimal negative externalities and maximal value-added contributions.*

2.4 Methodology

This chapter is positioned as a systematic bibliometric review of the literature relating to SE from 2002 to 2020. The systematic literature review is recognized as a valuable and important research methodology and is used in a number of settings to trace the path of research development and discussion (Kitchenham et al., 2009; Sengers et al., 2019). In accordance with the established methodological literature (Castillo-Vergara et al., 2018), the process of conducting a bibliometric literature review comprises five distinct stages: (1) research definition; (2) selection and justification of the use of appropriate databases; (3) refinement of the research criteria to provide a clear focus; (4) data collection and codification; and (5) critical examination of the data collected. These steps are displayed visually in Figure 2.1, demonstrating the interlacing of these five established stages of bibliometric research.

Figure 2.1: Stages of research design and data collection



Previous studies, such as that by Capobianco-Uriarte et al. (2019), have confirmed that it is preferable to use highly regarded databases to capture as much information as possible for inclusion in a study such as this. As such, the main database used for analysis in this research was Scopus, as it contains the largest number of peer-reviewed articles and includes a greater number of indexed journals than other similar databases, such as Web of Science (WoS). The search for data employed a simple Boolean approach to title keywords. This followed previous peer-reviewed research and is an accepted methodological approach for bibliometric reviews (Linnenluecke et al., 2020). Terán-Yépez et al.'s (2020) principle of excluding related search terms was adopted to maintain the focus. The search for data was undertaken in February 2021 and had temporal limits of January 2002, when the Scopus database was established, and December 2020.

This yielded 3289 articles in total, with the final cut-off date for inclusion being publication at the end of December 2020. Following the work of Terán-Yépez et al. (2020), the open-source software VOSviewer (Van Eck & Waltman, 2014) was utilized to support a visual presentation of the data and particularly to demonstrate the development of the interlaced research trends that contributed to the density of research. SciMAT was not used, this decision being guided by pragmatism, the

lack of the resources required to learn and utilize two pieces of software, and the fact that VOSviewer has an enhanced data visualization capacity. Furthermore, whilst the SciMAT software produces powerful visual images, the purpose of this research study was to focus on developments in the literature, particularly between 2002 and 2020, to establish which developments have taken place.

2.5 Results and Discussion

A systematic bibliometric review of the literature yields quantitative outputs that can be interpreted numerically to obtain a deeper understanding of the trends in the literature and their development. Good practice begins with a simple presentation of descriptive results, that is, the number of articles, journals, and authors. From this, deeper analysis is possible, during which the content of the literature is scrutinized and the density of publications and the trends in the literature, as well as the velocity of the development, are established. Accordingly, this section of the chapter first focuses on a descriptive analysis of the data collected from the database review and then offers a content analysis, revealing the trends in the literature and the density of keywords. The keywords utilized to obtain all the results for the literature review were sustainable entrepreneurship, green entrepreneurship, sustainability, entrepreneurship, entrepreneur, and sustainable development.

2.5.1 Descriptive Analysis

2.5.1.1 Research Publications

Table 2.2 presents a summary of the data regarding the percentages of total published articles and citations in the period 2002–2020. Figure 2.2 illustrates that, from 2012 onwards, there was a sharp increase in publications on the subject of SE and that this trend accelerated rapidly, revealing the extent of the interest in the subject and what might be assumed to be its growing importance. Both Table 2.2 and Figure 2.2 confirm that, while the first 10 years of notable publications in relation to SE accounted for less than 20% of the total research in this field, more than 45% of the research from 2012 onwards was published in the period 2018–2020. What can also be seen in Figure 2.2,

consistent with the findings of Terán-Yépez et al. (2020), is that there has been a parallel rise in both the number of articles and the number of citations, which is also in line with previous studies (e.g., Sarango-Lalangui et al., 2018; Thompson et al., 2011), demonstrating reliability in the methodological process of this research.

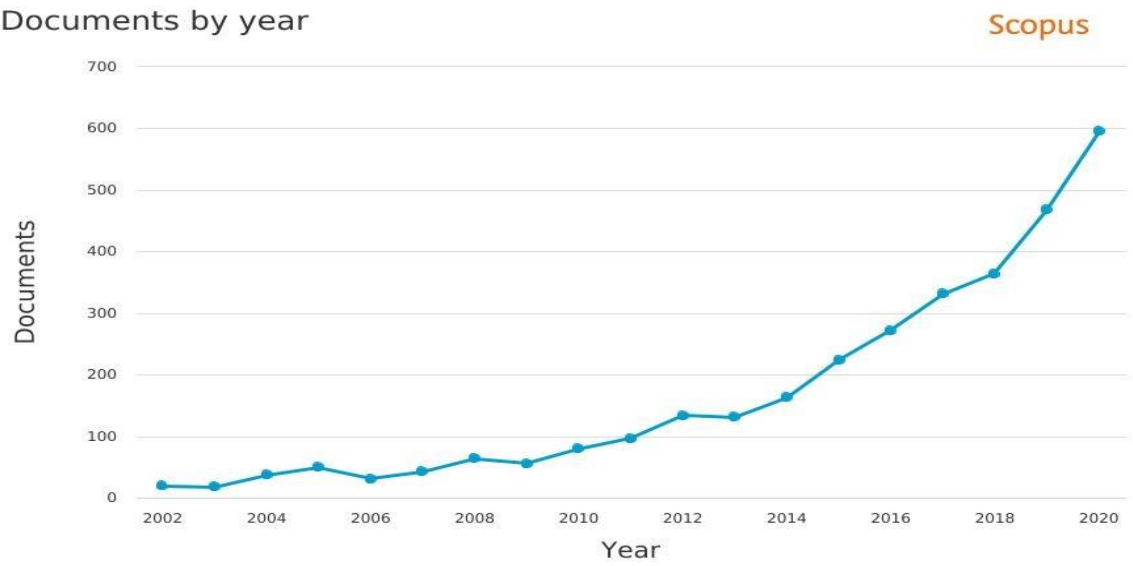
Table 2.2: Summary of publications in 2002–2020

Year	% of total citations	% of total publications
2020	41.89%	18.79%
2019	38.01%	14.78%
2018	35.21%	11.56%
2017	33.98%	10.42%
2016	30.46%	8.49%
2015	31.60%	7.10%
2014	30.98%	5.15%
2013	28.83%	4.14%
2012	29.76%	4.17%
2011	27.64%	3.03%
2010	25.58%	2.49%
2009	22.37%	1.74%
2008	19.29%	1.99%
2007	19.23%	1.33%
2006	17.98%	0.98%
2005	17.25%	1.55%
2004	18.20%	1.17%
2003	16.79%	0.54%
2002	16.11%	0.60%

Also consistent with previous studies (Belz & Binder, 2017; Sarango-Lalangui et al., 2018), this bibliometric analysis found that there have been year-on-year increases in terms of the productivity

of publications on the subject of SE, especially in the period 2018–2020. It can be concluded from these findings that there has been an increase in collaboration between prominent scholars in the field, an increase in international collaboration, and a measure of cross-disciplinary research as SE overlaps with other fields, which was particularly evident in 2020. For example, a detailed analysis of 2020 revealed that, in the last 3 months of 2020 alone, 116 articles on SE were published, accounting for 19.5% of the publications in that year. Whilst this undoubtedly reflects the increased interest in the subject, it might also give some scholars the opportunity to focus deeply on this area of research.

Figure 2.2: Trends in article publications and citations in 2002–2020

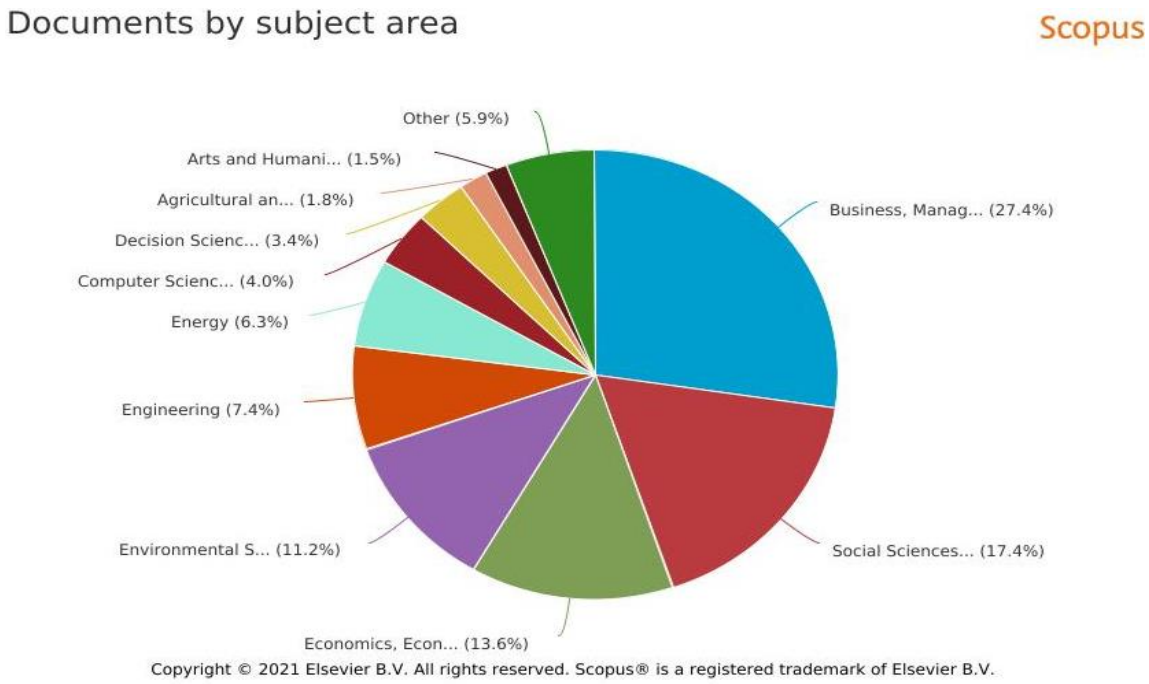


2.5.1.2 Research Distribution

The analysis also revealed the broadening distribution of research, which is consistent with the findings of an increasing number of international and cross-disciplinary publications. As illustrated in Figure 2.3, in 2018, SE was most likely to be published in the area of business, management, and accounting (27.4%), closely followed by social science (17.4%), which, when coupled with research on econometrics/finance (13.6%), accounts for nearly 50% of all the publications relating to SE. By 2020, this distribution had shifted even further in favour of the first three categories, with 58.4%, supporting the interpretation that SE specifically encompasses economic, social, and

environmental concerns. It was noted that the number of publications on the theme of energy had somewhat decreased but that those on econometrics/finance had increased. It was also noted that, consistent with the previous literature, the accounting-based TBL interpretation of SE encouraged research to continue to focus predominantly on business, management, and accounting. This could be considered to be consistent with the theoretical underpinnings of the literature (Section 3).

Figure 2.3: Comparison of publication distribution by subject categorization in December 2020



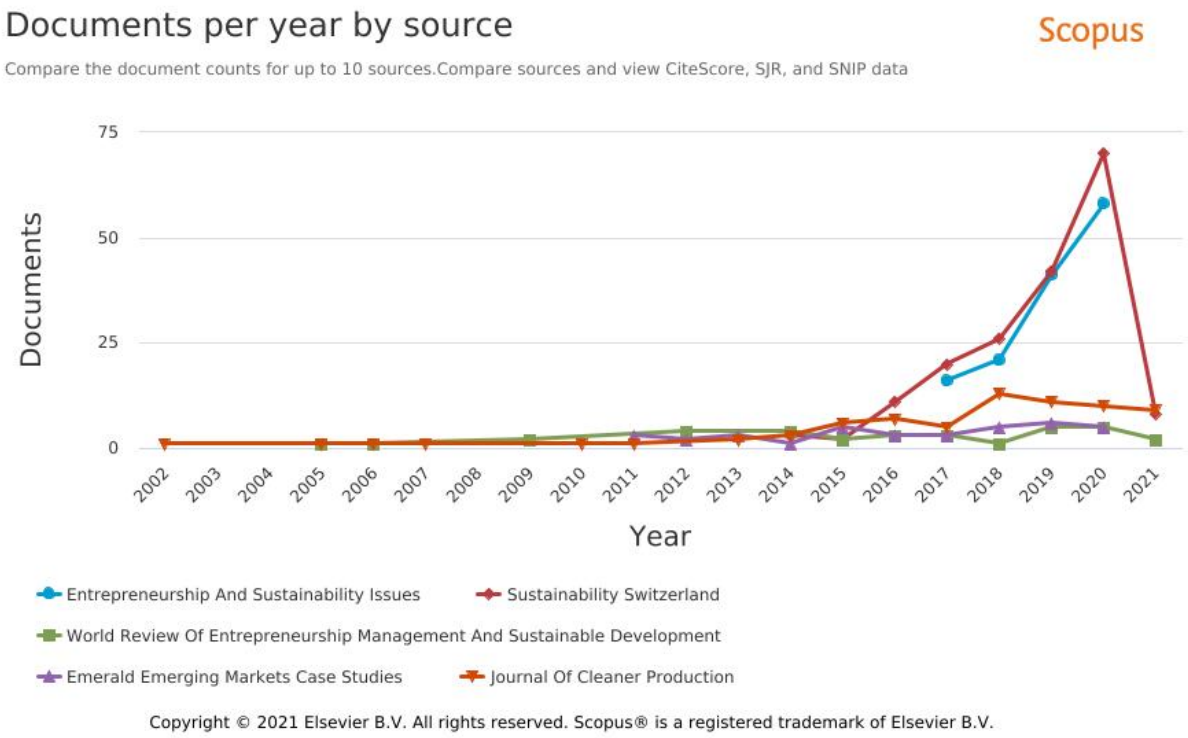
Also consistent with previous studies (Belz & Binder, 2017; Sarango-Lalangui et al., 2018) is that, whilst a greater breadth of research disciplines has begun to incorporate or encompass research on SE, they still account for little more than 11% of the research in this area. Terán-Yépez et al. (2020) found that SE research has now been published in more than 100 journals and that the distribution of publications in the 10 most significant journals in this field has changed very little in terms of proportional distribution. This is illustrated in Table 2.2 and in more detail in Figure 2.4, comparing and contrasting the publications of the top five journals for SE publications in 2018, 2019, and 2020. Unsurprisingly, *Sustainability* has attracted the greatest number of publications,

which is reasonable given the positioning of the journal with its focus on sustainable business activity.

Table 2.3: Comparison of publications in the five most productive journals in 2020

JOURNAL	2020
Sustainability	182
Sustainable Development	136
Journal of Cleaner Production	72
Emerald Emerging Markets	36
Journal of Business Venturing	20

Figure 2.4: Publications by year by journal in 2002–2020



The findings presented in Table 2.3 are more closely aligned with those of Terán-Yépez et al. (2020) than with those of previous scholars, who ranked journals such as the *Journal of Cleaner Production* as being more prolific in terms of publications. There are several possible explanations for this, including the use of different databases, the use of differing methodologies to classify the bibliometric analysis, and different interpretations and developments of keyword searches. Further support for this interpretation can be found in evidence that demonstrates that, if the number of citations is counted, the *Journal of Business Venturing* can be considered to be the most prolific in terms of attracting multidisciplinary research interest. It could also be suggested that the increase in citations in a broader range of journals is consistent with the interpretation that there is more research and indeed greater societal interest in SE, increasing the willingness of a great number of journals to publish chapters on this formally niche subject.

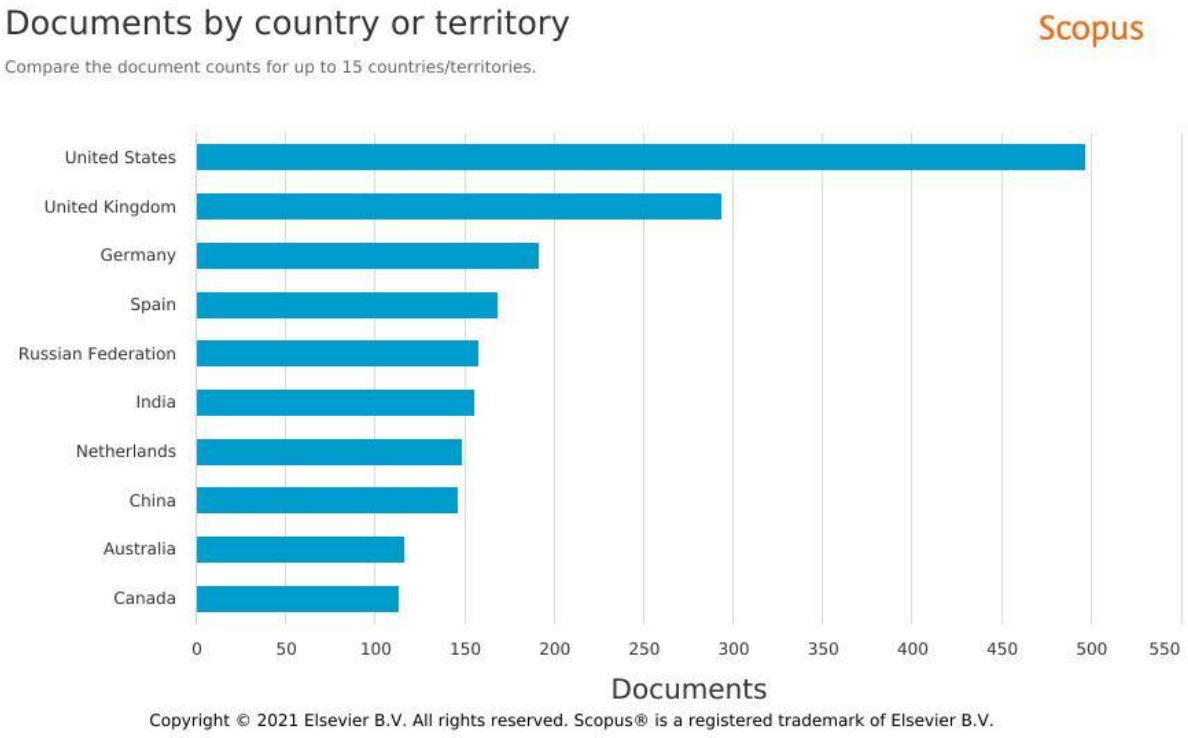
It is worth briefly noting that there is also increasing evidence of research on SE being published in higher-ranked journals, which would also be consistent with the greater research interest in the recognition of the subject. In the very early days of publications on the subject of SE, it was markedly more likely that lower-ranked journals would be willing to publish on the subject (Thompson et al., 2011), but, in the last 3 years, there has been an increase in the number of publications in journals such as the *Sustainable Development Journal*. In addition, higher-ranked journals are more likely to be associated with North American/European locations, indicating a strong interest in this research in these developed economies. However, it is important not to overlook the research contribution in developing and emerging economies. Aparicio et al. (2020b) commented on the fact that the pace of development of research in developing economies has in many respects been faster, evidenced by the increasing number of publications by authors from developing economies compared with those in North American/European journals. Moreover, cross-referencing with business research confirmed that the evidence of entrepreneurial sustainability is more readily witnessed in developing economies due to resource constraints.

2.5.1.3 Research Characteristics

Considering another dimension of the demographics of research publications on the subject of SE (Figure 2.5), it can be seen that, whilst the analysis showed that authors from more than 60 different

countries have published on the subject of SE, by far the greatest proportion of chapters has originated from English-speaking countries – predominantly the UK and the US – as well as nations with high levels of English proficiency, such as those in Northern Europe. There are a number of possible pragmatic explanations for this skew, including the fact that a greater proportion of publications on SE is in journals located in English-speaking countries, and this is likely to create/stimulate interest in the topic on the basis of readership. Likewise, wealthy developed economies attribute a large proportion of research income to subjects such as SE. Potentially, cultural aspects could be a consideration, as evidenced by the data suggesting that nations known to score highly on the Environmental Sustainability Index (2020) are more likely to have produced chapters on the subject of SE. From this, it might reasonably be inferred that the cultural tendency to believe in the importance of sustainability is in turn stimulating research into SE on an interwoven basis.

Figure 2.5: Demographics of geographic publication distribution

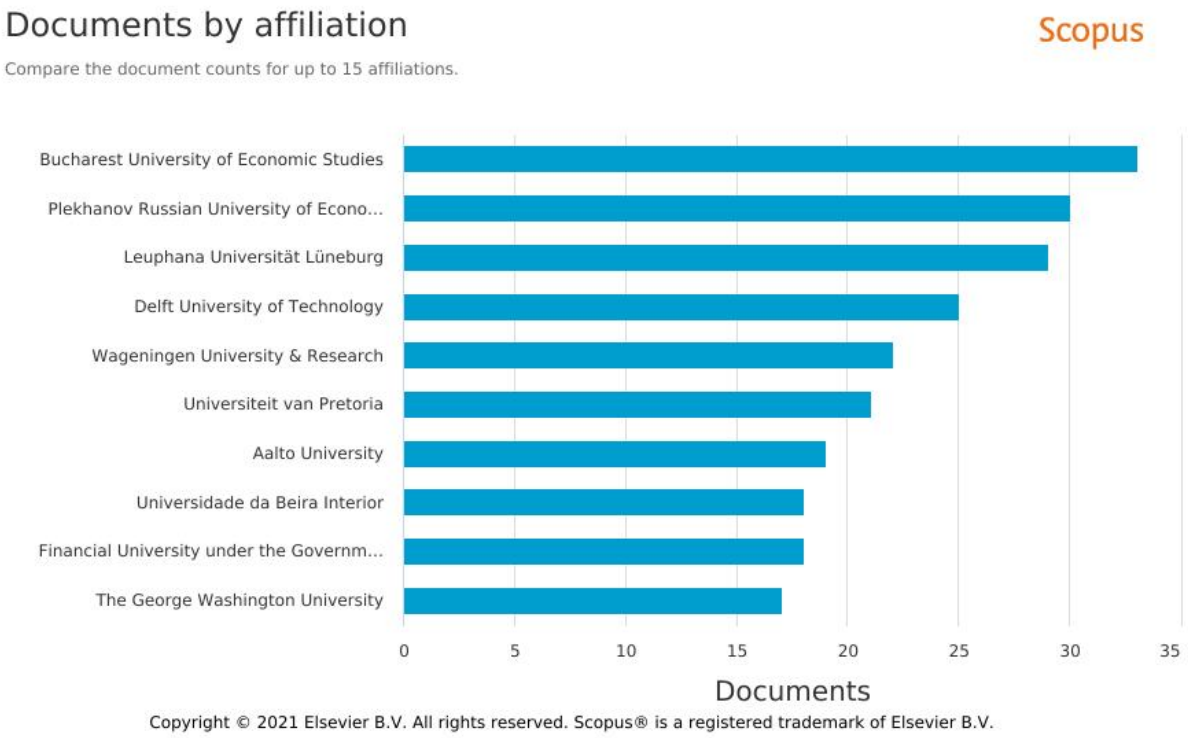


Reflecting on the same data from another perspective, comparing the proliferation of publications by geographic region relative to the timescale, it was observed that only more recently has a rapid

acceleration in research output on SE occurred, with some of the currently most prolific nations originally being slow to publish on this subject. For example, it was not until 2016 that contributions from the Netherlands, North America, and the UK began to accelerate. Southeast Asia also witnessed a sharp increase in publications on the subject of SE in the same period, which is most likely indicative of international collaboration on this rapidly developing topic. It is acknowledged that this bibliometric analysis did not take account of the fact that scholars, understandably, move from one institution to another and are more likely to do so on an international basis. The practical implications of such career moves coupled with the often-lengthy time frames for research and publication mean that a proportion of these geographic allocations might unintentionally have been misattributed. Such career moves, particularly for early-career researchers, might also explain the level of cross-cultural collaboration that is likely to have increased in recent years thanks to improvements in technological communications making data collection and analysis on the subject of SE much easier.

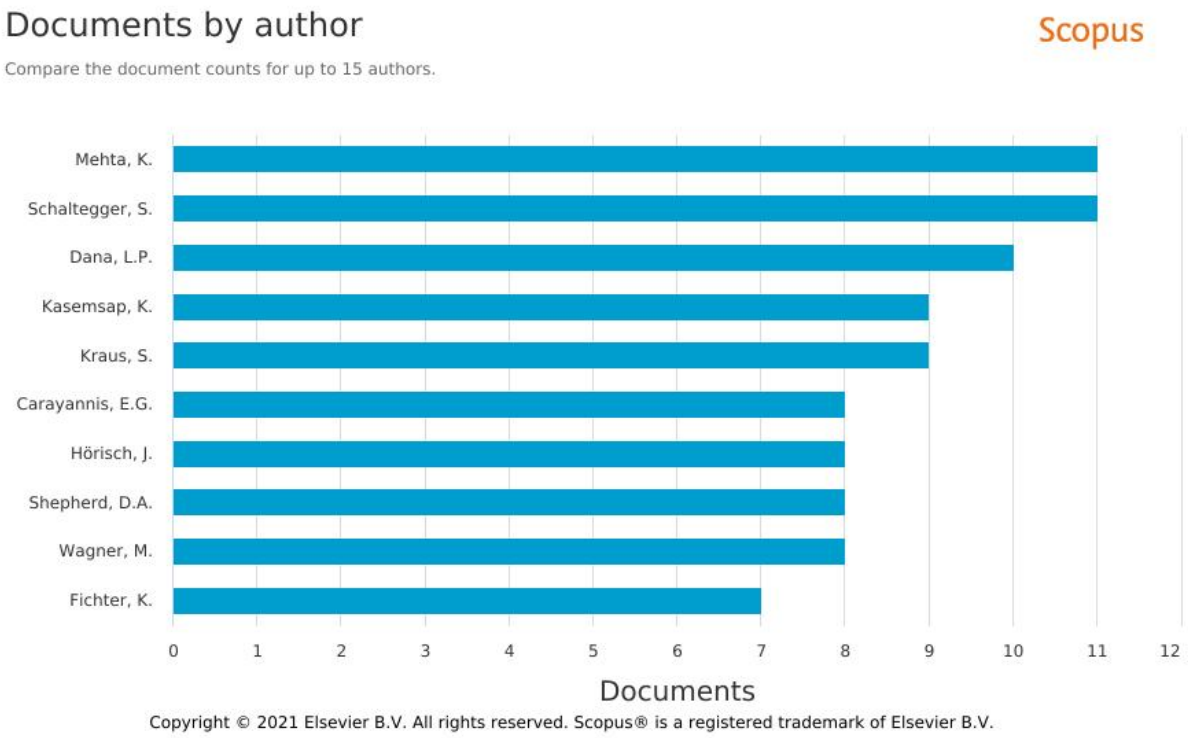
Figure 2.6 shows publications by university/institution, confirming that Europe is predominately driving research publications on SE and that all of the institutions included in the top 10 are highly regarded in a variety of industry rankings. This confirms the likely high quality of the research and indicates that, if high-ranking/well-regarded institutions are interested in publishing on the subject, it is worthy of interest. Again, research from these prominent institutions is probably driving the level of research interest as academics from other universities around the world seek to emulate and follow this trend. Understandably, larger, more prominent institutions with greater resources are likely to find it easier to forge novel research paths, again indicating a degree of pragmatism in the SE research trends, which is entirely understandable.

Figure 2.6: Publications on SE by university/institution



A visual analysis of the key authors in the field of SE (Figure 2.7) indicated that a number of prominent scholars have published consistently on the subject and in highly ranked journals and have received a high number of citations of their work. As Figure 2.7 illustrates, scholars such as Kiran Mehta have the greatest number of publications and by far the greatest number of citations. Other prominent scholars, such as Stefan Schaltegger, have increased their research output and independently attracted significant numbers of citations but even more so in collaboration with other scholars, particularly when overlapping research on SE with business, management, and accountancy research. The analysis of publications by scholar supports the previous analysis regarding publications by geographic region and institution as the top 10 most prominent scholars in the field of SE are all from either Europe or North America.

Figure 2.7: Analysis of key authors in the field of SE, 2018–2020



Consistent with the findings of Terán-Yépez et al. (2020), the analysis of the 10 most highly cited articles in the field of SE corresponds, as would be expected, to the publications by the most prominent scholars. The five most frequently cited articles (Table 2.3) have more than 5900 citations between them, with more than 68.6% of the citations being attributable to three chapters and their corresponding authors. It is also worth noting that, in keeping with the output of publications in the last quarter of 2020, there has been a corresponding increase in the number of citations of the same chapters from 5680 to 5901. These findings support the previous research in this area and indeed are consistent with the research trends in other fields, in which typically a small number of well-regarded scholars are instrumental in driving interest in a new research field. Pragmatically, this would be, in some ways, anticipated on the basis that emerging scholars/early-career researchers typically struggle to secure publications in prominent journals until they are able to demonstrate a track record of publication success. What this means in practice is that, for novel research areas, such as SE in its early days, in common terms, publications by "superstar" academics are needed to attract the necessary research interest of prominent journals and spark wider interest in readership. This being said, in the period 2018–2020, new scholars entered the

field, indicating growing depth and breadth in the number of scholars interested in the subject of SE.

Table 2.4: Five most highly cited articles on SE

Author(S)	Title	Journal	No. of citations
Dean and McMullen (2007)	Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action	*Journal of Business Venturing*	1393
Cohen and Winn (2007)	Market imperfections, opportunity, and sustainable entrepreneurship	*Journal of Business Venturing*	1392
Schaltegger and Wagner (2011)	Sustainable entrepreneurship and sustainability innovation: Categories and interactions	*Business Strategy and the Environment*	1326
Hockerts and Wüstenhagen (2010)	Greening Goliaths versus emerging Davids – Theorizing about the role of incumbents and new entrants in	*Journal of Business Venturing*	1052

	sustainable entrepreneurship		
Shepherd and Patzelt (2011)	The new field of sustainable entrepreneurship: Studying entrepreneurial action linking "what is to be sustained" with "what is to be developed"	*Entrepreneurship Theory and Practice*	828

Other practical considerations worth noting are that the most highly cited articles contain one or both of the two following common characteristics. First, they contain possible definition(s) of SE, which again, pragmatically, is likely to encourage citations by subsequent scholars seeking to frame their research. Second, they are published in highly ranked journals with a broad cross-disciplinary readership, which again would be consistent with the interpretation of prominent scholar publishing, a value attributable to a high journal ranking, which attracts wider circulation and research interest. This is not to disparage the quality of these chapters but to offer an insight into the way in which research distribution evolves and establishes itself and to highlight the necessity of having an awareness of pragmatic considerations when interpreting an analysis of this nature.

2.5.2 Content Analysis

2.5.2.1 Research Trends

To conduct meaningful content analysis of trends in the research in the field of SE, consistent with a number of previous studies (e.g., Cobo et al., 2015; Murgado-Armenteros et al., 2015; Terán-Yépez et al., 2020), it is necessary to divide the period 2002–2020 into a number of distinct temporal phases: (1) 2002–2012, accounting for the period from the beginning of research

publication on SE to when SE began to present a significant demonstrable uptick in publications (Figure 2.2); (2) 2013–2018, accounting for the period presenting the greatest increase in SE, the conclusion of which corresponds to the work of Terán-Yépez et al. (2020), which this study seeks to extend; and (3) 2018–2020, which represents the novel contribution of this study to the bibliometric analysis and which, as the analysis in Section 5.1 showed, presented a number of notable accelerations and extensions of the existing work in this field. Historically speaking, it can be acknowledged that these three different sub-periods have different lengths, again consistent with previous studies, recognizing the necessity of a sufficient volume of data for meaningful analysis. As Table 2.2 illustrates, by far the greatest proportion of research on the subject of SE was published in the last 5 years, with the last 3 years showing a particularly sharp increase in publications. The respective count of chapters in these 3 years is 366 (2018), 468 (2019), and 595 (2020).

VOSviewer was used to evaluate the research trends, comparing the centrality and density of emerging research themes in the first and second research periods. It demonstrated the shift in research trends in the period, consistent with the broadening range of research publications and the attraction of new scholars to the field. Unsurprisingly, publications on the theme of sustainability remained the most prominent, and one of the main reasons for this consists of the close keyword associations and publications in journals of the same name. Likewise, consistent with the research trends of the period, particularly from 2010 onwards, increasing interest in environmental concerns encouraged greater relationships between sustainability and the environmental impact, and this was contextually in accordance with the wider discussions around the UN's SDGs. This is reflected in the density of studies on the subject of sustainable development. Whilst the goals were formally published in 2015 (Schaltegger et al., 2018), they were preceded by considerable discussion and research interest, with cross-party involvement, and this understandably appears to be reflected in the concentration of research on the subject.

It can be observed that terms such as CSR do not appear to be particularly closely associated with SE, and this is also consistent with the theoretical development, as discussed in Section 3. Unsurprisingly, entrepreneurship/new ventures attract interest, but this is also directly associated with the keyword/terminology of SE and a clear theoretical association between new ventures with

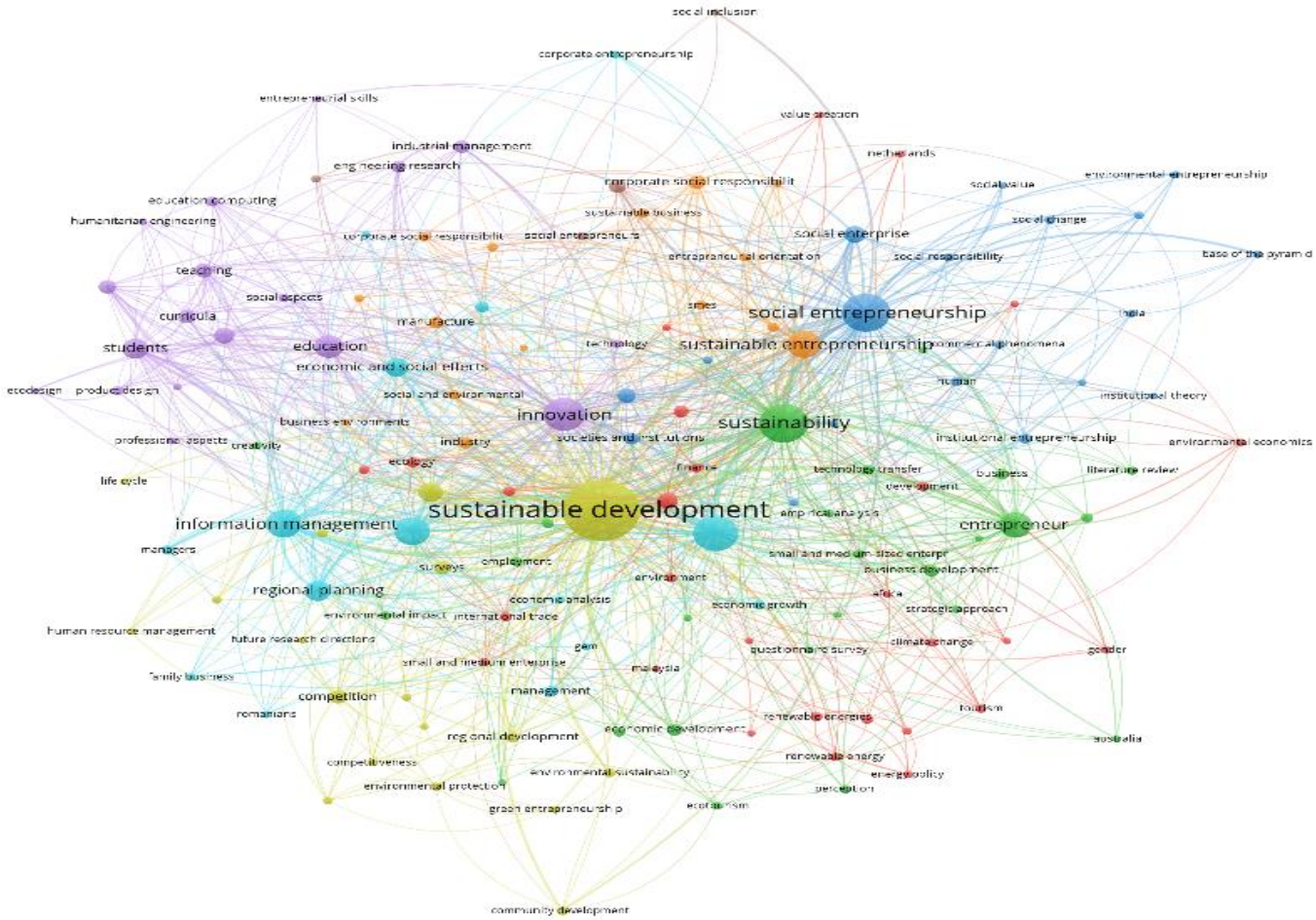
a central ethos of sustainability rather than the retrospective "fitting" of CSR. These findings are consistent with the theoretical underpinnings of SE (Breuer et al., 2018), demonstrating the interrelationship of SE with its accounting/TBL origins, which are predominately pragmatic in nature and recognize the necessity of the role of profit-generating ventures in supporting society. Contextually, the centrality and density of research themes support this interpretation as, particularly since 2015, there has been much greater interest in the interrelationships of business activity with social and environmental trends.

Likewise, there has been increased interest in the topic of sustainable development, which is entirely reasonable given the widespread adoption of the SDGs, especially in emerging and developing economies, perhaps more so than in certain developed economies, which may also explain the increasing number of research publications from Southeast Asia in collaboration with European and North American scholars. Hockerts and Wüstenhagen (2010) posited that the only true way to reach a state of sustainable entrepreneurial practices is through new venture creation because the fundamental necessity of SE is the core of any venture. Therefore, contextually, the increased interest in sustainability and sustainable development, coupled with increasing societal interest in socially and environmentally responsible business, signals a parallel development between SE as a research theme and SE as a practical reality. This parallel development trend is analogous to similar trends in the late 20th century regarding certain business practices, such as lean business activity and outsourcing (Jasti & Kodali, 2015), which gained substantial popularity and were embedded within the contemporaneous thinking on "best practices". Therefore, it would not be unreasonable to speculate that SE will quite possibly become as important as one of the leading practical business trends and a theoretical field of research.

Turning to the third research period (Figure 2.8), three further nascent/emergent themes are presented in the data, which are consistent with the previous interpretations of the increasing cross-disciplinary nature of the research and the broadening interest therein. This finding is also consistent with previous studies conducted at prior points in time (e.g., Castillo-Vergara et al., 2018), and other literature reviews/bibliometric analyses have identified increasing collaboration between scholars, consistent with parallel developments between research and practice. What has become apparent in the most recent research period is that there is an increasing focus on

entrepreneurship and on the role and responsibility of individual entrepreneurs in driving a sustainable approach. This development in terms of research trends is consistent with the interpretations of the core ethos or centrality of SE found in truly sustainable organizations since their outset. Another interpretation of this finding, in line with the study by Partzsch and Ziegler (2011), is that individuals who can be considered as truly sustainable entrepreneurs are "change agents" within business and society, which was the position of Wakkee et al. (2019), although this is an interpretation that is yet to be empirically proven.

Figure 2.8: Research density and centrality – third research period, January 2018–December 2020



This being said, examining the interrelationships of SE and sustainable development within the geographical context of developing economies signals strengthening research trends that are consistent with the practical interpretation of SE, which, as argued by Ploum et al. (2018), is more likely to be found in developing and emerging economies, not only because, in developing and emerging economies, there is more likely to be a greater propensity to engage in entrepreneurship, consistent with wider economic development, but also because these nations have learnt from the mistakes of developed nations in terms of the critical importance of respecting both society and the environment when creating business ventures. Whilst data from the third research period extend Terán-Yépez et al.'s (2020) study and confirm that some developments have occurred in terms of the volume of publications on SE from these emergent locations, it can be suggested that further research is likely to be highly insightful as it has been recognized in the entrepreneurship literature that there is often a strong inclination towards innovation and creativity in these economies due to the scarcity of resources. The practical effect is that the pace of innovation is often much faster in developing economies and reaches a wider number of people more cost-effectively, and research into this subject within the context of SE would be of theoretical and practical interest and benefit.

With regard to the nascent/emergent themes associated with SE, the data show that there are a number of possible gaps that would merit further research contributions, for example the interrelationships between SE and opportunity recognition and explication. Ultimately, successful entrepreneurship relies on entrepreneurs being able both to identify an opportunity and to exploit it. Whilst exploitation has particularly negative connotations in Western society, taking advantage of an opportunity is the very definition of entrepreneurship (Strachan, 2018). What has not yet been clearly understood in the literature is how individual entrepreneurs identify opportunities for true SE. Possible explanations might be that more educated and socially and environmentally aware individuals with entrepreneurial tendencies launch a venture with sustainability at its core. Alternatively, it may be the case that experienced and predominately economically biased entrepreneurs identify this growing social trend regarding the importance of sustainability and thus use their entrepreneurial experience to launch new ventures with sustainability as a focus. These are two subtly differentiated explanations for the relationship between SE and opportunity identification and exploitation, which warrant closer inspection. The reason for this observation is

also linked to the pace and distribution of articles on the subject of SE, which signal close parallels between research and practical application but also gaps in the understanding.

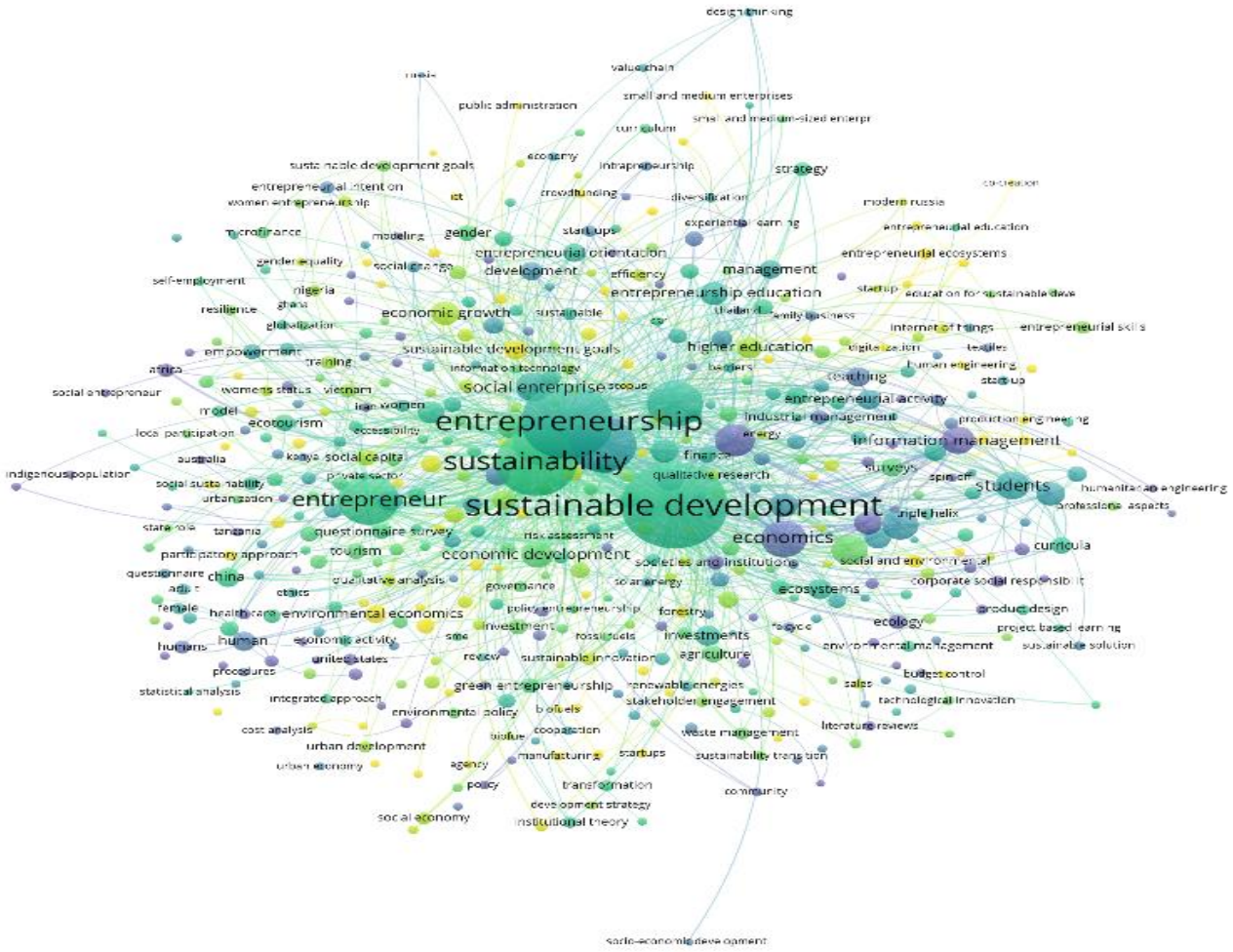
Comparing the centrality and density of the three time periods, it can be seen that there are certain constants, which, it is suggested, create the conditions for SE both to attract research interest and to manifest itself in practice. These conditions are as follows: (1) individual entrepreneurs, who may be singular individuals or a partnership group with a shared vision or interest; (2) conditions appropriate for creating an opportunity, such as a social government stimulus; (3) a context contingent on factors such as the geographic location and the resources available; and (4) opportunity identification and exploitation. The trends in the research on SE suggest that these four conditions are necessary for SE to take place, based on the analysis of the empirical studies on the subject, and this is consistent with broader research noting the necessity of suitable conditions for launching new ventures (Strachan, 2018) and the societal support for sustainability (Bansal et al., 2019). To express this situation from an alternative perspective, as many failed entrepreneurs can advise, luck and timing are also important components of successful entrepreneurship, meaning that the conditions and individual circumstances are also likely to be factors that would benefit from close research attention.

Other peripherally related themes on the subject of sustainability include topics such as sustainable management and sustainable business. Whilst not strictly speaking entrepreneurship, these subject areas are a logical extension of sustainability in practice and overlap with aspects such as sustainable development and CSR/ESG. Ultimately, any entrepreneurial venture will eventually become a mature business, so it would be insightful to engage in the longitudinal tracking of the success of nascent SE ventures to establish their growth trajectory in terms of economic, social, and environmental value. It could be argued that this currently represents a gap in the research, one that could not feasibly have been sensibly researched much earlier than circa 2015 on the basis of a lack of actual entrepreneurial ventures with sustainability at their core.

Figure 2.9 presents a word cloud illustrating the main keywords that emerged from the analysis of the key research trends. Consistent with Ertz and Leblanc-Proulx (2018), it is unsurprising that there is an overlap in the terms used – sustainable entrepreneurship, sustainability,

entrepreneurship, entrepreneur, and sustainable development – with weaker links to terms such as social entrepreneurship, environmental entrepreneurship, and green entrepreneurship. The clustering of these key search terms is consistent with the existing literature and forms a link between SE as a distinct research discipline and other dimensions of entrepreneurship, such as innovation and creativity, knowledge management, and sustainable development. Evaluating this analysis holistically, it can be suggested that there is a high degree of internal consistency with regard to the trends and developments in this field. Particularly over the last 3 years, SE has attracted considerable and arguably justifiable research and practitioner interest. It can tentatively be suggested that research in this field could in fact be a major catalyst in the development of new business trends that could yield great benefits for society and the environment.

Figure 2.9: Density of keyword search terms



2.6 Conclusions and Future Research

The purpose of this research chapter was to provide a systematic bibliometric analysis of research trends on the topic of SE. The chapter presented a brief overview of the literature in the field to date and highlighted the divergence in theoretical explanations of SE and the implications of this divergence for the origins of trends in SE research. The methodological approach of a systematic literature review was explained with reference to appropriate frameworks and tools, and the main portion of this research chapter focused on presenting the results and analysing this systematic review, interpreting the descriptive data through the volume of publications, geographic region, university, and prominent scholars and examining trends in the keyword development reflected in the centrality and density of the themes in the research.

Overall, it can be suggested that the findings of this chapter are highly consistent internally and with the extant research in the field, revealing an accelerating trend and interest in SE and the beginnings of more detailed empirical and practical applications of SE, particularly in developing and emerging economies. The findings suggest that there is greatly increasing research and practitioner interest in the subject of SE, which is developing in tandem with practical activity in global business. The possible explanations for this are both research led and pragmatic, creating a symbiotic relationship whereby research and practice develop in parallel. This is not always common, and, on previous occasions when this has occurred, best practice trends in major businesses have emerged, such as outsourcing and lean business activity. Given the positive impact of SE on business, the environment, and society, it is hoped that the same trend will replicate itself.

This bibliometric analysis also revealed potential opportunities for further research, some of which have already been mooted by both Ertz and Leblanc-Proulx (2018) and Terán-Yépez et al. (2020), but some of which are new and can extend this work. These future research suggestions include investigating how entrepreneurs can identify opportunities for SE and whether these same entrepreneurs have different motivations for their venture creation. In addition, there is practical evidence of SE in developing and emerging economies, which have already been shown in other

fields of research to be developing very rapidly in terms of entrepreneurial activity and new venture creation. New areas of research could also include the interrelationship between SE and organizational agility, the latter of which, in the wake of the global pandemic, is likely to be critical in terms of the future prospects of businesses and the economy. It can also be suggested that there is a need for longitudinal and/or life cycle research on SE ventures to understand whether they follow different trajectories and make diverse contributions to society and the economy compared with more traditional interpretations of entrepreneurship.

Chapter 3:

Governmental Supportive Policies for Green Entrepreneurial Activity in Saudi Arabia: An Institutional Analysis

3. Governmental Supportive Policies for Green Entrepreneurial Activity in Saudi Arabia: An Institutional Analysis

3.1 Introduction

Recently, the scholarly interest in the role of institutions in entrepreneurship has increased (Aparicio et al., 2021c). The existing literature has considered entrepreneurship as a key mechanism for long-term development (Bjørnskov & Foss, 2016; Bosma et al., 2018; Urbano et al., 2019a). However, a consensus is lacking on whether different approaches to entrepreneurial activities have economic as well as ecological benefits (Pacheco et al., 2010). Sustainable or green entrepreneurship has emerged as a possible solution to humanitarian, economic, and environmental issues while exploring, evaluating, and exploiting new opportunities (Dean & McMullen, 2007; Meek et al., 2010). This activity involves a complex set of principles and practices, oriented towards the development of entrepreneurial patterns that lead to healthy ecological conditions for current and future generations (World Commission on Environment and Development (WCED), 1987). As such, sustainability is universally adopted as a label for a development paradigm, closely adhering to opportunities for future generations, particularly in terms of environmental care alongside social and economic development (Pacheco et al., 2010; WCED, 1987). From this viewpoint, a focus on entrepreneurship can be used to evaluate common processes further through a green approach.

As an extension of this complex tension between adoption and avoidance in green entrepreneurship, institutional theory proposes that both formal and informal institutions play a role in affecting the adoption of sustainable business practices, particularly in relation to trade-offs and cross-industrial norms (North, 2005). At the organizational level, Iarossi et al. (2013) observed that industrial pressures ranging from shareholder priorities to stakeholder vulnerabilities and supply chain hurdles have a direct impact on sustainability preferences and priorities. Whilst companies are increasingly aware of the tangible advantages of CSR activities and sustainable

business practices, institutional theory suggests that driving forces and motivational agents play a critical role in shaping the priorities and practices of institutions (Iarossi et al., 2013). Green entrepreneurship therefore has the potential not only to facilitate change via cross-industry pressures (e.g., supply chain agreements) but to orient greener, more sustainable practices selectively across institutions throughout a singular industry (Demirel, 2019). When supported by and activated through governmental subsidies and network commitments, the progressive spillover effects surrounding sustainable practices precipitate a shift in institutional priorities that has the potential to embed changes throughout the normative domain (Demirel, 2019).

Dean and McMullen (2007) explained that an ecological initiative is derived from entrepreneurs who explicitly or implicitly seek solutions to market failures. They observed that certain entrepreneurial activities create novel goods and services that may solve an economic problem but leave various social and environmental issues standing. Meek et al. (2010) and Pacheco et al. (2010) suggested that governmental and social interventions, through policies and social norms, should encourage entrepreneurial activities with both commercial and sustainable purposes. Their evidence suggested a continued need to explore the importance of governmental initiatives to regulate and stimulate green entrepreneurship, guaranteeing gains beyond economic terms. This is a current goal in Saudi Arabia. However, since entrepreneurship in Saudi Arabia is risk averse and Saudi Arabia is an emerging market, similarities in the challenges and opportunities faced by other developing countries, such as Mexico, Indonesia, Nigeria, or South Africa, are anticipated (Nader & Faghih, 2015). These challenges and opportunities may involve the state's capacity to create a significant number of entrepreneurs, enhancing development by solving unemployment and technological and ecological issues.

Thus, in this chapter, we explore the influence of governmental supportive policies (i.e., environmental, innovation, and entrepreneurship) on green entrepreneurial activity in Saudi Arabia. We draw on institutional economics (North, 1990, 2005) to understand how these policies may affect the formation and existence of this type of entrepreneurship. Specifically, we utilize panel data from 21 Saudi Arabian cities during the period 2014–2018. The information was obtained from the annual reports of the General Authority for Meteorology and Environmental Protection as well as the reports of the General Authority for Statistics in Saudi Arabia. By

analysing these data, through the fixed- and random-effect models, we provide empirical evidence concerning the positive influence of governmental supportive policies on green entrepreneurship.

This chapter provides several contributions to the literature in the field of green entrepreneurship and government policy. Initially, we studied the influence of governmental supportive policies on green entrepreneurial activity by integrating further insights into the conversation involving institutions and sustainable entrepreneurship (Meek et al., 2010; Pacheco et al., 2010; Urbano et al., 2019b). Next, as a contribution to practitioners, we considered the Saudi Arabian context, for which further evidence is required. In this situation, managers of green and non-green companies may benefit from the analysis of these results, which present discussions beyond public reports. Environmental strategies in Saudi Arabia may be derived from the existence and influence of particular policies focused on encouraging entrepreneurship that cares for the environment. Finally, the analysis related to the concept of green entrepreneurial activity implies that national and local governments should continue designing, implementing, and evaluating policies that lead to sustainable development through green entrepreneurship (Díez-Martín et al., 2016; Kshetri, 2010).

3.2 Hypothesis Development

In general, there are several types of government policies with a variety of primary goals that converge to increase the standard of living. For example, governments need to find legitimate means of generating and endorsing user-friendly policies devoted to entrepreneurial activity (Papia, 2006). Legitimacy is the key since such policies need to be implemented irrespective of the changes of parties in power, and it should transcend political divergences to boost entrepreneurship (Papia, 2006). A policy provides the basic structure for any governmental programme; it guides the rationale of the government and defines the direction. A policy can be ambitious yet achievable on paper, but it may lack proper implementation (Obaji & Olugu, 2014). This realization, in turn, has generated a significant degree of interest in how government policies may be instrumental in fostering entrepreneurial activity and whether their effects are consistent across countries (Minniti, 2008). As a plan for sustainable development, governments need to

ensure that all entrepreneurs observe government policies (Obaji & Olugu, 2014). However, governments are unable to predict the type of entrepreneurial activity that will emerge or to determine how to make it emerge or how entrepreneurs will observe these policies (Minniti, 2008). Governments can create and implement a reliable set of policies to facilitate the environmental and sustainable development of entrepreneurship (Obaji & Olugu, 2014). For example, during the last two decades, many governments have paid increasing attention to entrepreneurship and implemented policies aimed at fostering innovative ideas within their countries since those policies ensure institutional transparency and protect the environment (Minniti, 2008). According to Nehrt (1998), adopting environmentally progressive policies may enable firms to develop strategic competencies and reap first-mover advantages on the assumption that all firms will eventually face these new regulations (Barrett, 1991). However, the historical problems arising when implementing these policies are due to several factors of governance and the willpower to accomplish them. The most important factor to consider is the implementation of an environmental policy since it positively influences green entrepreneurship. Based on these ideas, we suggest the following hypothesis:

Hypothesis 1: Environmental policy has a positive influence on green entrepreneurship in Saudi Arabia.

Complementary to the environmental policy, the government needs to enhance the entrepreneurial spirit in combination with an innovation policy (Zahedi & Otterpohl, 2015). An innovation policy is a relatively new consideration on policymakers' agenda, having only become popular since the mid-1990s (Edler & Fagerberg, 2017). There appears to be a requirement to adopt a package of policies to accelerate and encourage innovation, whereas a more targeted choice of policies is necessary to enhance the exploration of opportunities (Mohnen & Röller, 2005). Various paradigms in economics have framed innovation as a major driver of societal progress and environmental wealth (Del Rio et al., 2010). Eco-innovation (i.e., innovation related to environmental protection) was the focus of Del Rio et al.'s (2010) study. Two fields refer explicitly to this topic: innovation economics and environmental economics. Both deal with sustainable development within a three-pillar approach that combines economic, environmental, and social sustainability (Hines & Marin, 2004). The focus on sustainability extends beyond traditional

definitions and considers innovation within a non-traditional framework (Hines & Marin, 2004; Smith et al., 2010). Generally, the stress on innovation policy is intended to boost creativity and reflexivity, thereby expanding economic, environmental, and social sustainability, leading to the relationship described in our second hypothesis:

Hypothesis 2: Innovation policy has a positive influence on green entrepreneurship in different regions in Saudi Arabia.

Governments are often seen either to construct barriers limiting unchecked growth or to provide incentives to encourage growth (Cohen & Winn, 2007; Dean & McMullen, 2007; Shepherd & Patzelt, 2011). From this viewpoint, entrepreneurship policies should be a key governmental concern that affects entrepreneurship outcomes by providing new incentives and ensuring that issues, such as environmental and green issues, are mitigated (Baumgartner & Jones, 1993). They are a set of incentives and government procedures that enable entrepreneurs to facilitate the process of opening a business and establishing projects (Obaji & Olugu, 2014). Thus, governmental policies can influence the allocation of entrepreneurship more effectively. Additionally, the accessibility of financial services is one major entrepreneurship policy that supports the majority of newly formed firms as it is an essential element of entrepreneurship. According to Shuo (2014), governments adopt direct subsidies, tax incentives, and government procurement to inject extensive resources into the entrepreneurial process. Natural resources are subsidized directly through governmental budgetary and tax measures (Shuo, 2014). In this regard, governments significantly influence firms' adoption of environmental entrepreneurship supportive policies (Raines & Prakash, 2005). A consequence of this approach is the government's capacity to enforce and promote environmentally sound production methods (Shuo, 2014). Obaji and Olugu (2014) provided evidence from various studies that showed the salience of government entrepreneurship policies in developing sustainable entrepreneurial activities. Thus, we propose the following hypothesis:

Hypothesis 3: Entrepreneurship policy has a positive influence on green entrepreneurial activity in Saudi Arabia.

3.3 Methodology

3.3.1 Data and Variables

To test the hypotheses, we used data from the annual reports of the Authority for Meteorology and Environmental Protection in Saudi Arabia and the reports of the General Authority for Statistics Saudi Arabia from 21 cities from 2014 to 2018. The final sample consisted of balanced panel data with 105 observations from the following cities: Riyadh, Dammam, Makah, Madinah, Alqassim, Assir, Tabuk, Hael, Jizan, Najran, Albaha, Aljouf, the northern borders, Abha, Alquriyat, Taif, Yanbu, Al Hofuf, Jeddah, Jubail, and Alkhobar. These cities were chosen because they are among the most developed in terms of entrepreneurship and were used as the experimental platforms at the onset of the implementation of these policies (General Organization for Statistics, 2019). These 21 cities reflect the consensus regarding green issues and present a standardized demography because they are considered to be different cities from different regions that reflect the phenomena under discussion. Thereby, the dependent, independent, and control variables were explored across these cities and over the mentioned years.

3.3.1.1 Dependent Variable

Since we focused on green entrepreneurship, we measured the dependent variable by examining environmental commitment, which is one of the most important issues in Saudi Arabia. The data were derived from several different sources, as explained previously. According to the Organisation for Economic Co-operation and Development (OECD) (2011), green entrepreneurship can be measured as environmental commitment. Sustainability has tended to focus predominantly on issues concerning environmental, or what may be termed “green”, issues: recycling, energy, and resource conservation (Kraus et al., 2020). In Saudi Arabia, no database exists for sustainable entrepreneurship, so we used a proxy to measure green entrepreneurial activity. In this regard, the First Voluntary National Review 2018 determined whether Saudi Arabian firms had been adhering to the standards required to conduct business under green

entrepreneurship (Kingdom of Saudi Arabia, 2018). This evaluation was based on the parameters set by the United Nations, which call for the development and growth of businesses that meet sustainable goals. To measure this variable, we found a list of firms that consider environmental issues as well as the total number of firms in each city. This variable thus indicates the percentage of firms that consider the environment as a high priority in comparison with the total number of firms. For this variable, information was derived from annual reports (General Authority for Meteorology and Environmental Protection).

3.3.1.2 Independent Variables

As the independent variables, we considered environmental, innovation, and entrepreneurship policies. Specifically, we focused on policies that are traditionally labelled as sustainability and environmental commitment, as considered by several authors (cf. Mohnen & Röller, 2005; Obaji & Olugu, 2014; Shuo, 2014). In this sense, first, environmental policy involves creating market and non-market policies for firms to reduce pollution through the public disclosure of aspects of their environmental performance (Arora & Casson, 1996; Konar & Cohen, 1997). The values for environmental policy are reported on a 5-point scale (1 = minor nuisance, 5 = safety-related functioning). This score was obtained from the set of standards evaluating whether firms met the First Voluntary National Review 2018. A value of 1 implies that the policy is a minor nuisance. A value of 2 indicates that the policy is operable, and a value of 3 indicates the acceptable performance of the policy. A value of 4 means that the policy is functioning, whereas a value of 5 denotes that the safety-related application of the policy is functioning.

Second, innovation policy is a relatively new concern on policymakers' agenda as it was not referenced until recently (Minniti, 2008). Mohnen and Röller (2005) noted that innovation policy contains a package of policies to encourage firms to explore the market further. The values for this particular policy are again reported on a 5-point scale (1 = ineffective, 5 = safety-related functioning). A value of 1 indicates that the policy is ineffective, 2 means that the policy is operable, 3 indicates gradual improvement of the policy, 4 means that the policy is functioning, and 5 indicates that the safety-related applications of the policy are functioning. Third, entrepreneurship policy encompasses a set of incentives and government procedures that help

entrepreneurs to facilitate the process of establishing their ventures (Obaji & Olugu, 2014). Shuo (2014) highlighted that governments apply different mechanisms to affect entrepreneurs directly through subsidies, tax incentives, and government procurement to enhance their capacity to support entrepreneurial activity. The values for this policy are again on a 5-point scale (1 = very low, 5 = very high): 1 = very low or none, 2 = low or minor, 3 = moderate or significant, 4 = high, and 5 = very high. These values indicate the same as outlined earlier. The First Voluntary National Review 2018 examined this topic.

3.3.1.3 Control Variables

We included other variables in the model to control for additional factors that may partly explain green entrepreneurship. These control variables have been considered by different authors (cf. Uslu et al., 2015; Zahedi & Otterpohl, 2015). They have also been cited by the Saudi Government regarding sustainability issues (Ministry of Environment, Water, and Agriculture (MEWA), 2019; Ministry of Education – Kingdom of Saudi Arabia (MoE), 2019).

The annual growth rate represents the value of a country's resources, which becomes increasingly sensitive to competitive forces in world markets. Environmental issues are sensitive to world markets as they shape the potential for economic growth by conditioning survival. In Saudi Arabia, the unsustainable use of resources is one important issue that is mainly triggered by the lack of natural resource availability (MEWA, 2019). This challenges the sustainability of green entrepreneurship at a deep level and requires plentiful resources that are dependent on an annual growth rate (MEWA, 2019). The data source was the annual reports of the General Authority for Statistics in Saudi Arabia. The possible values of the annual growth rate are related to the average recorded over the 5 years for the agricultural sector in each city. We controlled for the population of the area since green entrepreneurship aims to minimize the threats that may arise from a decrease in environmental resources, such as an increase in population growth (Uslu et al., 2015). Among the main approaches suggested for sustainability is a reduction in population growth (Zahedi & Otterpohl, 2015). Saudi Arabia is one of the world's most populous countries, growing from 4 million in 1960 to in excess of 33 million in 2018 (General Organization for Statistics, 2019). According to Zahedi and Otterpohl (2015), population growth needs to be reduced to increase

sustainability. The data were derived from the annual reports of the General Authority for Statistics in Saudi Arabia. The value of this control variable is the population size, increasing for each area during the 5-year study. The size of the city, included as a control variable, may affect the amount of environmental resources available, so government supportive policies are required to manage environmental resources efficiently among different-sized cities (MEWA, 2019). The size of a city may also affect the rate of environmental resource depletion. A large city leads to the requirement for a greater amount of environmental resources (MEWA, 2019).

We needed to consider controlling for education as well. Governments aim to improve access to quality education, which may be required for sustainable developmental goals at all levels and in all social contexts, to transform society by reorienting education and helping individuals to develop the knowledge, skills, values, and behaviour needed for sustainable development (MoE, 2019). This variable was measured as the percentage of people in a city with the highest possible education level, which is a postgraduate degree. According to Al-Barawi et al. (2017), the increase in the number of postgraduate students is of the utmost importance for the entrepreneurial attitude and activity. Hence, the government and higher education organizations play an important role in developing graduates' entrepreneurial attitude and effective entrepreneurial strategies (Al-Barawi et al., 2017).

Summing up, Table 3.1 presents further details about our dependent, independent, and control variables, which were standardized and transformed into natural logarithms. The reason is that the former avoids problems resulting from variables with different scales, while the latter enables a direct interpretation in terms of a percentage change of the dependent variable when the independent one changes by 1 per cent (for a more precise explanation, see Urbano & Aparicio, 2016).

Table 3.1: Description of the variables

Variable	Definition	Data source
Dependent variable		

Green entrepreneurship	Percentage of firms considering the environment in the city out of the total number of firms in the city. The variable is standardized.	Annual reports (General Authority for Meteorology and Environmental Protection)
Independent variables		
Environmental policy	Policies for firms to reduce pollution by requiring public disclosure of some aspects of firms' environmental performance; values are on a 5-point scale (1 = minor nuisance, 5 = safety-related functioning). The variable is standardized.	Annual reports (Authority for Meteorology and Environmental Protection)
Innovation policy	Innovation policy is the interface between technological development policy, research, and industrial policy and aims to create a framework for bringing new ideas to the market (OECD, 2020). The values for this particular policy are on a 5-point scale (1 = ineffective, 5 = safety-related functioning). The variable is standardized.	Annual reports (Authority for Meteorology and Environmental Protection)
Entrepreneurship policy	A set of incentives and government procedures that facilitate the entrepreneurial process of the establishment of projects. The values for this policy are on a 5-point scale (1 = very	Annual reports (Authority for Meteorology and Environmental Protection)

	low, 5 = very high). The variable is standardized.	
Control variables		
Population	The number of inhabitants per region. The variable is standardized.	General Authority for Statistics in Saudi Arabia
Size of the city	The area of the city (km^2). The variable is standardized.	General Authority for Statistics in Saudi Arabia
Annual growth rate	The annual growth rate for the agricultural sector in each city. The variable is standardized.	General Authority for Statistics in Saudi Arabia
Education	The percentage of people with tertiary education in each city. The variable is standardized.	General Authority for Statistics in Saudi Arabia

Authors' own table based on the General Authority for Meteorology and Environmental Protection (https://mewa.gov.sa/en/InformationCenter/Pages/default.aspx) and the General Authority for Statistics in Saudi Arabia (https://www.stats.gov.sa/ar#).

3.3.2 Model and Techniques

The model that we adopted is a simple log-log equation that takes into consideration both variations in the independent variables of interest and some controls, as shown below:

$$\ln GE_{it} = \alpha + \beta_1 \ln EvP_{it} + \beta_2 \ln IP_{it} + \beta_3 \ln EP_{it} + \sum_k \delta_k \ln CV_{it} + \varepsilon_{it}$$

where GE_{it} represents green entrepreneurship in city *i* at time *t*, EvP_{it} is the environmental policy across cities and time, IP_{it} denotes the innovation policy, EP_{it} is the entrepreneurship policy, δ_i is the parameter estimated for each *k* control variable CV_{it}, and $\varepsilon_{it}$is the error term that captures the variables that may affect green entrepreneurship but are unknown in this study.

The fixed-effect (FE) estimation technique was used to test whether environmental, innovation, and entrepreneurship policies affect green entrepreneurial activity. These techniques allowed us to observe the time effects through a cross-regional approach (Baltagi, 2008; Cumming et al., 2014). Univariate and bivariate statistics were considered initially to explain the existing relationships between variables (Table 3.2). Subsequently, multivariate models were employed (Table 3.3). The main analysis was completed with the FE model, considering green entrepreneurship as the dependent variable. The independent variables were environmental, innovation, and entrepreneurship supportive policies, being the main predictors for the three suggested hypotheses. In Model 1, only control variables were included. Afterwards, the three models were set, each having only one predictor that represents each hypothesis. The first model regressed green entrepreneurship on environmental policy (Model 2), the second one considered the influence of innovation policy (Model 3), whereas the third one regressed green entrepreneurial activity on entrepreneurship policy (Model 4). In the second set of models, the control variables were added to the three models with one variable, each regressing the dependent variable on both the independent variable of interest and the control variables (Models 5, 6, and 7). Following this, Model 8 included all the predictors through the fixed-effect technique. Models 2, 3, and 4 are useful since they elucidate the associations of the three independent variables with the dependent variable within models that do not suffer from having too many predictors compared with other cases. Therefore, Models 1–4 provide a connection between the three aspects that underpin green entrepreneurial activity, specifically policies supporting innovation, the environment, and entrepreneurship. We believe that an institutional change can be observed through these three policies due to the time dimension that was incorporated into our panel data models. Thus, we were able to observe variations in the 5-point Likert scale over time.

3.4 Results and Discussion

The descriptive statistics for the non-standardized variables in the study are reported in Table 2. Green entrepreneurship varied from 20.220 to 77.650%. Despite the large number of firms, we identified only an average of 44.863% firms with environmental purposes across cities in Saudi Arabia. Environmental policy ranged from 1 to 5, with an average of 3.352 (standard deviation

(SD) = 1.373). Innovation policy ranged from 1 to 5 (mean (M) = 3.248, SD = 1.426). Entrepreneurship policy also varied from 1 to 5 (M = 3.057, SD = 1.336). Table 2 shows that the three supportive policies are statistically correlated with green entrepreneurship, so the correlations met our initial expectations. The correlation between the variables was examined to explore the strength of the relationship between the variables (Table 3.2). Pearson's correlation was used to assess the relationship between green entrepreneurship and environmental, innovation, and entrepreneurship policies. Based on this test, we found that several variables had significant positive relationships. We also found a small correlation between environmental policy and entrepreneurship policy (r = 0.265) and a small correlation between innovation policy and entrepreneurship policy (r = 0.130). However, we found a moderate correlation between green entrepreneurship and environmental policy (r = 0.467).

Table 3.2: Descriptive statistics and correlation matrix

	Variable	Mean	SD	Min.	Max.	1	2
1	Green entrepreneurship	44.866	12.462	20.220	77.650	1	
2	Environmental policy	3.352	1.373	1	5	0.467*	1
3	Innovation policy	3.248	1.426	1	5	0.438*	0.105
4	Entrepreneurship policy	3.057	1.336	1	5	0.597*	0.265*
5	Population	1,945,362	2,392,560	54,622	8,597,713	0.11	0.099
6	Size of the city	123,036	118,669	12,000	540,000	0.001	-0.05
7	Annual growth rate	3.814	0.458	2.950	5.240	0.260*	0.074
8	Education	61.800	4.783	53.380	73.980	0.179*	0.164*
		3	**4**	**5**	**6**	**7**	**8**
3	Innovation policy	1					
4	Entrepreneurship policy	0.13	1				
5	Population	-0.03	-0.064	1			
6	Size of the city	-0.121	-0.141	0.412*	1		
7	Annual growth rate	0.205*	0.250*	-0.098	0.007	1	

8	Education	0.252*	0.290*	0.13	-0.179*	0.155	1

* $p < 0.1$. Author's own table.

The results of correlations can be used to observe the multicollinearity problem amongst variables. As shown in Table 3.2, all the correlation coefficients across the variables were below 0.9. Hair et al. (2010) suggested that values above 0.90 reveal a multicollinearity problem. Therefore, this showed that the collected data had no multicollinearity problems.

Table 3.3 presents the results of all the FE models. The random-effect (RE) models were practically identical, and the Hausman test results revealed that it was more appropriate to use the FE model since the *p*-value was below 0.05. This means that we could reject the null hypothesis, which was H_0 = RE. We noted similarities to the FE estimation across the models. Therefore, interpretations are provided only for the FE models.

Concerning the testing of the hypotheses, we observed a significant positive influence of environmental policy on green entrepreneurship in different regions in Saudi Arabia, as stated in hypothesis 1. We found a positive influence on government policies, such as environmental policy, on green entrepreneurship. According to Obaji and Olugu (2014), governments can create a reliable set of policies that can be implemented to provide green entrepreneurship. Environmental policy has a positive influence on the bivariate relationship, which becomes positive when controlling only for other variables (the annual growth rate). This variable remains positive when using only the three variables of interest as predictors, and it is again positive in the model with all the predictors.

A further variable that was employed to comprehend green entrepreneurship was innovation policy. Hypothesis 2 proposed that innovation policy has a significant positive influence on green entrepreneurship in Saudi Arabia. We found that innovation policy was positively related to green entrepreneurship. A 1 per cent increase in the standard deviation of environmental policy led to an average of a 0.049 per cent increase in the standard deviation of the dependent variable. For the second hypothesis, the same positive influence was noticeable, but, overall, the influence of

innovation policy was not contrary to the expectations since it was positive. According to Mohnen and Röller (2005), the influence of innovation policy on green entrepreneurship is positive.

Hypothesis 3 was also fully supported. We found a significant positive influence of entrepreneurship policy on green entrepreneurial activity in Saudi Arabia. Hence, the third hypothesis was also accepted, with entrepreneurship policy being positively related to the dependent variable, green entrepreneurship. Government policies affect entrepreneurship outcomes by providing new policies, and they move issues from less effective policies to more effective approaches (Baumgartner & Jones, 1993), such as environmental and green issues. Thus, government entrepreneurship policy can influence the allocation of entrepreneurship resources (Baumol, 1990; Bowen & De Clercq, 2008). Obaji and Olugu (2014) indicated a positive influence of entrepreneurship policy on green entrepreneurship as well.

According to Urbano et al. (2019b), the institutional approach provides a broad insight into which institutions are related to entrepreneurial activity as well as which institutions are the most important in explaining the entrepreneurship rates that enhance economic growth. From this viewpoint, the main results in this chapter support the assertation that formal institutions (i.e., government policy) positively influence green entrepreneurship. Particularly for our laboratory, there have been various policies to support entrepreneurial endeavours within Saudi Arabia involving innovation and the environment. It is vital that the world, particularly Saudi Arabia, embraces sustainability to reflect the recent increased interest in and concerns about the environment. The increased availability of local resources, easier logistic planning, simplified administrative procedures, and clearly expressed support for green entrepreneurship are policies that will advance the regional economy. The increased interest in green issues and sustainability since 2014 reflects the views of the public and general world leaders on such issues. Global issues regarding deforestation, the exploitation of cheaper local resources, clearer modes of communication, and, where possible, the easing of red tape all contribute to a clearer and more accessible supply chain. These factors will not only aid green entrepreneurship but also raise its profile globally.

3.5 Conclusions

This exploratory study illustrated the positive influence of governmental supportive policies (i.e., environmental, innovation, and entrepreneurship policies) on green entrepreneurial activity in Saudi Arabia. Institutional economics was used to frame our literature review and analysis theoretically. This was complemented by an empirical approach based on balanced panel data for the 2014–2018 period. Our results revealed that the three analysed factors are important for green entrepreneurship across cities in Saudi Arabia.

These findings have several implications for different audiences. Firstly, national and local governments are encouraged to adopt influential and suitable policies to develop entrepreneurial activities that solve environmental problems. Thus far, governmental supportive policies have strongly influenced environmental commitment and are solving environmental issues in Saudi Arabia. This accomplishment may encourage government staff and managers from private companies to create new policies and strategies that improve policy instruments and public–private collaborations that attract entrepreneurs. Secondly, governments need to help create an environment in which entrepreneurs engage with environmental commitments. For example, governments can increase the emotional engagement of green entrepreneurs by building strong bonds with managers or colleagues from other companies as well as with other new ventures.

Green entrepreneurship can be engaged cognitively by understanding the clear mission and purpose of new businesses and by receiving information and appropriate feedback regarding social needs. If green entrepreneurs have strong bonds with governments, they feel valued by local and national entities, so their opinions and actions are highly considered in sustainable developmental processes. This allows entrepreneurs to develop internally an emotional engagement that aids their new venture in succeeding concerning its goals. Additionally, government support for green entrepreneurship is beneficial for a more sustainable environment. This may be the first step towards a more environmentally conscious society and the conservation of resources for future generations. The Government of Saudi Arabia, in particular, should continue to promote such policies. It may be interested in publicizing the results to increase the legitimacy and the support from managers and the entire population. Practitioners in non-governmental organizations and

businesses could claim the need for similar regulations and measures, including fiscal benefits and green actions.

Table 3.3: Estimated results for green entrepreneurship

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Environmental policy		0.044*			0.053**			0.050**
		(0.022)			(0.022)			(0.019)
Innovation policy			0.065***			0.061**		0.077***
			(0.020)			(0.022)		(0.024)
Entrepreneurship policy				0.066**			0.059*	0.068**
				(0.030)			(0.031)	(0.029)
Population	0.024				0.029	0.029	0.027	0.036
	(0.025)				(0.023)	(0.028)	(0.022)	(0.023)
Size of the city	0.000				0.000	0.000	0.000	0.000
	(0.001)				(0.001)	(0.001)	(0.001)	(0.001)
Annual growth rate	0.127				0.180	0.031	0.054	-0.027
	(0.184)				(0.170)	(0.191)	(0.201)	(0.205)
Education	0.236				0.235	0.183	0.164	0.086
	(0.180)				(0.171)	(0.192)	(0.175)	(0.188)
Observations	105	105	105	105	105	105	105	105
R^2 overall	0.076	0.218	0.192	0.356	0.212	0.185	0.297	0.494

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Authors' own table.

Despite these findings and implications, this research also has some limitations. Firstly, as we explored the relationship between governmental supportive policies and green entrepreneurship, which is represented by environmental commitment in Saudi Arabia, considering other government policies that may affect green entrepreneurship would be beneficial. These policies may be related to the taxation system or the financial structure, along with other aspects. Secondly, we used secondary data over 5 years (2014–2018), so subsequent studies should focus on a longer time frame to enable long-term analyses. Thirdly, future researchers may be interested in extending the analysis to cross-country comparisons (for example by examining other regions in the Arab Gulf). Fourthly, we did not have a database for sustainable entrepreneurship in Saudi Arabia, so future research could experiment with various proxies for green entrepreneurship. Limited data sources are a challenge faced by researchers, particularly when attempting to conduct cross-country comparisons. Due to the limited number of indicators and the differences in measurements across countries (Schillo et al., 2016), further efforts are necessary to gather homogeneous data relating to the antecedents and consequences of green entrepreneurship. As for the existing measurements, future research should improve the quality and scope of the indicators for both dependent and independent variables. This may increase the reliability of research and enable the analysis of causal relationships in cross-sectional data (Urbano et al., 2019b).

Chapter 4:

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

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

4.1 Introduction

The amount of research on sustainable entrepreneurship has grown considerably in recent decades, enabling scholars to link entrepreneurship and sustainable development (Schaltegger & Wagner, 2008). Ultimately, researchers have utilized the term "sustainable entrepreneurship", along with added expressions such as "green entrepreneurship" or "environmental entrepreneurship" (Chick, 2008; Dixon & Clifford, 2007; Krueger, 2005; Schlange, 2006). 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 when the focus on green policies is stronger than ever. Furthermore, green-related entrepreneurship has become an important subfield of entrepreneurship research (Dixon & Clifford, 2007). Such societal challenges generate a need for better knowledge of both the antecedents and the consequences of green entrepreneurial activity. In this chapter, we consider green entrepreneurship in line with the intensified call for conducting business in a "greener" way. A preoccupation with green entrepreneurial activity has thus arisen (Gliedt & Parker, 2007; Harini & Meenakshi, 2012; Linnanen, 2005), boosted by a culture of green entrepreneurship that shapes new breeds of entrepreneurs (Allen & Malin, 2008) and contributes to moulding social norms that support this "greenism" (Gast et al., 2017).

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 (Inglehart, 2018). 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 (Inglehart, 2018). In this way, cultural identity is a distinctive feature not only of the individual but also of a similar group of people who share the same views (General Organization for Statistics, 2019). 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 (MEWA, 2019). One of the main objectives tangential to these three pillars involves increasing the amount of environmentally friendly activities, including green entrepreneurship. However, there is a lack of evidence that would enable 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 (North, 1990, 2005), the role of formal (particularly economic regulations) and informal (particularly culture) institutions in sustainability has been discussed (Meek et al., 2010; Roy & Goll, 2014) in addition to how informal institutional factors may explain more different types of entrepreneurial activities, including green entrepreneurship, than formal institutions. In this sense, according to Adler (1983), Andries and Stephan (2019) found that there are institutional factors that are characterized by cultural differences in environmental activities and actions. Encouraging environmental consciousness that embraces these aspects is one way to expand sustainability (Gibbs & O'Neill, 2014; Lotfi et al., 2018). It is also vital to comprehend how entrepreneurship accounts for social values, beliefs, and culture, which change over time and space (Audretsch & Keilbach, 2008; Baumol & Strom, 2007). In this regard, organizational processes have a temporal dimension, often implicit and without discourse, that clearly characterizes the entrepreneurial process (Bird & West, 1998). 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 (Allen & Malin, 2008; Gibbs & O'Neill, 2014; Meek et al., 2010) in developing countries such as Saudi Arabia.

Thus, in this study, institutional economics (North, 1990, 2005) was used to enhance our comprehension of cultural influences (i.e., informal institutions) on green entrepreneurship in Saudi Arabian cities. Drawing on this, it can be suggested that the national culture affects environmentally friendly policies (Roy & Goll, 2014). In particular, we analysed the influence on green entrepreneurship of three cultural factors: (1) environmental actions, (2) environmental consciousness, and (3) temporal orientation. To test the suggested hypotheses, we relied on balanced panel data, with a sample of 84 observations during the 2015–2018 period. After testing

the fixed-effect models for 21 cities in Saudi Arabia, we found that the three cultural factors assessed 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 the existing knowledge, there is still no consensus on a definition of this term (Gast et al., 2017; Gevrenova, 2015; Gibbs & O'Neill, 2014; Schaper, 2016). Bearing 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 (Meek et al., 2010). Scholars have assessed different informal factors in their studies, but this chapter 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 provides an excellent case study on this subject, and scholars and practitioners may find its 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 policymaking. Knowledge of the consequences of green entrepreneurial practices may allow the forecasting of the long- and short-term changes in society as well as an understanding of which types of incentives could be provided to direct social and sustainable development (Lotfi et al., 2018). A significant set of green-aware companies is expected to change and encourage others to adopt green entrepreneurship.

4.2 Literature Review

As it was mentioned, the previous chapter suggested that a number of studies have analysed formal institutions as initial steps towards entrepreneurial activity (see Bjørnskov & Foss, 2016; Urbano et al., 2019b; and Zhai et al., 2019 for thorough literature reviews), and it has been argued that informal institutions are more influential within society (Su, 2020; Urbano & Aparicio, 2016; Urbano et al., 2019b). An additional conclusion relates to interactions between formal and informal institutions, with many regulations potentially working better depending on the cultural values of

society (Thornton et al., 2011). Informal institutions limit the influence of formal bodies and vice versa (Urbano & Aparicio, 2016).

Similar ideas, particularly focused on culture, have explored green entrepreneurship (Meek et al., 2010). Although there is no consensus about what green entrepreneurial activity means (Melay & Kraus, 2012) (see Appendix 1 for different definitions), we adopted the approach offered by Gast et al. (2017, p. 46), 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". This is similar to the work of Silajdžić et al. (2015, 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 Yi (2020), who proposed 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 prioritization of the skills and initiative of the entrepreneur seeking success through social or environmental innovations for sustainability (Schaltegger & Wagner, 2008).

Culture may be seen as heavily influential when pursuing sustainability (Caprar & Neville, 2012, p. 236). Several studies have viewed culture as a significant variable in sustainability-related actions (Haxhi & Van Ees, 2009; Ringov & Zollo, 2007; Waldman et al., 2006). For instance, cultural habits play a vital role in assessing variations within corporate social responsibility (CSR) (Ioannou & Serafeim, 2012). Similarly, regarding consumer views of corporate responsibility, studies have advocated global culture-related differences (Stephan & Uhlaner, 2010; Williams & Zinkin, 2008). Some scholars who 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 (Grinevich et al., 2019; Roland, 2004). Having a socially supportive culture affects the level of national entrepreneurship and its quality. In this chapter, we focus on green entrepreneurship and its association with culture, using cultural habits as proxies for informal institutions, as Stephan and Uhlaner (2010) suggested. Although other important institutional factors might affect sustainable development, including green entrepreneurship (Roy & Goll, 2014), 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 (Meek et al., 2010).

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 has been 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 (North, 2005). This is due to cultural norms forcing limitations on formal institutional development (Nalband et al., 2016). The sedentary nature of cultural change also presents obstacles to extreme institutional change (Roland, 2004). People thus observe dominant practices (e.g., in green entrepreneurship) and reflect them in their own values, attitudes, and behaviours. There is no doubt that the total entrepreneurial activity acts as a catalyst for economic growth (Audretsch & Keilbach, 2008; Urbano & Aparicio, 2016), so those values, attitudes, and behaviours 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 (Urbano et al., 2019c). 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 represent a different type of entrepreneur (Allen & Malin, 2008). Instead of building their life on making a profit, they are also concerned about social justice (Allen & Malin, 2008, p. 828). Personal motivation and a forward-thinking approach to sustainability are also important characteristics of entrepreneurs (Allen & Malin, 2008, pp. 837–840).

In general, green entrepreneurship plays a rising role in the protection of the environment (Yi, 2020). Based on this idea, Ndubisi and Nair (2009) suggested that there is a need for companies to adopt a green approach. This idea is embedded in a culture of reflexive development, in which concern about environmental issues and the need for sustainability have 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 the values reflected by entrepreneurs. It is important to contextualize the situation of green entrepreneurs (Gibbs, 2006), which is consistent with theories of post-modernization and

reflexive modernization (Inglehart, 2018). 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 existing businesses that pursue a process of greening and as part of new businesses that are green from the outset (Schaper, 2016).

The institutional perspective (North, 1990, 2005) enables us to understand why governments encourage all members of society to support actively sustainability initiatives such as green entrepreneurship (Parboteeah et al., 2012). Such a culture is visible through social norms and policies that foster green entrepreneurial activity. Indeed, companies that promote green measures are even more visible to societies: they are easier to notice and create an institutional framework that individuals can observe and internalize. Evidence for this interpretation can be found in a number of studies, such as those by Karimi and Nabavi Chashmi (2019), Papadopoulos et al. (2014), Silajdžić et al. (2015), and Thang et al. (2013), which demonstrated relationships between social and structural interventions and subsequent attempts by organizations to engage in the "greening" of their entrepreneurial activities. These studies reported different attempts to introduce green entrepreneurial practices in Vietnam (Thang et al., 2013), Greece and Cyprus (Papadopoulos et al., 2014), Bosnia and Herzegovina (Silajdžić et al., 2015), and Tehran (Karimi & Nabavi Chashmi, 2019). 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 the ability to apply culture at various levels (Roland, 2004). When considered at the aggregate level, one may observe cultural descriptive norms and practices, whereas, at the individual level, cultural values trigger attitudes and behaviours focused on the environment. Policies that promote green entrepreneurship and corresponding green behaviours are based on a culture of caring for others combined with promoting performance, as demonstrated or hypothesized by various scholars (Gibbs & O'Neill, 2014; Miska et al., 2018; Roy & Goll, 2014; Schaper, 2016). Several authors (Adler, 1983; Allen & Malin, 2008; Kluckhohn, 1951; Kluckhohn & Strodtbeck, 1961) have also noted such key cultural dimensions,

which need further attention. Hence, in this chapter, we focus on environmental actions, environmental consciousness, and temporal orientation.

It is worth noticing that embracing sustainability does not automatically lead to practising it (Melay & Kraus, 2012). Cultural values may precede practices since they dictate behaviour (Anbari et al., 2003). There are cultural differences regarding the initial mode of activity; some cultures emphasize action and outcomes (Adler, 1983). In developing countries, environmental actions are of prime importance (Lotfi et al., 2018). Green entrepreneurs run businesses to achieve dual environmental and business objectives to ensure that their sectors become more sustainable (Egri et al., 2012; Jolink & Niesten, 2013). For those wishing to be greener in their business, there is a disparity between self-principled customers' interests, affecting public behaviour (Gibbs & O'Neill, 2014). 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 (Schaltegger, 2002). When businesses previously placed priority on cost saving, environmental benefits may only have been a minor concern, suggesting that a global, mainstream view of green principles was in its infancy. Consumers are motivated partially by sustainability itself but also by simultaneously occurring underlying and/or societal sustainability issues (Gibbs, 2009). Evans and Abrahamse (2009) put forward the argument that appealing to these underlying issues may expand sustainability commitment. While saving money may attract individuals to engage in sustainable habits, it may have limited influence if wider consumption practices continue (Gibbs & O'Neill, 2014). We thus suggest the following hypothesis:

Hypothesis 1: 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 (Lotfi et al., 2018). Indeed, environmental awareness has improved lately at every level of society (Meek et al., 2010); however, there are differences in cultures and in people's relationships with the natural environment (Meek et al., 2010). 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 that it conveys (Adler, 1983). Entrepreneurship and wealth/economic growth are closely linked and hence heavily promoted and encouraged in the modern world (Urbano & Aparicio, 2016). Environmental consciousness also leads green entrepreneurship to affect green innovation and social–environmental responsibility (Acs et al., 2018). Recently, with the increased interest in environmental and social issues, entrepreneurship has conjoined the objectives of sustainable development and the accumulation of wealth (Pacheco et al., 2010; Tilley & Parrish, 2006).

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 environmentally conscientious, actively seeking educational opportunities that support green entrepreneurship and/or sustainability initiatives. For example, Soomro et al. (2019) and Yi (2020) provided evidence highlighting 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 out the potential wider generalizability of this particular study on the basis of transferable concepts in rapidly developing economies. Similarly, evidence from Serbia showed that the social desirability of environmental education is translated into economic and environmental practice (Radović-Marković & Živanović, 2019).

Environmental consciousness is related to the social image, which supports individuals in becoming green entrepreneurs and taking care of the environment (Rodgers, 2010; Thompson et al., 2011). In emerging markets, there is sensitivity to environmental issues and an effort to combine them with green entrepreneurship (Thompson et al., 2011). 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 (Lotfi et al., 2018). Entrepreneurs are now motivated to consider environmental issues to satisfy their social obligation, so the exploration of green entrepreneurship extends research to non-financial desires (Kirkwood & Walton, 2014). Green entrepreneurs negotiate the disparity between business

activities, environmental mission statements, and wider contexts relating to sustainable and growth-focused economies (Gibbs & O'Neill, 2014). As such, entrepreneurs who are interested in sustainability, as influencers, prioritize environmental issues over profits where possible, being conscious of the need to make the optimal effort to reduce damage to the environment. They may present a win-win situation for both economic growth and the environment and may achieve their own personal goals. These entrepreneurs gradually enhance the environment and educate a wide audience on the benefits related to environmental protection through products and services (Schaper, 2016). Green entrepreneurs are labelled as novel entrepreneurial investors, aiming to integrate environmental awareness with business advancement through holistic measures: a unique logical approach compared with that of conventional entrepreneurs (Tilley & Parrish, 2006). Indeed, the commitment to the environment displayed by green entrepreneurs enhances their reputation in comparison with that of other entrepreneurs (Kluckhohn, 1951). On this basis, we propose that:

Hypothesis 2: 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, in the present, and into the future (Zimbardo & Boyd, 1999; Zimbardo et al., 1997). There are cultural differences regarding individuals' temporal orientation, that is to say, their orientation towards the past, present, or future (Bird & West, 1998). In past-oriented cultures, tradition is central to the wisdom of societal life (Bird & West, 1998), whereas future-oriented societies disregard the past and focus entirely on the future, resulting in an extensive long-term timeline (West & Meyer, 1998). In contrast, present-oriented cultures have a limited timeline, focusing on short-term gains (Bird & West, 1998). 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, cognition, and behaviour (Shipp et al., 2009). For example, several authors have discovered that a culture with a present time perspective focuses less on future strategic processes than other differing cultures (Bird, 1992; West & Meyer, 1998). Individuals who are embedded in a present time perspective focus predominantly on the present, perceiving future planning as futile, unlike those with a future time perspective (Zimbardo

& Boyd, 1999). Green entrepreneurs offer clear solutions regarding social transformation (Isaak, 1998), creating long-term outcomes and an enhanced positive future.

Time itself is a factor that may help us to understand the changing attitudes towards entrepreneurship (Lévesque & Stephan, 2019). For instance, organizational processes involve temporal dimensions that are implicit, with no discourse, and temporal issues clearly and accurately describe the entrepreneurial process (Bird & West, 1998). Past experiences and comprehension of previous activity are the basis on which present actions are taken, moving towards future wealth gain. These temporal dimensions are carried out over many levels within entrepreneurial campaigns (Bird & West, 1998). Entrepreneurs and the individuals working alongside them act in the present to ensure future gains (Bird & West, 1998). Some of the characteristics of entrepreneurs derive from their personal experiences and history, including their 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, and setting aims and ambitions for the future. This interpretation was observed by both Grinevich et al. (2019) and Yi (2020), who demonstrated the importance of both temporal and conceptual interpretations of green entrepreneurship relative to the prevailing circumstances. To a lesser extent, the earlier work of Papadopoulos et al. (2014) 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 (Bird & West, 1998). At the industry or environmental level, time figures in 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 (Bird & West, 1998).

At the country level, there is 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 (Welter, 2011). A vital aspect of the social sustainability endeavour is that it

emphasizes the business-based long-term benefits that society expects (Schwartz & Carroll, 2008). This is due to the fact that one of the objectives of sustainability is that of inter-generational equity (Bansal & Song, 2016). The requirements of today's generations must not limit or compromise future generations (Bansal & DesJardin, 2014). 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 an organization's financial performance (Acs et al., 2018; Thompson et al., 2011), which involves future planning. Furthermore, utilizing green logic alongside the social and economic aspects in a flexible manner involves temporal adjustments (Parboteeah et al., 2012). 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 (Bansal & DesJardin, 2014). Based on these ideas, the following hypothesis is suggested:

Hypothesis 3: Temporal orientation is positively associated with green entrepreneurship in Saudi Arabia.

4.3 Methodology

4.3.1 Data and Variables

Extensive literature has prioritized the identification of the 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 for which each culture within society makes a choice. This suggests that societies may be classified in accordance with major cultural dimensions (Klasing, 2013), which may in turn explain green entrepreneurial activities (Meek et al., 2010). To understand this relationship, we used variables and data from a number of different sources, which are explained below.

4.3.1.1 Dependent Variable

For the dependent variable, we measured green entrepreneurship in accordance with the Organisation for Economic Co-operation and Development, which defined this particular type of entrepreneurial activity as an environmental commitment (OECD, 2020). This definition is also consistent with the conceptual foundation that we adopted from Gast et al. (2017). According to Kraus et al. (2020), sustainability studies have focused mainly on issues involving the environment, which is an important issue in Saudi Arabia (MEWA, 2019). 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, in line with Miska et al., (2018) focus on corporate sustainability practices and performance orientation practices as factors affecting green entrepreneurship. We note that there may be some methodological critique of the use of a dependent variable throughout a percentage (Papke & Wooldridge, 2008), but, in line with Liu and Xin (2014), it was considered appropriate in the conditions of this study because the dependent variable was standardized.

4.3.1.2 Independent Variables

Environmental actions, which consisted of motivation for action and emphasized 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. (2020), environmental activities are carried out 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 their environmental actions by achieving dual environmental and business objectives and by wishing to transform sectors to become more sustainable (Egri et al., 2012; Jolink & Niesten, 2013). The information for these variables came from annual reports of General Authority for Statistics during the 2015–2018 period (see Table 4.1). 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 (2014) presented a novel and interpretive concept, with the evolving issue of "being" and "becoming" a green entrepreneur, rather than the fixed categories presented in the previous literature.

We considered environmental consciousness as the percentage of the maintenance of a natural resource, for example the prudent use of water. The rate considered the reduction/control of the use of natural resources relative to outputs by living in balance with natural forces (General Organization for Statistics, 2019). Kirkwood and Walton (2014) considered the environmental consciousness of green entrepreneurs as involving the manner in which they conduct their business while keeping to their environmental commitment. Hence, environmental preferences may allow for benefits exceeding simple cost savings since customers forge deals with entrepreneurs that are associated with a positive image and are recognized as "modern" (Shipp et al., 2009). The data for this variable came from annual reports (General Authority for Statistics, 2020). Kirkwood and Walton (2014) studied the motivations and the key green aspects of entrepreneurs who are 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.

Regarding the 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 embraced environmental initiatives (General Authority for Statistics, 2020). Shipp et al. (2009) 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 emerging environmental needs (Zahra, 1996).

4.3.1.3 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 (MEWA, 2019). This challenges the sustainability of green entrepreneurship and requires many resources that depend on the annual

growth rate of the agricultural sector (MEWA, 2019). The data used for this were from the annual reports of the General Authority for Statistics in Saudi Arabia. The annual growth rate took into consideration the average value of the resources that each city produced yearly in the agricultural sector. We also controlled for the population of the city as green entrepreneurship aims to minimize the threats to environmental resources, such as an increased population rate (Uslu et al., 2015; Zahra, 1996).

One approach suggested for sustainability is a reduction in population growth (Audretsch et al., 2018). Saudi Arabia is one of the world's most populous countries, growing from 4 million in 1960 to more than 33 million in 2018 (General Organization for Statistics, 2019). 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 (MEWA, 2019). We also controlled for the level of education; a culture may be affected by the level of education, which may be needed for sustainable developmental objectives at all levels and in all social arenas, to transform society by reclassifying and updating education and to aid individuals in developing the skills and values required for sustainable development (Zahedi & Otterpohl, 2015). In addition, the extant literature showed a significant and positive influence of education and sustainability orientation on green entrepreneurship inclination (Soomro et al., 2019). Furthermore, research has suggested that education has a positive correlation with entrepreneurial activity (MoE, 2019), and this variable was measured as the percentage of people with tertiary educational levels in each city. Both the independent variable and the control variables were also standardized. A summary of the variables that we used in this study is presented in Table 4.1.

Table 4.1: Description of the variables

	Variable	**Description**	**Source**
Dependent variable	Green entrepreneurship	This variable shows the percentage of SMEs that are environmentally friendly out of the total number of SMEs in the city. Green	Annual reports of the General

		entrepreneurship can be measured as environmental commitment (OECD, 2011). The variable was standardized.	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 (Egri et al., 2012; Jolink & Niesten, 2013). The variable was standardized.	Annual reports of the General Authority for Statistics in Saudi Arabia.
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 (General Organization for Statistics, 2019). The variable was standardized.	
	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 (Liu & Xin, 2014), 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 resources 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 kilometres (km^2). The variable was standardized.	
Education	The percentage of people who have tertiary education in each city. The variable was standardized.	

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

4.3.2 Method and Model

Fixed-effect (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:

$$LnGE_{it} = \alpha + \beta_1 LnEA_{it} + \beta_2 LnEC_{it} + \beta_3 LnTO_{it} + \phi_k LnCV_{k,it} + \varepsilon_{it} \qquad (1)$$

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 the 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 the variables were transformed into natural logarithms to facilitate a direct interpretation (Urbano & Aparicio, 2016).

A city-level analysis enhances the detailed exploration of entrepreneurship trends, both within and between states, as these can vary significantly (Estrin et al., 2013b). In addition, since different cities may increase the level and regularity of observations, this may lead to 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 enabled us to observe time effects using a cross-regional approach (Baltagi, 2008). Panel data are also better able to measure and identify effects that are not detectable simply in pure cross-sectional or pure time series data (Baltagi, 2008). 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 (Baltagi, 2008).

As noted, the advantages of this methodology in this study included the ability 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.

4.4 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, and temporal orientation. The test revealed that some of the variables had significant positive relationships and some had 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, a correlation existed 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 4.2: 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; and VIF = variance inflation factor.

Multicollinearity analysis was conducted prior to 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 a study is the variance inflation factor (VIF). Values above 0.90 are suggestive of a multicollinearity problem (Bondell et al., 2010). A VIF value in excess of 10 is also concerning (Hair, 2010). 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 for the variable of education. However, given the

pre-existing knowledge of the role of education in these conditions (MoE, 2019; Zahedi & Otterpohl, 2015) and the fact that potential collinearity is not harmful enough (Mason & Perreault, 1991; Myers, 1990), we considered all the independent and control variables to be relevant in supporting the internal consistency of our findings and analysis.

Table 4.3 describes all of the linear regression models. Only the controlled variables were included in Model 1, which was a starting point for 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 the hypotheses (Models 5, 6, and 7). Finally, an additional Model 8 was explored, which included all the 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, tests were performed using a new set of models without the control variable, education. Appendix 2 shows that the results for the main variables remained similar to those in Table 4.3.

The hypothesis testing 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 the running of the business with sustainability ideals (Egri et al., 2012). A further variable employed to understand green entrepreneurship was 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 can incrementally enhance the environment through their own businesses, and, with their products and services, they are potentially able to educate a wide audience regarding the many advantages of

environmental protection (Kluckhohn, 1951). 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 (Shipp et al., 2009). Temporal orientation had a significantly positive influence on green entrepreneurial measures within Saudi Arabia.

Table 4.3: Regression analysis (DV = green entrepreneurship)

	1	2	3	4	5	6	7	8
Environmental actions		0.215 *			0.265 **			0.282 **
		(0.113)			(0.111)			(0.115)
Environmental consciousness			0.274 **			0.292 **		0.305 ***
			(0.109)			(0.107)		(0.102)
Temporal orientation				0.275 *			0.244	0.342 **
				(0.147)			(0.160)	(0.132)
Population of the area	−0.056 ***				−0.075 ***	−0.065 ***	−0.052 ***	−0.080 ***
	(0.008)				(0.012)	(0.008)	(0.009)	(0.012)
Size of the city	0.000				0.000	0.000	0.000	0.000
	(0.001)				(0.001)	(0.001)	(0.001)	(0.001)
Annual growth rate	0.246 **				0.268 **	0.250 **	0.197	0.204 *
	(0.116)				(0.110)	(0.112)	(0.129)	(0.106)
Education	0.080				0.096	0.092	0.113	0.156 **
	(0.094)				(0.089)	(0.080)	(0.093)	(0.061)
Constant	0.564 *	0.813 ***	0.784 ***	0.773 ***	−0.039	0.046	0.177	−1.162 **
	(0.294)	(0.221)	(0.179)	(0.247)	(0.348)	(0.303)	(0.398)	(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. Note: DV = dependent variable.

4.5 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 to solving environmental issues in Saudi Arabia.

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 endeavours (Roy & Goll, 2014). Actions and motivations derive from the need to tackle environmental issues, resulting in alternative and enhanced environmentally friendly products and practices that are widely disseminated (Schaltegger, 2002). 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 (Gibbs & O'Neill, 2014). Green entrepreneurs were thus identified as novel entrepreneurial players, in search of ways to fuse environmental awareness and business acumen in a holistic way (Tilley & Parrish, 2006). Indeed, it is their overall objective regarding the sanctity of the environment that separates them from other entrepreneurs (Kluckhohn, 1951). 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 (Bird & West, 1998).

4.5.1 Implications for Theory

Green entrepreneurs become 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 regarding 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 (Lotfi et al., 2018). This allows entrepreneurs to develop an emotional engagement that helps their venture to succeed in its sustainable goals by understanding the contextualized societal culture. An important implication for the analysis of informal institutions (North, 1990, 2005), 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 towards a more environmentally 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 of sustaining the environment and ecosystems whilst promoting both economic and non-economic gains for investors and society in general (Pacheco et al., 2010). 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 indicating 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, a further theoretical understanding may better guide scholars studying Saudi Arabia to advance the comprehension of culture and the society's awareness of sustainability further. It may also serve to encourage the advertising of results related to sustainability to increase their legitimacy and the support from the entire population as well as from entrepreneurs.

4.5.2 Implications for Practice

We focused on different cities in different regions of Saudi Arabia. The 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 a 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 show, the 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 who operate on an intra-city basis may benefit from such an approach. Our study offers insights to aid entrepreneurs in coping with the challenges of strategically balancing sustainability practices as international ventures with the expectation of being local between cities that have common shared cultural values and corporate sustainability.

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

4.5.3 Limitations and Future Research

Despite these strengths, there are limitations to this study. Firstly, as the present chapter 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 (Meek et al., 2010). For example, firstly, it would be supportive to consider variables at the city level, such as crime rates, air pollution, unofficial companies, and so on. Secondly, we used secondary data for the 2015–2018 period; subsequent

studies should focus on a wider time span to undertake long-term analyses, in which dynamic effects may also highlight the different or similar responses of entrepreneurs when institutional factors change in developing countries (Urbano et al., 2019c). Thirdly, as it was mentioned, the previous chapter suggested that 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 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 (Schillo, 2016). Further efforts are needed to create homogeneous information concerning green entrepreneurship as well as its antecedents and those consequences beyond economic terms (Aparicio et al., 2020b). Future research should improve the quality and scope of the indicators, for both dependent and independent variables, which may increase the reliability and the ability to analyse causal relationships in a cross-sectional setting (Urbano et al., 2019b).

Chapter 5:

The Influence of Green Entrepreneurship on the Sustainable Development of Saudi Arabia: The Role of Formal Institutions

5. The Influence of Green Entrepreneurship on the Sustainable Development of Saudi Arabia: The Role of Formal Institutions

5.1 Introduction

Successful sustainable development meets the needs of the present without compromising those of future generations (Brundtland et al., 1987; Maskay, 2006; Terán-Yépez et al., 2020). Traditional conceptions of sustainability have typically included three major dimensions: environmental, economic, and social (Delai & Takahashi, 2011; Khan et al., 2016; Mamede & Gomes, 2014; Svensson & Wagner, 2015). According to Kahn (2013), various factors related to these three dimensions are used to describe those who tend to exploit sustainable development. The social dimension of sustainability includes factors such as safety, health, and social concerns (Delai & Takahashi, 2011; Khan et al., 2016). On the economic front, Svensson and Wagner (2015) highlighted factors such as profits and business dynamics. Brocke et al. (2012) and Gevrenova (2015) stressed the substantial role of green businesses in the pursuit of environmentally friendly and sustainable development. The environmental dimension of sustainability covers ecological degradation, carbon labelling, product dematerialization, and efficiency improvement programmes (Mutisya & Yarime, 2014; Svensson & Wagner, 2015). It has been argued that entrepreneurs, or more specifically green entrepreneurs, who aim to achieve both business and environmental goals, have a transformative influence on their sectors and play a major role in sustainable development (Johnson & Schaltegger, 2020; O'Neill & Gibbs, 2016).

Theoretically speaking, entrepreneurship exerts an influence on economic outcomes (including sustainability). However, such an influence differs from country to country because entrepreneurship acts within a concrete institutional landscape and its behaviour is shaped by this context (Aidis et al., 2008). Green entrepreneurs are a part of complex sociotechnical networks and are affected by other actors, social institutions, policies, and regulations. Zahraie et al. (2016) found that green entrepreneurs struggle to break through dominant trends but that regulative

support at appropriate moments may help this transition by promoting a vision for collective action. Similar findings were reported by Demirel et al. (2019), who suggested that governments play a large role in giving green entrepreneurship legitimacy by awarding contracts, enforcing environmental legislation, or facilitating financing. Yi (2020) observed that university-level support of green entrepreneurship fosters an enabling environment for green businesses. While these studies have provided evidence of the link between institutional policies and green entrepreneurship in Organisation for Economic Cooperation and Development economies, little research has been carried out on Gulf Cooperation Council countries. For example, although scholars have provided evidence supporting the link between environmental entrepreneurship and sustainability in developed economies (Fernandes et al., 2021; Zahraie et al., 2016), it is unclear whether one is present in developing countries such as Saudi Arabia.

The present study explored the extent to which green entrepreneurial activity has affected sustainable development and the role played by formal institutions and entrepreneurship policies in Saudi Arabia in fostering these. Institutional economics (North, 1990) was used as the basis for understanding the relationship between green entrepreneurship and sustainable development, which was tested through panel data models from more than 13 Saudi Arabian cities during the period 2012 to 2017. Using information from the General Authority for Statistics in Saudi Arabia, we learnt that green entrepreneurship is an antecedent of economic, social, and environmental outcomes in the country. Entrepreneurship policies also produced important results because the green entrepreneurship–sustainable development relationship was potentiated when governments positively intervened through initiatives that encouraged entrepreneurial activity.

The study extends previously available frameworks, such as endogenous growth theories and the Schumpeterian theory of entrepreneurship, by treating sustainable development as a composite index with economic, social, and environmental elements (Potluri & Phani, 2020). It addresses a gap in the existing literature because the entrepreneurship policies implemented in Saudi Arabia cover several dimensions of sustainability. First, we studied the influence of green entrepreneurship on sustainable development by integrating further insights into the conversation involving green and non-green entrepreneurship and sustainable development. Terán-Yépez et al. (2020) noted that there is no readily available theoretical framework to explain fully the

relationship between green entrepreneurship and sustainable development. From a theoretical perspective, a number of prominent journals have encouraged research into sustainability, arguing that there is still much to understand in relation to sustainable entrepreneurship in terms of its development and integration with meaningful practical activity (Criado-Gomis et al., 2017). There is a lack of research explicitly examining the relationship between green entrepreneurship and environmental development. Second, to assist practitioners, we considered the empirical evidence regarding sustainable development and green entrepreneurial practices and suggested that managers of green and non-green companies may benefit from an analysis of these results. Our research revealed differences in approaches to green entrepreneurship and sustainable development in different regions of Saudi Arabia, highlighting the benefits that are likely to be accrued from sharing knowledge in this rapidly developing economy.

5.2 Institutional Economics, Green Entrepreneurship, and Sustainable Development: A Framework for the Saudi Arabian Context

To comprehend the possible mechanisms behind the relationship between green entrepreneurship and sustainable development, we used institutional economics (North, 1990, 2005), a widely utilized theoretical lens for entrepreneurship research on the role of interactions and choices in economic evolution (Acs et al., 2018; Bruton et al., 2010; Thornton et al., 2011; Urbano et al., 2019c). As it was mentioned, scholars have explored institutions as antecedents of entrepreneurial activity and their relationship with economic growth (Aparicio et al., 2016; Bjørnskov & Foss, 2016; Bosma et al., 2018; Terán-Yépez et al., 2020; Urbano et al., 2019c). The present study focused on formal institutions in Saudi Arabia because it will more readily inform the decisions of the country's policymakers.

As it was mentioned, government policies help to establish the conditions for boosting environmentally friendly entrepreneurship (Dai & Si, 2018). The need for development through

entrepreneurship has to be balanced with the need to preserve the opportunity for future generations to reach and enjoy a high quality of life and to sustain the environment; this is what the Saudi Arabian Government is trying to achieve. Vision 2030 for Saudi Arabia includes a suite of government-level policies that support economic and social improvements. A particular focus of the Saudi Arabian Government and the executive has been on reducing the country's dependency on oil as one of the major industries and on diversifying into other sectors, such as clean energy, health, and tourism. Green entrepreneurship and a focus on a holistic approach to economic development that balances people, profit, and the planet is thus a cornerstone of Saudi Arabia's long-term national strategy (Alwakid et al., 2020).

As it was mentioned, the policies adopted by Saudi Arabia are consistent with the rising need to address environmental threats and to protect the environment (Alwakid et al., 2020; Yi, 2020). Indeed, Ndubisi and Nair (2009) suggested that there is a need for companies to adopt a green approach. In developing countries, environmental actions are of prime importance (Lotfi et al., 2018). However, it is not clear whether the actions of the Saudi Arabian Government are having their intended effects. It is possible that the government either uses resources inefficiently or faces obstacles in implementing environmental policies. As such, it is important to assess whether the formal institutions in Saudi Arabia have had a significant effect on the role of green entrepreneurship.

5.3 Literature Review and Hypotheses

5.3.1 Green Entrepreneurship and Sustainable Development

Green entrepreneurship and sustainable development are very closely linked (Johnson & Schaltegger, 2020). Previous studies have not always agreed on the direction of causality, and the relationship has often been viewed as bidirectional with feedback loops (De Marchi & Grandinetti, 2013; Hoogendoorn et al., 2015; Maskay, 2006). This has been explained mainly by the lack of a clear theoretical framework and the complexity of measuring sustainability (Ukko et al., 2018; Yoon et al., 2016). Rodrigues and Franco (2019) developed systematic indicators to assess the

degree of sustainable development through the lens of social, economic, and environmental indicators in Portuguese cities. The researchers used exploratory factors and principal component analysis to devise a composite index of sustainability. The drivers of sustainable development included the level of urbanization and social inclusion and waste management methods. Similarly, Ukko et al. (2018) assessed the implications for sustainable development in terms of certain social, environmental, and economic dimensions.

The social dimension of sustainability highlights the relationship between entrepreneurship and its stakeholders and factors such as safety, health, and social concerns (Delai & Takahashi, 2011; Khan et al., 2016). Maintaining social capital requires entrepreneurs to invest in areas such as education (Goodland, 1995). Delai and Takahashi (2011) and Khan et al. (2016) elaborated on social determinants to explain the relationship between stakeholders and firms through human capital development, job creation, health factors, social recognition, and safety-related issues. Galdeano-Gomez et al. (2013) stated that the direct influence of social factors on the well-being of the community and people has gradually led to firms' exploitation of green entrepreneurship and practices. Ukko et al. (2018) found that social factors drive the intention to exploit sustainability initiatives. However, despite these forces, social sustainability faces a number of challenges, such as balancing societal and economic welfare with individual needs and nature's capabilities. This has been highlighted by Choi and Ng (2011), He et al. (2016), and Lioutas and Charatsari (2018). Cai and Zhou (2014) and Jakhar (2017) identified social recognition as a major element in driving green innovation. On the basis of the literature, the following hypothesis was proposed to examine the relationship between the dependent variable of green/non-green entrepreneurship and the social dimension of sustainability:

Hypothesis 1: The influence of green entrepreneurship on the social dimension is greater than that of non-green entrepreneurship.

On the economic front, Goodland (1995) and Mamede and Gomes (2014) used the maintenance of capital in a firm to assess the drivers of green entrepreneurship. Svensson and Wagner (2015) stressed factors such as profits, new markets, new business, and costs when examining the resources that provide exhaustible inputs for the production processes within a company. Sheth et al. (2011) stated that conventional financial indicators, such as cost reduction in operations and

external stakeholders' welfare, motivate firms to adopt green innovations and pursue sustainability. Lee (2015) and Lioutas and Charatsari (2018) claimed that cost-saving motivators stimulate green innovation and entrepreneurship. Hojnik and Ruzzier (2016) and Horbach et al. (2013) also connected the externalities associated with cost-saving schemes that drive environmental research and development investments, thus leading to organizational and processual eco-innovation. Generically, economic sustainability in green entrepreneurship is characterized by the generation of prosperity across society as a whole, stimulating economic activity, productivity, competitiveness, and the creation of quality jobs (Pozdniakova, 2017).

This institutional context shapes the conditions and constraints for businesses, which are hindered by high levels of corruption and weak property rights (Urbano et al., 2019a). Scholars have explored institutions as antecedents of entrepreneurial activity and their relationship with economic growth (Aparicio et al., 2016; Bosma et al., 2018). According to Urbano et al. (2019), the institutional approach provides a broad insight into how institutions are related to entrepreneurial activity as well as identifying the institutions that are the most important in reflecting the entrepreneurship rates that enhance economic growth. From the perspective of institutional economics, formal institutions can adjust their policies much more quickly than informal institutions (North, 2005). The difference can be particularly important when trying to accommodate practices that promote rapid economic growth. Governments are able to make quick adjustments to policies that facilitate the establishment of new enterprises, which may include sustainability-oriented businesses. Appropriate entrepreneurship policies may stimulate the adoption of green entrepreneurial practices that have a positive influence on the economy. At the same time, it is possible for institutional support to focus on economic growth in a way that may have negative effects. Based on the studies covering the economic dimension of sustainability, the following hypothesis is proposed:

Hypothesis 2: The influence of green entrepreneurship on the economic dimension is greater than that of non-green entrepreneurship.

Schaltegger et al. (2016) defined green and sustainable entrepreneurship as a process that is attained by solving social and environmental problems through the selection of sustainable market

opportunities using innovative techniques and business models. Studying social factors specific to human capital, Del Rio et al. (2015) and Huang et al. (2016) highlighted the notion that human capital development (i.e., training) pushes employees to engage in sustainable methods. Similar evidence was recorded by Qi et al. (2010), and Doran and Ryan (2012) argued that commitment in terms of human capital development and information flows leads to green innovation and entrepreneurship and in turn to sustainable development. Sustainability can only be achieved through the avoidance of resource depletion and the balancing of ecological factors for the benefit of future generations. Cowan (2018) and Khan (2018) pointed out that Saudi Arabia's dependence on oil production and exports is unsustainable.

Brocke et al. (2012) and Gevrenova (2015) noted the substantial role played by green businesses in the pursuit of environmentally friendly and sustainable development. Suggested measures for promoting a green entrepreneurial spirit included the use of organic products, stringent rules and regulations with regard to emissions and pollution, the efficient use of natural resources, and environmentally friendly practices for logistics and supply management. Environmental issues and unsustainable business practices have altered the pattern of consumer buying, and consumer purchasing patterns are gradually aligning with the supply of products that are driven by environmentally friendly production and marketing practices, creating an ecosystem of sustainability. Nikolaou et al. (2011) demonstrated that the foundations of green entrepreneurship were built by entrepreneurs who put their trust in green technologies and products. In light of the literature that has discussed the environmental aspect of sustainability, the following hypothesis on the dependent variable was proposed:

Hypothesis 3: The influence of green entrepreneurship on the environmental dimension is greater than that of non-green entrepreneurship.

5.3.2 The Role of Entrepreneurship Policy in Green Entrepreneurial Activity and Sustainable Development

Three further hypotheses were proffered to test the relationship between entrepreneurship policy and its moderating influence on the three dimensions of sustainability through the mechanism of

green/non-green entrepreneurial activity. These hypotheses stemmed from the literature on institutional theory, which has stated that both formal and informal institutions may influence the adoption of sustainable business practices. Governments may foster specific cultural and social norms that correspond to a bidirectional relationship between formal and informal institutions in the framework of institutional economics (North, 2005). Proper social conditions are necessary for the development of green entrepreneurship (Domańska et al., 2018). This suggests that entrepreneurship policies might moderate the effect of green entrepreneurship by offering additional incentives for socially responsible businesses, which would translate into a positive moderating relationship. However, government policies aimed at achieving rapid economic growth could offset this influence. As such, the net moderating impact of entrepreneurship policy on the social aspect of sustainable development may be ambiguous. In particular, formal institutional factors (e.g., entrepreneurship policy) could indirectly encourage safety and a higher quality of life through the promotion of socially conscious development.

Governments also have the capacity to enforce and promote environmentally sound production methods (Shuo, 2014) and to influence significantly firms' adoption of environmental entrepreneurship policies (Raines & Prakash, 2005). Entrepreneurship policies should be the key governmental concern. They should provide new incentives and ensure that environmental issues are more palatable (Baumgartner & Jones, 1993). Policies should focus on social values in order to motivate the entrepreneurial activity and then facilitate economic development (Aparicio et al., 2021a). Also, policy implications are suggested for both developed and developing countries to increase the economic performance of entrepreneurship (Aparicio et al., 2021b). In this regard, entrepreneurship outcomes could affect economic, social, and environmental issues.

Furthermore, green entrepreneurship is likely to be more effective in promoting environmentally responsible practices as governments adjust entrepreneurship policies and create greater awareness. Within the framework of institutional theory, this corresponds to the capacity of formal institutions to influence cultural and social norms (North, 1990). However, governments may prioritize more immediate social or economic problems over environmental concerns and therefore adjust entrepreneurship policies to tackle inequality, unemployment, poverty, and infrastructure deficiencies rather than pursuing sustainable development (Domańska et al., 2018). The net

moderating impact of entrepreneurship policy on the environmental aspect of sustainable development may then be ambiguous. A consequence of this approach concerns the government's above-mentioned capacity to enforce and promote environmentally sound production methods (Shuo, 2014). Three additional hypotheses were therefore proposed:

Hypothesis 4a: Entrepreneurship policy has a positive moderating influence on the relationship between green entrepreneurship and the social dimension of sustainable development.

Hypothesis 4b: Entrepreneurship policy has a positive moderating influence on the relationship between green entrepreneurship and the economic dimension of sustainable development.

Hypothesis 4c: Entrepreneurship policy has a positive moderating influence on the relationship between green entrepreneurship and the environmental dimension of sustainable development.

5.4 Methodology

5.4.1 Data and Variables

This section describes the data, sample, and methodology used in the present study, which drew on the reports from the General Authority for Statistics and the annual reports of the General Authority for Meteorology and Environmental Protection. Regional data for 13 cities in Saudi Arabia for the period 2012–2017 were extracted, and the cities were used as proxies for the regions. The two main independent variables in the study were green and non-green entrepreneurship in Saudi Arabia. Entrepreneurship policy constituted the third independent variable. The dependent variable was sustainable development. Data on this variable were not readily accessible and therefore had to be constructed as a composite index based on the available information. Appendix 3 contains a full table detailing the dependent, independent, and control variables.

5.4.1.1 Dependent Variables

The present study adopted the common approach of dividing sustainable development into economic, social, and environmental components, following Potluri and Phani (2020), who explored green entrepreneurship using the resource-based view (RBV). Following Secundo et al. (2020), the social dimension of sustainable development in the present study included expenditure on healthcare, social policy, education, and security. The social dimension of sustainable development comprised: (a) healthcare as a percentage of total government expenditure in the health and social development sector; (b) social policy – social investment in quality of life (i.e., total spending on development); (c) education as a percentage of the total government expenditure on education; and (d) security as a percentage of the total government expenditure on security and regional administration.

The social dimension of sustainable development was represented by a composite of several aspects, taking inspiration from the approach of Le et al. (2019) and Potluri and Phani (2020), who observed that higher education and healthcare play a major role in sustainability. They also suggested that the achievement of sustainable development requires effective responses to a wide range of social issues, including inequality, insecurity, and conflict. This justifies government expenditure in various social sectors and represents the social dimension of sustainable development.

The economic dimension of sustainable development was represented by a composite of three aspects, taking inspiration from Potluri and Phani's (2020) composite approach to resource variables and from Le et al. (2019), who argued for the impossibility of parsing sustainability and financial sector development in the modern world. Accordingly, the economic dimension of sustainable development in the present study included: (a) Saudi Arabia's employment and unemployment rates (using data gathered from the General Authority for Statistics), which represented a sensible proxy; (b) the level of financial development as measured by the density of banks, which was an indicator of economic growth driven by demand; and (c) the level of entrepreneurship and competition as measured by the proportion of small businesses within the market.

These factors were consistent with numerous studies confirming the existence of a relationship between the presence of small firms and the levels of entrepreneurial activity. For example, Goldstein (2001) and Le et al. (2019) claimed that sustainability cannot be analysed in isolation from financial inclusion and financial sector development. Eustachio et al. (2019) studied global sustainability goals and concluded that economic activity and employment were essential elements of sustainability. The present study's inclusion of small businesses followed the strategy of Cantele and Zardini (2018), who found that small enterprises gain significant competitive advantages through green entrepreneurship. We therefore expected the small business sector to be a significant contributor to sustainability.

The environmental dimension of sustainable development was measured using several variables, including: (a) waste management; (b) recycling, based on empirical evidence showing how the use of recycling and waste reduction help to achieve sustainable production (Bostanci, 2020) – the preservation of the environment in cities and in rural regions has frequently been used as a factor in previous empirical research (del Mar Martínez-Bravo et al., 2019; DesRoches, 2020; Erbaugh et al., 2019); (c) development assistance to conserve biological diversity; and (d) the Agricultural Trend Index (with data gathered from the General Authority for Statistics). All the variables were rescaled to obtain comparable value ranges.

Appendix 4 provides a summary of the factor analysis of the economic, social, and environmental components of sustainable development. The components of sustainable development were taken as the first principal components of the corresponding decomposition. The Kaiser–Meyer–Olkin Index was at least 0.75 for all three components of sustainable development, indicating that it was appropriate to use factor analysis to describe the data. Appendix 4 uses principle component analysis (PCA) to show again the suitability of factor analysis.

5.4.1.2 Independent Variables

For the independent variables, we considered green and non-green entrepreneurship. In Saudi Arabia, no database exists for green entrepreneurship, so we used a proxy to measure them. The

First Voluntary National Review (Kingdom of Saudi Arabia, 2018) determined whether Saudi Arabian firms had adhered to the standards of green entrepreneurship. This evaluation was based on the parameters set by the United Nations, which has called for the development and growth of businesses that meet sustainability goals. To measure these variables, we considered the number of firms that had adopted an environmentally sustainable business model as a proxy for green entrepreneurship and the number of firms with high pollution rates (e.g., tonnes of carbon emissions) based on annual reports from the General Authority for Meteorology and Environmental Protection as a proxy for non-green entrepreneurship.

Entrepreneurship policy constituted another important independent variable in the present study, expanding on Obaji and Olugu's (2014) research by exploring the moderating influence of entrepreneurship policy on the relationship between entrepreneurship and various dimensions of sustainable development. Entrepreneurship policy was understood as the set of incentives and government procedures that facilitate the entrepreneurial process of establishing a company. Shuo (2014) explained how governments apply different mechanisms, such as subsidies, tax incentives, and government procurement guidelines, which enhance the economy's capacity to support entrepreneurial activity and affect entrepreneurs directly. All the variables were rescaled to obtain comparable value ranges on a 5-point Likert-style scale: 1 = very low or none, 2 = low or minor, 3 = moderate or significant, 4 = high, and 5 = very high.

5.4.1.3 Control Variables

We included other variables in the model to control for additional factors that might help to explain sustainable development. We controlled for Saudi Arabia's national annual growth rate, which represented the value of the country's resources and which is increasingly sensitive to competitive forces in world markets. Environmental issues are sensitive to world markets because they shape the potential for economic growth by conditioning survival. In Saudi Arabia, the unsustainable use of resources is an important issue, a consequence mainly of the unavailability of natural resources (MEWA, 2019). The data source for the annual growth rate was the annual reports of the General Authority for Statistics (2012–2017). Values for the annual growth rate were drawn from the 5-year average for each city.

We also considered environmental consciousness, measured as the percentage of natural resources that were maintained at an appropriate level. This variable represented the reduction in the use of natural resources relative to output, that is, the extent to which a city was balanced in its use of natural resources (General Authority for Statistics, 2020). According to Alwakid et al. (2020), environmental consciousness is positively associated with green entrepreneurship in Saudi Arabia. We controlled for the population of the area studied since green entrepreneurship aims to minimize the threats that may occur as a result of a decrease in natural resources, such as an increase in population growth (Uslu et al., 2015; Zahedi & Otterpohl, 2015). The data for this control variable were again extracted from the annual reports of the General Authority for Statistics. The variable's value was the population size, which increased in each area during the 5-year study. The size of a city (which was included as a control variable) may affect the availability of natural resources and its rate of natural resource depletion; a larger city leads to a greater demand for natural resources (MEWA, 2019).

We also used the level of education in each city as a control variable. Governments aim to improve access to high-quality education, which may be required for the achievement of sustainable development at all levels and in all social contexts. Effective policies can transform a society by reorientating the education system and helping individuals to develop the knowledge, skills, values, and behaviours needed for sustainable development (MoE, 2019). This variable was measured using the percentage of people with a postgraduate degree in each city. According to Al-Barawi et al. (2017), an increase in the number of postgraduate students is of the utmost importance to entrepreneurship. The average number of beneficiaries of basic services (e.g., water and electricity utilities) and economic activity – as measured using the per capita growth in the total output – was included as an additional control variable.

We also controlled for the preservation of the environment in the agricultural and municipal sectors, namely temporal orientation, which we defined as the rate at which public and private organizations adopted environmental measures in each city. According to Alwakid et al. (2020), temporal orientation is positively associated with green entrepreneurship in Saudi Arabia. Entrepreneurs operating in environments of high temporal orientation often need to compete with

other firms by taking advantage of the dynamic market conditions to create novel products or services, thus addressing emerging environmental needs (Zahra, 1996). The final control variable was innovation policy. This is a relatively new concern for policymakers (Minniti, 2008). Mohnen and Röller (2005) noted that innovation policy encompasses a range of policies that encourage firms to create and offer new products and services. The values for this particular variable were based on a 5-point Likert-style scale: 1 = very low to 5 = very high. Appendix 3 provides further details about the variables.

We ensured that all of the firms included in the dataset could be considered as entrepreneurial, which we determined through their age and/or their size measured by their turnover at the time of the data collection. Kücher et al. (2020) regarded any firm under the age of 3 years to be entrepreneurial in nature. Beyond that, a firm is typically considered to have moved into a secondary phase of maturity (Marom & Lussier, 2014); as both regional and global studies on the survival rates of small firms have indicated, failure is most likely to occur in this period. Firm size was also treated as a proxy for entrepreneurial activity. Revilla et al. (2016) showed that smaller firms retain the characteristics of entrepreneurship and entrepreneurial orientation even as they mature. This is evidenced by their agility, responsiveness, and adaptability. It was therefore appropriate for the present study to focus on green entrepreneurship.

5.4.2 Modelling Approach

Fixed-effect (FE) models were used to determine whether green and non-green entrepreneurship influence sustainable development and to test the moderating influence of entrepreneurship policy on the relationship between green entrepreneurship and various dimensions of sustainable development. Equation (1) specifies the overall FE model:

$$SD_{it} = \alpha + \beta_1 GR_{it} + \beta_2 NonGR_{it} + \beta_3 GR_{it} \times EntP_{it} + \beta_4 NonGR_{it} \times EntP_{it} + \beta_5 EntP_{it} + \gamma Controls_{it} + \varepsilon_{it}, \quad (1)$$

where SD is one of the three components of sustainable development, GR and $NonGR$ are green and non-green entrepreneurship, $EntP$ is entrepreneurship policy, and $Controls$ is the vector of

the control variables. Each variable was normalized by its standard deviation and transformed using natural logarithms to improve the fit of the linear model.

The use of the FE technique allowed us to observe the time effects following a cross-regional approach (Baltagi, 2008; Cumming et al., 2014). Panel data are also better able to measure and identify effects that are not detectable simply in pure cross-sectional or pure time series data (Baltagi, 2008). 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, which stemmed from unnecessary fixed effects (Baltagi, 2008).

A city-level analysis enhanced the detailed exploration of entrepreneurship trends, both within and between states, as these can vary significantly (Estrin et al., 2013b). In addition, different cities may have increased the level and regularity of observations, leading to higher levels of confirmed and verified results. Considering different cities in an array of locations allowed us to evaluate any significant influence, and the panel data technique enabled us to observe time effects using a cross-regional approach (Baltagi, 2008).

5.5 Results

The key descriptive statistics for the variables are shown in Table 5.1. Economic factors varied from -2.247 to 3.484, with an average of 0.000. Social factors ranged from -2.526 to 4.044, with an average of 0.000 (*SD* = 1.578). Environmental factors ranged from -2.566 to 2.992 (*M* = 0.000, *SD* =1.627). Green entrepreneurship varied from -4.212 to 1.300 (*M* = -1.273, *SD* = 1.599); non-green entrepreneurship ranged from -2.087 to 1.227, with an average of -0.378 (*SD* = 1.012).

Table 5.1: Summary statistics

Variable	N	Mean	Std Dev.	Min.	Max.
Dependent					
Economic factors	78	0.000	1.653	-2.247	3.484

Social factors	78	0.000	1.578	-2.526	4.044
Environmental factors	78	0.000	1.627	-2.566	2.992
Independent					
Green entrepreneurship	78	56204.81	69147.11	1025	253653
Non-green entrepreneurship	78	80906.64	74476.37	9241	254032
Controls					
Resources	78	3.475	1.291	1.402	7.421
Population	78	2232516	2737204	139114.2	1.42E+07
Education	78	6.408	1.875	3.262	11.181
City size	78	144677.1	137752	5287.588	769082.3
Economic activity	78	0.255	1.154	-4.419	2.196
Environmental preservation	78	30.090	17.000	6	87
Basic services	78	82.723	15.388	46.442	100.000
Environmental consciousness	39	6.182	3.081	2.108	15.536
Innovation policy	52	2.085	0.954	1	5
Temporal orientation	39	59.347	22.779	25.721	135.861
Interaction variables					
Entrepreneurship policy	52	1.783	0.819	1	5

Pearson's correlation revealed that some of the variables had significant positive relationships and others insignificant relationships. For example, environmental factors showed a strong correlation with green entrepreneurship (r = 0.916), whereas there was a moderate correlation between social factors and non-green entrepreneurship (r = 0.643). Table 5.2 shows that both green entrepreneurship and non-green entrepreneurship were highly correlated with the components of sustainable development. The correlation between independent variables was moderate to low, suggesting that there were no multicollinearity problems in the sample. Entrepreneurship policy did not appear to be correlated with the components of sustainable development.

Table 5.2: Correlation matrix

	Variable	1	2	3	4	5	6	7	8
1	Economic factors	1							
2	Social factors	0.836	1						
3	Environmental factors	0.938	0.862	1					
4	Green entrepreneurship	0.943	0.811	0.916	1				
5	Non-green entrepreneurship	0.795	0.643	0.768	0.893	1			
6	Resources	-0.074	-0.072	-0.096	-0.116	-0.096	1		
7	Population	0.602	0.398	0.570	0.606	0.690	0.134	1	
8	Education	0.540	0.407	0.481	0.582	0.531	0.126	0.486	1
9	City size	0.005	-0.011	0.045	-0.004	0.041	0.129	0.154	-0.065
10	Economic activity	-0.080	-0.090	-0.068	-0.083	-0.119	-0.139	-0.146	-0.187
11	Environmental preservation	-0.013	-0.037	-0.012	-0.001	-0.018	-0.141	0.023	0.000
12	Basic services	0.171	0.087	0.163	0.077	0.083	0.143	0.179	-0.054
13	Environmental consciousness	-0.119	0.075	0.041	-0.087	-0.053	0.035	0.062	-0.102
14	Temporal orientation	-0.108	-0.131	-0.130	-0.163	-0.229	-0.147	-0.069	-0.205
15	Innovation policy	0.189	0.279	0.198	0.169	0.140	-0.045	0.150	0.138
16	Entrepreneurship policy	0.054	0.018	-0.007	0.028	0.020	0.028	-0.001	-0.182

Table 5.3 presents a synthesis of the key results of all the linear regression models evaluating the social, economic, and environmental dependent variables. Only the controlled variables were included in models 1, 4, and 7. The other three models (2, 5, and 8) were then set, each with one predictor representing each hypothesis. Finally, additional models (3, 6, and 9), which included all the predictors (i.e., independent variables, controls, and interaction terms), were explored. Throughout this empirical strategy, we tested whether different linear combinations created different results or whether a robust specification was found; the full tables are presented in Appendices 5, 6, and 7. Table 5.3 contains the results of all the FE models. The random-effect (RE) models were practically identical, and the Hausman test results revealed that it was more appropriate to use the FE model since the p-value was less than 0.05. This means that we could

reject the null hypothesis, which was H0 = RE. We noted similarities to the FE estimation across the models.

Table 5.3: Social, economic, and environmental factors

	Social factors			Economic factors			Environmental factors		
Main independent variables									
Green entrepreneurship	0.910***	2.182***	2.179***	1.077***	1.185*	1.220**	1.066***	1.115***	1.117***
	(0.118)	(0.609)	(0.666)	(0.142)	(0.560)	(0.431)	(0.162)	(0.322)	(0.328)
Non-green entrepreneurship	0.208	-6.294	-6.228	-2.053	-9.174	-10.407	-0.526	-5.821	-5.848
	(2.318)	(5.077)	(5.342)	(1.179)	(5.704)	(6.070)	(2.687)	(6.028)	(5.996)
Interaction terms									
Green entrepreneurship Policy			-0.011			-0.739*			0.004
			(0.362)			(0.346)			(0.229)
Non-green entrepreneurship Policy			0.007			1.071**			-0.002
			(0.487)			(0.483)			(0.320)
Controls									
Entrepreneurship Policy		-0.064	-0.079		-0.119	-0.796**		0.090	0.096
		(0.154)	(0.401)		(0.185)	(0.281)		(0.117)	(0.224)
Resources	0.101	0.436**	0.438**	0.008	-0.002	-0.011	0.036	0.121	0.121
	(0.280)	(0.182)	(0.188)	(0.131)	(0.173)	(0.186)	(0.110)	(0.135)	(0.148)

Population	-0.041	-0.398*	-0.396	0.146	0.394	0.434**	0.015	0.079	0.078
	(0.233)	(0.217)	(0.241)	(0.085)	(0.254)	(0.191)	(0.073)	(0.191)	(0.196)
City size	-0.249	-0.370	-0.371	0.119	0.098	0.272	-0.036	0.355**	0.356*
	(0.256)	(0.233)	(0.275)	(0.116)	(0.226)	(0.204)	(0.118)	(0.147)	(0.168)
Education	-0.023	-0.404*	-0.398	0.028	-0.693	-0.625	0.319**	0.356	0.353
	(0.294)	(0.222)	(0.235)	(0.133)	(0.406)	(0.452)	(0.127)	(0.315)	(0.326)
Economic activity	-0.040	0.030	0.028	-0.013	0.003	-0.028	0.029	0.029	0.029
	(0.084)	(0.081)	(0.105)	(0.063)	(0.065)	(0.059)	(0.032)	(0.032)	(0.034)
Environmental preservation	-0.133	0.320**	0.320*	-0.050	-0.072	-0.024	0.033	-0.004	-0.004
	(0.123)	(0.145)	(0.161)	(0.062)	(0.089)	(0.111)	(0.081)	(0.091)	(0.099)
Basic services	-0.640	-0.457	-0.467	0.402	1.055	1.142	-0.321	-0.229	-0.225
	(0.685)	(0.663)	(0.789)	(0.310)	(0.699)	(0.674)	(0.223)	(0.540)	(0.575)
Environmental consciousness		-0.228	-0.225		-0.483*	-0.253		0.270	0.269
		(0.167)	(0.200)		(0.230)	(0.303)		(0.321)	(0.349)
Temporal orientation		-0.183	-0.187		-0.063	-0.185		-0.005	-0.003
		(0.346)	(0.384)		(0.244)	(0.188)		(0.167)	(0.177)
Innovation policy		0.406	0.409		-0.105	-0.194**		-0.034	-0.036
		(0.241)	(0.271)		(0.144)	(0.088)		(0.091)	(0.109)
Constant	2.159	1.301	1.329	0.078	-1.871	-2.348	1.256	-0.725	-0.737

	(1.767)	(1.678)	(1.800)	(0.687)	(2.230)	(1.952)	(0.993)	(1.546)	(1.536)
N	78	39	39	78	39	39	78	39	39
R^2 within	0.476	0.789	0.789	0.807	0.447	0.625	0.823	0.732	0.732
R^2 between	0.709	0.389	0.387	0.075	0.714	0.724	0.860	0.636	0.637
R^2 overall	0.644	0.305	0.302	0.031	0.676	0.684	0.842	0.589	0.590

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

There was a positive association between green entrepreneurship, non-green entrepreneurship, and sustainable development in different regions of Saudi Arabia, so hypothesis 1 was confirmed. We found that green entrepreneurship had a significant positive effect on the dependent variable in the full model (0.883, $p < 0.05$), whereas non-green entrepreneurship had a non-significant effect. Hypothesis 2 argued that the influence of green entrepreneurship on the economic dimension was greater than the influence of non-green entrepreneurship. We found that green entrepreneurship was positively related to the economic dimension. Like Pozdniakova (2017), we saw that green entrepreneurship had a significant positive influence on the dependent variable in the full model, whereas non-green entrepreneurship had no significant impact on economic factors; this was consistent with hypothesis 2.

The third hypothesis, hypothesis 3, suggested that the influence of green entrepreneurship on the environmental dimension was greater than that of non-green entrepreneurship. Green entrepreneurship was positively associated with the environmental dimension, so hypothesis 3 was fully supported. This was consistent with the empirical findings of Svensson and Wagner (2015). In addition, we found that green entrepreneurship had a significant positive influence on the dependent variable in the full model (1.067, $p < 0.05$), whereas non-green entrepreneurship had a non-significant negative influence. Thus, only green entrepreneurship appeared to boost the environmental component of sustainable development.

Green entrepreneurship had a significant positive influence on the dependent variable in the full model, whereas non-green entrepreneurship had a non-significant effect. In other words, green entrepreneurship appeared to improve social factors. This was consistent with the findings of Estrin et al. (2013), who used bi-panel data to demonstrate a link between social entrepreneurship

and social capital under conditions of low government activism. We also observed, however, that non-green entrepreneurship did not influence this component of sustainable development, so H1 was supported. The interaction term for green entrepreneurship was not statistically significant; in other words, green entrepreneurship had a similar influence on social factors regardless of entrepreneurship policy, so hypothesis 4a could not be confirmed.

Green entrepreneurship had a significant positive influence on the dependent variable in the full model, whereas non-green entrepreneurship had a non-significant effect. Non-green entrepreneurship also had no significant impact on economic factors, which was consistent with hypothesis 2. The interaction term for green entrepreneurship was negative and significant at the 0.10 level, suggesting that the influence of green entrepreneurship on economic factors decreased with the quality of entrepreneurship policy. This contradicted H4b. The findings therefore varied from those of Silajdžić et al. (2015), who studied the effect of green entrepreneurship policies on economic growth in developing economies, although, admittedly, the countries under review in their analysis were recovering from armed conflict, thus implying that the contextual circumstances were potentially an influencing factor.

Other statistically significant results are presented in Table 5.3. Environmental consciousness (a proxy for education) and innovation policy had a bearing on the relationship between green and non-green entrepreneurship and organizational outcomes. Environmental consciousness (0.483, $p < 0.10$) and innovation policy (0.194, $p < 0.05$) were calculated as being significant at the 0.10 and the 0.05 level, respectively, from which it can reasonably be inferred that longitudinal policies on educational attainment, coupled with wider environmental and innovation policies, were encouraging nascent business owners to adopt at least some green entrepreneurial behaviours. These findings were consistent with hypothesis 1 and hypothesis 4a.

Green entrepreneurship had a significant positive influence on the dependent variable in the full model, whereas non-green entrepreneurship had a non-significant negative effect. Thus, only green entrepreneurship appeared to boost the environmental component of sustainable development. This was consistent with H3 and much of the literature in the field, such as Estrin et al. (2013a), Pozdniakova (2017), and Svensson and Wagner (2015). The interaction term for green

entrepreneurship was not significant at the 0.10 level. This indicated that the positive impact of green entrepreneurship on environmental factors did not depend on the quality of the entrepreneurship policy, thus contradicting hypothesis 4c.

In summary, a comparison of hypotheses 1, 2, and 3 showed strong significant relationships between proactive green entrepreneurship and social, economic, and environmental outcomes, but the data suggested that non-green entrepreneurship had a non-significant effect. It was therefore concluded that, overall, there was a statistically significant relationship between green entrepreneurship and social and environmental outcomes, which in turn collectively supported economic outcomes.

In addition, we calculated Cronbach's alpha as a measure of internal reliability of the Likert-scored elements of the research instrument, that is, in relation to innovation policy and environmental policy. It is a useful measure because it can be applied to continuous and non-dichotomous variables. Cronbach's alpha, denoted by the Greek symbol α and calculated using the equation

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum V_i}{V_t}\right)$$

is a measure of internal reliability and consistency. It contained the following elements in the present instance: a count of the items (2), a count of the sum of the items (343), and the sum of the variance of the items (16.35). Unfortunately, there appeared to be limited internal reliability. Possible explanations for this include gaps in the data and uncertainty over their interpretation in different regions. Further studies are therefore necessary to determine causality, as has previously been discussed.

5.6 Discussion and Conclusions

At the present time, the knowledge of the association between green entrepreneurship, non-green entrepreneurship, and sustainable development in Saudi Arabia is limited. We discovered a

positive relationship between green and non-green entrepreneurship and sustainable development and observed that it varied across regions. In particular, green entrepreneurship had a stronger influence than non-green entrepreneurship on the social dimension of sustainable development, so hypothesis 1 was confirmed. The second hypothesis stated that green entrepreneurship had a stronger positive influence than non-green entrepreneurship on the economic dimension of sustainable development. This was also supported by the data. They showed that green entrepreneurship had a stronger influence than non-green entrepreneurship on the environmental dimension of sustainable development, so hypothesis 3 was confirmed.

The results revealed that green entrepreneurship was an antecedent of economic, social, and environmental outcomes, therefore being largely in line with previous studies that have shown tight links and interrelations between green entrepreneurship and sustainable development (De Marchi & Grandinetti, 2013; Hoogendoorn et al., 2015; Maskay, 2006). The findings also correspond to more recent work that has recognized the bidirectional nature of green entrepreneurship and sustainable development in urban contexts (Rodrigues & Franco, 2019; Ukko et al., 2018).

By contrast, the results on the moderating influence of entrepreneurship policy were mixed. All three corresponding hypotheses were not confirmed, indicating that entrepreneurship does not have a positive moderating influence on the relationship between green entrepreneurship and sustainable development. Interestingly, a negative moderating influence was found for the economic component of sustainable development. This suggests that the existing entrepreneurship policies in Saudi Arabia may be impairing the positive influence of green businesses on the country's economic sustainability. When viewed through the lens of institutional economics, the results can be considered consistent with the work of Urbano et al. (2019) in that business is hindered by high levels of corruption and weak property rights. As North (2005) reminded us, it is possible for institutional support to be focused on economic growth. This could have a negative moderating influence and might explain the outcome of hypotheses 4a–c.

The results are in line with the potential "rebound effects" (Kabanshi, 2020) of sustainable development. Government interventions aimed at sustainable development may indirectly promote

unsustainable behaviour. Furthermore, the influence may differ across large firms and small and medium-sized enterprises (SMEs; Farinelli et al., 2011; Khan et al., 2020) because SMEs are less likely to have access to government support (Liu, 2014). The results are also in accordance with Yi (2020), who emphasized the role of external institutional support in translating green entrepreneurial intentions into actions.

The lack of a moderating influence of entrepreneurship policy on the link between green entrepreneurship and economic and environmental factors might reflect the degree of sustainability awareness amongst both producers and consumers (Rodríguez-García et al., 2019). Alternatively, a non-significant effect represents a net zero impact of positive and negative externalities of governmental policies. The Saudi Arabian Government may not be providing adequate instruments for green entrepreneurs to deal with the existing risks and uncertainties, which will impair sustainable development (Silajdžić et al., 2015).

The findings of the present study are consistent with Khan (2013), who claimed there are not enough associations and institutions in Saudi Arabia lobbying for sustainable business practices. Therefore, the policies designed by the relevant Saudi authorities might not be taking important entrepreneurship networks into account. This could reduce the number of opportunities for new businesses and impair the development of green entrepreneurship in the country (Nordin & Hassan, 2019; Uddin et al., 2015). Saudi Arabia only has a small number of business incubators (Khan, 2013), which may be limiting the availability of value-added assistance for green entrepreneurs (Yurdakul & Kazan, 2020).

5.6.1 Implications for Theory and the Literature

The present study focused on different cities in Saudi Arabia. The government can affect the engagement of entrepreneurs by helping them in their understanding and application of sustainable development policies. There are other important implications for the analysis of formal institutions (North, 1990, 2005). For example, if green entrepreneurs have strong bonds with governments, they feel valued by local and national entities, so their opinions and actions are positively

considered in sustainable developmental processes. Government support for green entrepreneurship allows for a more sustainable environment and can be the first step towards a more environmentally conscious society and the conservation of resources for future generations. The Government of Saudi Arabia, in particular, should continue to promote such policies.

Motivated by lacuna identified in the previous chapter green entrepreneurship is a novel field of research; further exploration is needed with respect to the role of entrepreneurial activity as a means of sustaining the environment and ecosystems while advancing both economic and non-economic gains for investors and society in general (Pacheco et al., 2010). Research into the influence of formal institutions on certain outcomes in green entrepreneurship should be founded on theory. The present study has advanced the knowledge in the field by testing existing theoretical propositions robustly and comprehensively and has confirmed the role of green entrepreneurship in sustainable development. We also consider that our empirical findings may better guide scholars studying Saudi Arabia by helping entrepreneurs to become more aware of sustainability policies. They may also serve to encourage the advertising of outcomes related to sustainability as a way of increasing the legitimacy of policies and generating the support of entrepreneurs.

The present study contributes to the theory by demonstrating the value and usefulness of a composite approach to measuring the economic dimension of sustainable development specific to developing/emerging economies. In addition, it builds on the work of Le et al. (2019) and Potluri and Phani (2020) by pointing to the impossibility of parsing sustainability and financial sector development in the current context.

5.6.2 Implications for Policy and Practice

A number of policy recommendations can now be made. First, Saudi Arabia is able to achieve a higher degree of sustainable development by supporting new green entrepreneurs – thereby facilitating the creation of green businesses – and adjusting the regulatory entry barriers, thus leading to economic, social, and environmental improvements. Second, the authorities should amend the existing entrepreneurship policy because it may at present be promoting growth practices that are economically unsustainable in the long run (Shepherd & Patzelt, 2011; Shuo,

2014). The evidence for this comes from the regression analysis, which revealed the absence of statistical significance between existing policies and outcomes, from which it may be inferred that changes to the policy are needed to link policy and outcomes more closely and to drive sustainable development outcomes.

We also recommend that further support is offered to green social entrepreneurship ventures. We make this suggestion on the basis of the existing literature, which has confirmed that supporting green social ventures directly improves environmental outcomes (Silajdžić et al., 2015). In addition, there is a proven relationship between policy interventions and improved social capital and subsequent local economic growth (Svensson & Wagner, 2015). In light of the growing societal support for green and/or environmental initiatives that have genuine substance (Acs et al., 2018; Terán-Yépez et al., 2020), we warmly encourage the Government of Saudi Arabia to embrace green entrepreneurship and support genuinely sustainable development in the long term.

On a practical basis, we recommend the establishment of a centre of knowledge sharing to encourage and facilitate knowledge transfer between green entrepreneurial ventures on an intra-regional basis (Baltagi, 2008; Estrin et al., 2013). This would accelerate the pace of green entrepreneurship and act as an incubator for sustainable development (Obaji & Olugu, 2014). We also propose additional educational support for new graduates to encourage greater awareness of the relationship between green entrepreneurship and sustainable development (MoE, 2019).

5.6.3 Limitations and Future Research

The present study has some limitations, partly because sustainable development has not readily been defined in the literature. Following the work of Lee (2015), it was constructed in the study as a set of composite indices based on factors that potentially affect internal reliability (as evidenced by the Cronbach's alpha test). It is recommended that future researchers test the relationship between green entrepreneurship and sustainable development by using different proxies for social, environmental, and economic aspects to ensure confidence in the policy application of their findings. Latent variables may also be a valuable contributing factor, which can be established through further factor analysis. This suggestion is based on the variations in the findings regarding

the role of green entrepreneurship and sustainable development in developing or transitional economies (Silajdžić et al., 2015) and may lead to the identification of the likely impact of contextual factors such as wider economic development and social issues. This in turn might help to clarify further the role and impact of green entrepreneurship policy in institutional economics. Finally, future researchers could carry out more cross-sectional and longer-term analyses by investigating other countries in the Gulf Cooperation Council region and by extending the present study's 6-year time frame.

Chapter 6:

Property Rights and Traditions as Antecedents of Green Entrepreneurship and Sustainable Development in Saudi Arabia: An Institutional Approach

6. Property Rights and Tradition as Antecedents of Green Entrepreneurship and Sustainable Development in Saudi Arabia: An Institutional Approach

6.1 Introduction

Recently, sustainability has been receiving more and more attention from producers, consumers, and scholars (Filser et al., 2019). There is an increasing demand for green products and services as the need to incorporate environmental concerns becomes more widely recognized (Makki et al., 2020). Firms' commitment to sustainable practices is growing, and more research is being conducted on environmental challenges and appropriate sustainability initiatives. However, the literature on sustainability has been noted to consist of relatively independent streams of research (Gast et al., 2017). Few studies appear to have explored sustainable entrepreneurship in a comprehensive way (Aparicio et al., 2020a). In particular, it can be expected that both formal and informal institutions affect environmental entrepreneurship, yet little research has considered an integrative framework of sustainable entrepreneurship (Casson et al., 2010; Filser et al., 2019). The present chapter helps to bridge this gap by considering both formal and informal institutional antecedents of green entrepreneurship.

Researchers have employed a variety of terms to describe sustainability-related entrepreneurship, including "sustainable entrepreneurship", "environmental entrepreneurship", "green entrepreneurship", "ecopreneurship", and "enviropreneurship" (Demirel et al., 2019; Gast et al., 2017; Haldar, 2019a). While there are some differences between these terms that may reflect the fragmented nature of the field, these concepts represent the common idea of entrepreneurial activity focusing on "green", or ecologically sustainable, policies (Antolin-Lopez et al., 2019). A large body of entrepreneurship research has shifted towards green entrepreneurial activity as the recognition of environmental concerns has become more widespread (Filser et al., 2019). Designing adequate sustainable initiatives requires more knowledge about both the determinants and the implications of green entrepreneurship (Demirel et al., 2019). The culture of green

entrepreneurship shapes the strategic goals of new businesses and is itself shaped by changing social norms and attitudes (Gregori et al., 2019). In this chapter, the role of social norms is explored by considering traditions as an informal institutional antecedent of green entrepreneurship. However, this investigation is enhanced by the incorporation of formal institutions, represented by property rights, into the model.

The scholarly concept of tradition encompasses an inherited body of customs and beliefs (Handler & Linnekin, 1984). Traditions can be linked to the concept of national culture as described by such frameworks as Hofstede's theory of culture or the GLOBE dimensions of culture (Roy & Goll, 2014). In particular, the GLOBE framework describes traditions and cultural practices in terms of nine dimensions, including institutional collectivism, future orientation, human orientation, and uncertainty avoidance (Nadeem & de Luque, 2020). Hofstede's framework is coarser as it only considers five dimensions of culture, including long-term orientation, individuality, and uncertainty avoidance (Beugelsdijk & Welzel, 2018). Traditions can be expected to influence the development of green entrepreneurial activity through these dimensions. Indeed, a more collectivist and long-term-oriented society could lead the public to pressure the authorities to implement laws and regulations that alleviate environmental concerns (Roy & Goll, 2014). Furthermore, firms might gain legitimacy through compliance with the expectations of the public, which are in turn shaped by traditions (Johnson & Schaltegger, 2020). Traditions may facilitate the recognition of the poor sustainability of established business practices and accelerate the development and adoption of sustainable policies (Haldar, 2019b). Thus, traditions may be a major informal institutional antecedent of green entrepreneurship.

While informal institutions may influence the decision making of new businesses through both internal and external influences, green entrepreneurship can also be encouraged or hindered by formal institutional barriers (Björklund, 2018; Yang et al., 2021). The rule of law has been widely considered to be central to the efficient allocation of resources in classical liberal frameworks (Bjørnskov & Foss, 2013). Economic freedom, including the extent and security of property rights, is among the key determinants of entrepreneurial activity (Demirel et al., 2019). Property rights that are well defined and enforced by law reduce contracting and transaction costs through easier and more secure resource mobilization (Bjørnskov & Foss, 2013). Moreover, enforced property

rights reduce the risks of engaging in entrepreneurial activities. As green entrepreneurs may face additional risks and barriers to those faced by traditional businesses, reduced uncertainty can be particularly beneficial for green firms (Filser et al., 2019). Therefore, property rights may play an important role as a formal institutional antecedent of green entrepreneurship.

In addition to the little research existing on an integrative framework of green entrepreneurship, few studies have explored sustainability practices in the MENA region, despite its growing importance in the global economy. In particular, there is little empirical evidence on the antecedents of sustainable entrepreneurial activity in Saudi Arabia. At the same time, cultural identity plays a large role in Saudi Arabia's 2030 Vision on building a prosperous economy and a vibrant society (Alwakid et al., 2020). The present chapter attempts to address this gap by considering both formal and informal institutional determinants of green entrepreneurship in Saudi Arabia. The study by Alwakid et al. (2020) is the most relevant research work in the context of the present chapter. However, the current chapter expands on their study by integrating both socio-cultural and formal institutional antecedents of green entrepreneurship in the country, which should provide a more comprehensive analysis of sustainable entrepreneurial activity in Saudi Arabia.

6.2 Linking Property Rights and Tradition with Green Entrepreneurship

The present section discusses the conceptual framework of the chapter, linking property rights and tradition with green entrepreneurship. The framework is used to develop the main hypotheses of the study.

6.2.1 Property Rights

Economic freedom is central to traditional liberal frameworks (Bjørnskov & Foss, 2013). While the concept may include the freedom to change jobs, save money, or keep income, the extent and

security of property rights are the key component of economic freedom. The quality of property rights is affected by the arbitrariness of governmental bodies, which creates expropriation risk (Johnson & Schaltegger, 2020). This corresponds to the institutional characteristic of generality, indicating whether equals are treated equally (Bjørnskov & Foss, 2013). In addition, the quality of property rights is influenced by the quality of institutions responsible for the protection of property rights (Purnomo et al., 2018). The corresponding institutional characteristics are transparency and accountability. If public decision making is transparent and property rights institutions are properly implemented, entrepreneurs will be more willing to make investments (Demirel et al., 2019). Notably, economic agents will face lower uncertainty as high-quality institutions translate into predictability.

Protection of property rights reduces investment risk and fosters innovation (Escandon-Barbosa et al., 2019). Furthermore, well-defined property rights reduce contracting costs. These include the costs of searching for and negotiating with the owners of the inputs (Bjørnskov & Foss, 2013). Put differently, adequate property rights translate into low transaction costs of resource mobilization. Lower costs allow entrepreneurs to undertake productivity-enhancing as well as sustainability-oriented innovations (Gregori et al., 2019). The concept of private property also has a psychological dimension that enhances the feeling of internal control (Estrin et al., 2013a). More generally, property rights reflect the stability of the institutional framework and may send a signal to entrepreneurs regarding the arbitrary use of power by public administrators.

The role of property rights in green entrepreneurship can also be understood by considering the framework of social capital theory (Ahmad & Hall, 2017). Social capital is understood as constituting obligations, expectations, social norms, and networks between individuals (Escandon-Barbosa et al., 2019). Within this framework, property rights institutions can be distinguished into two underlying components, namely social capital and political institutions (Ahmad & Hall, 2017). The strength of social networks is determined by the quality and stability of formal institutions, such as property rights. Social capital enhances the economic efficiency of such institutions and rewards long-term investments (Escandon-Barbosa et al., 2019). From this perspective, stronger property rights are more rewarding for entrepreneurs who invest in sustainable operations.

The prospect theory of Kahneman and Tversky (1979) is another framework that may provide insights into the role of property rights in green entrepreneurship. The theory posits that the evaluation of prospects is dependent on the reference point as well as the differences in attitudes towards risk. Established businesses may struggle to adapt their operations and strategies to make them environmentally sustainable in the long term, while new firms may be able to adopt green practices more easily (Estrin et al., 2013b). In the context of prospect theory, the relevant risk faced by businesses is arbitrary expropriation. For established businesses, this risk is evaluated relative to the asset position achieved, while, for young businesses, the losses are compared to the initial asset valuation. Thus, new businesses would adopt safer strategies as the losses due to arbitrary expropriation would be comparable to their total value. It follows that weak property rights would discourage more entrepreneurial strategies, including green entrepreneurship. These considerations lead to the following hypothesis on the general effect of property rights on green entrepreneurship:

Hypothesis 1: The influence of property rights on green entrepreneurship is greater than the influence of property rights on non-green entrepreneurship.

Stronger property rights institutions would reduce the costs and uncertainty faced by green entrepreneurs. This could allow businesses to invest more resources in addressing the demands of various stakeholder groups, including the government, local communities, and non-governmental organizations (Demirel et al., 2019). The horizontal contracting perspective suggests that stronger property rights translate into more protected investors in green businesses (Estrin et al., 2013b). Due to the information asymmetry between lenders and borrowers, weak formal institutions may encourage opportunistic behaviour, while stronger property rights would restrict such behaviour, which should contribute to social sustainability (Hörisch, 2019). Based on these arguments, the following hypothesis is proposed:

Hypothesis 1a: Green entrepreneurship determined by property rights is positively associated with the social dimension of sustainable development.

Reduced uncertainty associated with high-quality property rights institutions leads to better predictability. This provides incentives for economic actors to make productive investments, which contribute to the economic growth (Bjørnskov & Foss, 2013). Furthermore, secure property rights enhance the growth aspirations of new entrepreneurs (Estrin et al., 2013b). Stronger formal institutions reduce losses relative to the reference point of new green businesses, which should further improve economic growth. Thus, the following hypothesis can be formulated:

Hypothesis 1b: Green entrepreneurship determined by property rights is positively associated with the economic dimension of sustainable development.

As secure property rights translate into lower costs and reduced uncertainty, green businesses may have more resources to address the demands of sustainability-focused stakeholders, such as environmental organizations and the natural environment in general (Demirel et al., 2019). Stronger property rights also reflect more underlying social capital, which may allow entrepreneurs to employ more efficient strategies for reducing the impact of their operations on the environment. This leads to the following hypothesis:

Hypothesis 1c: Green entrepreneurship determined by property rights is positively associated with the environmental dimension of sustainable development.

To sum up, the existing theoretical frameworks, such as social capital theory, horizontal contracting theory, and prospect theory, imply that stronger formal institutions would be particularly beneficial to green entrepreneurs compared with non-green businesses. Furthermore, secure property rights should enhance the contribution of green businesses to all three dimensions of sustainable development.

6.2.2 Traditions

Among the major frameworks that have been used to describe how socio-cultural factors such as traditions may influence green entrepreneurship are institutional theory and stakeholder theory (Roy & Goll, 2014). The institutional theory considers similarities between organizations within a

specific organizational field. Although organizational fields may be diverse at the earlier stages of their development, ultimately, organizations face pressure towards homogenization. Within the context of this theory, the process of homogenization is referred to as isomorphism (DiMaggio & Powell, 1983). Three forms of isomorphism can be distinguished, namely mimetic, coercive, and normative. Mimetic isomorphism occurs when organizations deliberately model themselves after established organizations in the field. Organizations may engage in such behaviour to enhance their image and reputation (Isensee et al., 2020). Specifically, firms may choose to resemble another organization to appear successful or more legitimate. In the context of green entrepreneurship, mimetic isomorphism may occur as more and more firms adopt sustainable policies. This could make non-green businesses stand out and lose legitimacy in the eyes of society as environmental concerns become more widely acknowledged (Johnson & Schaltegger, 2020). A greater role of tradition would create stronger mimetic pressures. Green businesses would be more exposed to these pressures as green entrepreneurship may be viewed as a deviation from the status quo (Haldar, 2019b).

Coercive isomorphism is the second type of homogenization in the framework of institutional theory. Coercive pressures may occur as a result of regulatory changes. New government laws might force businesses to adjust their strategic model or change it completely (Yadav et al., 2018; Yi, 2020). However, coercive isomorphism may also be created by societal expectations. In particular, cultural expectations shaped by traditions could translate into coercive pressures on businesses (Isensee et al., 2020). Green entrepreneurship can be expected to be particularly affected by coercive isomorphism. Indeed, traditions may hinder or accelerate the adoption of sustainable practices depending on such cultural dimensions as institutional collectivism and future orientation in the GLOBE framework or long-term orientation, individuality, and uncertainty avoidance in Hofstede's framework. Normative isomorphism is driven by professionalization. Firms seek to adopt practices that are socially acceptable since this allows them to gain legitimacy and access resources more easily (Jiang et al., 2018). Socio-cultural norms may be shaped by traditions that, in turn, affect green entrepreneurship by exerting pressure on both new and established businesses (Kardos et al., 2019).

The key implication of institutional theory is that organizations engage in economic behaviour that is socially acceptable, as determined by the existing rules, beliefs, traditions, and norms. Imitating other organizations reduces uncertainty, enhancing firms' performance and facilitating their survival (Demirel et al., 2019). As more and more firms adopt certain practices, the pressure on the remaining organizations in the field increases through all three types of institutional isomorphism. Organizations seek to gain legitimacy and obtain the required resources and thus imitate other organizations to comply with social pressures, which could be driven by traditions (Gast et al., 2017). Green firms are particularly affected as green entrepreneurship may be seen as a departure from the established economic behaviour. Cultures that lean towards a long-term orientation, collectivism, and uncertainty avoidance may have traditions that would increase the isomorphism pressures on non-green businesses. In addition to direct social pressures driven by tradition, firms may face indirect coercive pressures through changes in laws and regulations (Makki et al., 2020). Indeed, society's beliefs and traditions may lead to the adoption of new regulatory frameworks that emphasize sustainability (Gregori et al., 2019). In turn, these frameworks may exert coercive isomorphism pressures on non-green businesses through the regulatory requirements of formal institutions.

Another perspective on the role of socio-cultural factors is provided by stakeholder theory. This theory posits that organizations benefit from considering the concerns of all stakeholder groups, including the government, the local community, and environmentally focused groups (Johnson & Schaltegger, 2020). Both green and non-green businesses are affected by a variety of stakeholders, such as suppliers, customers, employees, society as a whole, and the natural environment itself (Middermann et al., 2020). As different stakeholders may have competing demands, organizations face the problem of prioritizing the interests of specific stakeholder groups. The balance between the demands of various stakeholders is determined by the salience of each stakeholder group. Salience is affected by stakeholder legitimacy, power, and the urgency of demands. Within the stakeholder framework, traditions may shape the demands of specific stakeholders or society as a whole (Qazi et al., 2020). The cultural dimensions of the society would then determine whether this influence facilitates or hinders the adoption of sustainable business practices (Jiang et al., 2018).

To sum up, both institutional theory and stakeholder theory imply that green entrepreneurship would be particularly strongly affected by traditions. From the institutional perspective, firms face coercive, mimetic, and normative pressures. Traditions may directly or indirectly create all three types of homogenization pressures on businesses. Green firms are viewed as a departure from the established economic behaviour. The pressures on non-green firms increase as environmental concerns become more widely recognized. Thus, the effects of tradition on green entrepreneurship should be stronger than the effects of tradition on non-green entrepreneurship. This leads to the formulation of the following hypothesis:

Hypothesis 2: The influence of tradition on green entrepreneurship is greater than the influence of tradition on non-green entrepreneurship.

Socio-cultural factors, including traditions, may indirectly influence social sustainability. Enhancing social capital requires investments in people and their capacity levels as well as in education and knowledge. Reducing poverty is considered to be one of the key goals of sustainable development (Filser et al., 2019). Organizations may invest in human development due to growing societal pressures (Demirel et al., 2019). In particular, firms that do not contribute social value may be poorly socially embedded in the markets in which they operate and lose legitimacy (Thompson & Eijkemans, 2018). This could lead to a competitive disadvantage, which would force them to consider their effects on society. Traditions may exacerbate these effects in the context of green entrepreneurship, which would lead to an indirect effect on social sustainability through green firms (Gast et al., 2017). Based on these considerations, the following hypothesis is formulated:

Hypothesis 2a: Green entrepreneurship determined by traditions is positively associated with the social dimension of sustainable development.

Traditions may also indirectly affect economic sustainability by strengthening market institutions and reducing uncertainty. From the institutional point of view, firms face homogenization pressures. Since imitation reduces uncertainty, firms that adopt sustainability practices may enjoy lower costs due to reduced uncertainty risks, which should enhance their performance and survival.

Traditions may create mimetic pressures by requiring contributions to sustainability to obtain legitimacy (Gregori et al., 2019). Thus, traditions may indirectly influence economic sustainability through green entrepreneurship. This leads to the following hypothesis:

Hypothesis 2b: Green entrepreneurship determined by traditions is positively associated with the economic dimension of sustainable development.

Traditions may influence environmental sustainability through both formal and informal institutions. A firm's access to resources depends on its perceived legitimacy, its contribution to environmental sustainability, and its compliance with laws and regulatory requirements (Gast et al., 2017). From the perspective of stakeholder theory, firms may gain legitimacy by incorporating the demands of various stakeholders. Ecological responsibility is one of the motivations for the adoption of sustainable practices, alongside competitiveness and legitimation (Wagner et al., 2019). Similarly, the institutional framework suggests that firms would contribute to ecological sustainability under societal pressures, which in turn may be shaped by traditions (Demirel et al., 2019). Furthermore, non-green firms may be under the coercive pressure of environmental regulations. These regulations could be adopted as a response to societal demands driven by norms, beliefs, and traditions, providing an indirect pathway for the effect of traditions on environmental sustainability. Therefore, the following hypothesis is proposed:

Hypothesis 2c: Green entrepreneurship determined by traditions is positively associated with the environmental dimension of sustainable development.

Overall, the review of the relevant literature provides a conceptual framework for studying the impacts of formal and informal institutions on green entrepreneurship and sustainable development. Both property rights and traditions act as constraints on the economic behaviour of firms. Stronger property rights with enforced rule of law and greater socio-cultural pressures shaped by traditions may encourage green entrepreneurship. Furthermore, it has been suggested that these effects are stronger for green entrepreneurship than for non-green entrepreneurship. It has been argued that both property rights and traditions indirectly influence all three dimensions of sustainable development through green businesses.

6.3 Methodology

6.3.1 Justification and Focus

This field of study is characterized by a variety of methods and analytical techniques that derive their focus from problem-centred objectives and theoretical framing. The current study has undertaken to analyse a discrete phenomenon in a nation where green enterprises and sustainability are novel and emergent phenomena. Therefore, to analyse the relationship between green entrepreneurship and sustainable development cohesively and effectively, a quantitative approach was adopted that applies proxy measures to interpret several unique relationships. As outlined in both of the hypotheses, this study predicts an associative role between traditions and property rights and green entrepreneurial motivations. To assess this phenomenon, the following sections outline the data selection procedure, highlight the statistical tests that were employed, and discuss the particular structure of the analytical model.

6.3.2 Data and Variables

The dependent variables in this study included the dimensions of sustainable development as well as green and non-green entrepreneurship, corresponding to the two-stage design employed, which was adopted from Aparicio et al. (2016). Firstly, green and non-green entrepreneurship are described in terms of property rights and traditions. Green entrepreneurship is defined as the number of firms considering the environment in the city, while non-green entrepreneurship is defined as the number of firms with a high pollution rate. The data on the numbers of green and non-green firms were obtained from the annual reports of the General Authority for Meteorology and Environmental Protection.

The measurement of the socio-cultural concept of tradition followed the approach by Adekola and Egbo (2016). A descriptive survey was conducted using random sampling. The data related to the traditions and customs as well as their influence on entrepreneurial activity were obtained from

the annual reports (General Authority for Statistics in Saudi Arabia). The items were structured using a modified Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree).

Next, the green and non-green entrepreneurship variables were used as the main independent variables in an instrumental variable design. The dependent variables reflect the degree of sustainable development in Saudi Arabia and can be grouped into three categories: economic components, environmental components, and social components. The economic components of sustainable development included economic growth as economic activity, the employment rate as a measure of growth and employment, the unemployment rate, and the density of banks measured as the number of bank branches. The social components of sustainable development included government expenditure in the education sector, government expenditure in the health and social development sector, government expenditure in the security sector and administrative regions, social projects for quality of life as the total resource flows for development, and basic services. Finally, the environmental components of sustainable development included the recycling rate as a measure of waste management, development assistance to conserve biological diversity, environmental preservation, and the Agricultural Trend Index as a general measure of the preservation and protection of the environment. The data were retrieved from the annual reports of the General Authority for Meteorology and Environmental Protection.

The general control variables included the population measured as the number of inhabitants per region, size of the city measured as the area of the city, annual growth rate for each city, and percentage of people with tertiary education in each city as a measure of education. In addition, four control variables were included that reflected green entrepreneurship incentives and environmental orientation, following Alwakid et al. (2020). These included environmental consciousness, measured as the percentage of the maintenance of natural resources; temporal orientation, measured as the percentage of public and private organizations that have adopted environmental measures in each city; innovation policy, representing the interface between technological development policy, research, and industrial policy; and entrepreneurship policy, representing the incentives and government procedures that facilitate the entrepreneurial process of the establishment of projects. All the data were obtained from the annual reports of the Authority for Meteorology and Environmental Protection.

Table 6.1 presents the variables used in the regression models.

Table 6.1: Definition of the variables

Variable	Definition	Data source
Dependent variables		
Economic components of sustainable development	Economic activity (growth, %) Growth and employment (employment rate) Unemployment rate (%) Density of banks (number of bank branches)	Annual reports (General Authority for Meteorology and Environmental Protection)
Social components of sustainable development	Government expenditures for the education sector, % (Government expenditures in the health and social development sector) % Government expenditures for the security sector and administrative regions, % Social projects for quality of life (total resource flows for development) Basic services, %	
Environmental components	Management of waste (recycling rate) Development assistance to conserve biological diversity	

	Environmental preservation Preservation and protection of the environment (Agricultural Trend Index)	
Green entrepreneurship	Number of firms considering the environment in the city	Annual reports (General Authority for Meteorology and Environmental Protection)
Non-green entrepreneurship	Number of firms with a high pollution rate	
Independent variables		
Tradition	Extent of socio-cultural traditions	Annual reports (General Authority for Statistics in Saudi Arabia)
Property rights	Extent of property rights	
Control variables		

Population	Number of inhabitants per region	Annual reports (General Authority for Statistics in Saudi Arabia) (Authority for Meteorology and Environmental Protection)
Size of the city	Area of the city (km^2)	
Annual growth rate (resources)	Annual growth rate for each city	
Environmental consciousness	Percentage of the maintenance of natural resources	
Education	Percentage of people with tertiary education in each city	
Temporal orientation	Percentage of public and private organizations that have adopted environmental measures in each city	
Innovation policy	Interface between technological development policy, research, and industrial policy, which aims to create a framework for bringing new ideas to the market. The values for this particular policy are on a 5-point scale (1 = very low, 5 = very high)	

Entrepreneurship policy	A set of incentives and government procedures that facilitate the entrepreneurial process of establishment of projects. The values for this policy are on a 5-point scale (1 = very low, 5 = very high)	Annual reports (Authority for Meteorology and Environmental Protection)

6.3.3 Modelling Approach

The present study expanded on the general empirical model employed by Alwakid et al. (2020) by considering a two-stage instrumental variable (IV) design. It investigated how formal institutions, represented by property rights (Pr), and informal institutions, represented by traditions (Tr), influence green entrepreneurship and sustainable development in Saudi Arabia. Due to the recursive nature of the relationship between green entrepreneurship and sustainable development, this research ran two simultaneous regressions, similar to the process implemented by Aparicio et al. (2016). The first regression used green and non-green entrepreneurship as the dependent variables and property rights and traditions as the key independent variables. The model is specified as follows:

$$main\_ge_{ij} = \alpha_0 + \beta_1 Pr_{ij} + \beta_2 Tr_{ij} + \beta_3 Control_{ij} + \varepsilon_{ij}$$

where $main\_ge$ ($main\_nge$) is the measure of green (non-green) entrepreneurship, Pr is the extent of property rights, Tr is the extent of socio-cultural traditions, and $Control$ is a vector of the control variables, including resources, city size, population, education, environmental consciousness, temporal orientation, innovation policy, and entrepreneurship policy. This follows Alwakid et al. (2020). Hypotheses 1 and 2 are explored based on the β_1 and β_2 coefficients of the $main\_ge$ and $main\_nge$ models. In particular, if the β_1 coefficient estimated in the model for

green entrepreneurship is larger than the corresponding coefficient for non-green entrepreneurship, then this will provide evidence in support of hypothesis 1. In other words, the influence of property rights on green entrepreneurship would be stronger than the influence of non-green entrepreneurship. Similarly, if the β_2 coefficient estimated in the model for green entrepreneurship is larger than the corresponding coefficient for non-green entrepreneurship, then this would provide evidence in support of hypothesis 2. Put differently, the influence of tradition on green entrepreneurship would be stronger than the influence of non-green entrepreneurship. It is also possible that the coefficient would be positive and statistically significant in the $main\_ge$ model while being statistically insignificant in the $main\_nge$ model. This implies that the effect of property rights or tradition on non-green entrepreneurship is indistinguishable from zero, which would also support the corresponding hypothesis.

The second regression employed the measures of formal and informal institutions as instrumental variables in the effect of green entrepreneurship on various dimensions of sustainable development. Three groups of regressions were estimated, which corresponded to the economic, social, and environmental dimensions of sustainable development:

$$Econ_{ij}(Soc_{ij}, Env_{ij}) = \alpha_0 + \beta_1 main\_ge_{ij} + \beta_2 uENVC_{ij} + \beta_3 uTIOR_{ij} + \beta_4 uINNP_{ij} + \beta_5 uSUPP_{ij} + \varepsilon_{ij}$$

where $Econ\,(Soc, Env)$ is the economic (social, environmental) component of sustainable development; $main\_ge$ is the measure of green entrepreneurship; $uENVC$ is environmental consciousness; $uTIOR$ is the temporal orientation; $uINNP$ is the innovation policy; and $uSUPP$ is the entrepreneurship policy. The auxiliary regression for green entrepreneurship also controls for resources, city size, population, and education.

The econometric estimation is performed by running a two-stage least-squares (2SLS) regression with instrumental variables (IV regression). The functional form of the system of equations is provided below:

Green entrepreneurship = f (property rights, tradition, controls)

Sustainable development = f (green entrepreneurship, controls)

The validity of hypotheses 1a–1c is determined by considering the β_1 coefficient estimated using the property rights variable Pr as the instrumental variable in the green entrepreneurship regression. A positive and statistically significant β_1 coefficient in the IV regression model for Soc $(Econ, Env)$ would provide support for hypotheses 1a, 1b, and 1c. In other words, green entrepreneurship determined by property rights would be positively associated with the social (economic, environmental) dimension of sustainable development. Likewise, the validity of hypotheses 6–8 is determined by considering the β_1 coefficient estimated using the tradition variable Tr as the instrumental variable in the green entrepreneurship regression. A positive and statistically significant β_1 coefficient in the IV regression model for Soc $(Econ, Env)$ would provide support for hypotheses 1b, 1c, and 2a. In other words, green entrepreneurship determined by traditions would be positively associated with the social (economic and environmental) dimension of sustainable development.

6.4 Results

The analysis of these relationships begins with an evaluation of the summary descriptive statistics reported in the following table.

Table 6.2: Descriptive statistics

Variable	Obs.	Mean	Std Dev.	Min.	Max.
Green entrepreneurship	78	62,445.83	63,156.93	1,025.00	174,993.00
Non-green entrepreneurship	78	80,906.64	74,476.37	9,241.00	254,032.00
Property rights	78	83.50	9.13	69.80	99.10
Traditions	78	2.52	0.64	1.22	3.87
Economic activity	78	0.26	1.15	-4.42	2.20
Employment rate	78	14.94	8.39	4.82	41.23
Preservation and protection of the environment	78	4.86	2.45	2.12	10.18
Density of banks	78	6.86	3.63	3.00	18.00
Government expenditure on education	78	6.91	4.10	2.00	22.00
Government expenditure on health	78	6.12	6.81	1.00	43.00
Government expenditure on security	78	4.32	2.48	1.00	14.00
Social projects for quality of life	78	25,935.20	32,030.82	3,617.56	139,110.20
Basic services	78	84.10	14.49	51.78	100.00
Recycling rate	78	10.91	5.84	3.00	25.00
Management of waste	78	111,932.80	81,128.92	47,865.07	330,805.80
Environmental preservation	78	30.09	17.00	6.00	87.00
Preservation and protection of the environment	78	4.63	2.26	1.55	9.67
Resources	78	3.47	1.29	1.40	7.42
Population	78	2,232,516.00	2,737,204.00	139,114.20	14,200,000.00
City size	78	144,677.10	137,752.00	5,287.59	769,082.30
Education	78	64.08	18.75	32.62	111.81
Environmental consciousness	39	61.82	30.81	21.08	155.36
Temporal orientation	39	59.35	22.78	25.72	135.86
Innovation policy	52	3.44	2.15	1.00	10.00
Entrepreneurship policy	52	3.15	2.25	1.00	12.00

The descriptive statistics include the number of observations in the first column (Obs.), the arithmetic mean value for the sample (Mean), the standard deviation of the variables (Std Dev.), and the extreme points represented by the minimum (Min.) and maximum (Max.) values of the

treated variables. As can be seen, some of the variables had missing values, which resulted in fewer observations for uENVC, uTIOR, uINNP, and uSUPP, whereas the rest of the variables had 78 observations in total.

One of the main observations from the assessment of the descriptive statistics is that the number of green entrepreneurships in Saudi Arabia was, on average, smaller than that of non-green entrepreneurships over the period from 2012 to 2017. The variables used in the analysis also exhibited mixed degrees of linear correlation, as reported by the next table. The issue of correlation may be serious in linear regression models as an excessively high correlation could lead to problems with multicollinearity, which could make the estimated coefficients unrepresentative of the true relationship with the dependent variable. If one independent variable is highly correlated with another, it will be difficult to measure their individual effects on the dependent variable. The table below shows that our key predictors, namely property rights and traditions, share a positive correlation, with the coefficient being equal to 0.35.

Table 6.3: Correlation matrix

Pr	Tr	ec1	ec2	ec4	ec5	s1	s2	s3	s4	s5	en1	en2	en3	en4	c1	c2	c3	c4
1.00																		
0.35	1.00																	
-0.36	-0.23	1.00																
0.28	**0.02**	-0.16	1.00															
0.28	**0.09**	-0.28	0.91	1.00														
0.25	**0.04**	-0.25	0.94	0.87	1.00													
0.22	**0.08**	-0.14	0.89	0.85	0.85	1.00												
0.14	**0.18**	-0.50	0.58	0.80	0.64	0.60	1.00											
0.26	**-0.03**	**-0.06**	0.77	0.75	0.69	0.62	0.51	1.00										
0.28	0.17	**0.04**	0.56	0.53	0.50	0.46	0.27	0.47	1.00									
0.13	-0.17	**-0.05**	0.15	0.11	0.14	0.13	**0.00**	**0.03**	**0.08**	1.00								
0.30	**0.05**	-0.24	0.91	0.90	0.92	0.82	**0.66**	**0.71**	**0.53**	0.20	1.00							
0.13	**0.02**	-0.20	0.93	0.90	0.88	0.89	0.66	0.73	0.38	0.10	0.88	1.00						
-0.08	**-0.03**	-0.01	-0.03	-0.15	0.00	-0.12	-0.17	**-0.01**	0.00	-0.16	-0.04	-0.11	1.00					
0.40	0.11	-0.16	0.85	0.85	0.82	0.77	0.55	0.77	0.75	0.16	0.86	0.78	-0.11	1.00				
0.00	0.12	-0.16	-0.05	0.04	-0.05	-0.15	0.31	-0.04	-0.16	0.05	0.06	0.02	-0.24	-0.07	1.00			
0.03	-0.15	-0.24	0.72	0.76	0.76	0.69	0.66	0.48	0.20	0.23	0.79	0.84	**-0.03**	0.57	0.08	1.00		
0.37	0.26	-0.38	0.61	0.56	0.55	0.56	0.36	0.45	0.21	-0.29	0.50	0.62	-0.11	0.44	-0.10	0.37	1.00	
0.04	-0.10	0.15	0.11	0.05	0.13	0.16	**-0.03**	**-0.08**	0.07	0.19	0.18	0.10	0.13	0.06	0.06	0.23	-0.10	1.00
0.08	-0.08	-0.22	-0.10	-0.01	-0.13	-0.05	0.10	0.19	-0.06	0.35	0.03	-0.02	-0.25	0.09	0.07	0.08	-0.10	-0.16
-0.05	-0.27	0.10	0.00	-0.15	0.05	-0.12	-0.22	0.06	0.12	0.07	-0.11	-0.10	0.32	0.03	-0.14	-0.04	-0.23	0.09
0.01	**-0.05**	-0.07	0.15	0.23	0.12	0.20	0.24	0.31	-0.01	0.14	0.20	0.25	-0.21	0.19	0.01	0.22	0.11	0.08
-0.27	-0.28	**-0.04**	**-0.07**	0.04	0.05	**-0.06**	0.27	-0.14	-0.10	**0.03**	**0.02**	**-0.01**	-0.23	-0.01	0.13	0.13	-0.15	-0.26

Correlations in bold are significant at $p < 0.01$

Notes: ec1 is economic activity; ec2 is growth and employment (employment rate); ec4 is unemployment; ec5 is the density of banks; s1 is government expenditure on education (%); s2 is government expenditure on health (%); s3 is government expenditure on security (%); s4 is social projects for quality of life (total resource flows for development); s5 is basic services; en1 is the management of waste (recycling rate); en2 is the management of waste (development assistance to conserve biological diversity); en3 is environmental preservation; en4 is preservation and protection of the environment (Agricultural Trend Index); c1 is resources; c2 is the population; c3 is the city size; c4 is education; uENVC is environmental consciousness; uTIOR is temporal orientation; uINNP is innovation policy; uSUPP is entrepreneurship policy; Pr is property rights; Tr is traditions; main_ge is green entrepreneurship; and main_nge is non-green entrepreneurship.

Even though this is not a very high correlation, it was still reasonable to run separate regressions in which each of these institutional factors would be treated individually to exclude potential interferences. The results of the regression models based on the first equation are reported in the following table.

Table 6.4: Regression models with green and non-green entrepreneurship as dependent variables

	Green entrepreneurship	***Green entrepreneurship***	**Non-green entrepreneurship**	***Non-green entrepreneurship***
Property rights	460.226**		138.366**	
	(192.098)		(61.63448)	
Traditions		12411.270**		718.310
		(5259.431)		(1906.213)
Resources	967.588**	508.452	374.143**	349.097*
	(443.238)	(486.664)	(142.211)	(176.385)
Population	0.000	-0.000	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
City size	-0.030***	-0.032***	0.004	0.004
	(0.009)	(0.009)	(0.003)	(0.003)
Education	-77.7561*	-63.795	-45.940***	-46.197***
	(39.844)	(40.702)	(12.783)	(14.751)
Environmental consciousness	39.727	44.894	-24.757**	-24.606**
	(27.359)	(27.570)	(8.778)	(9.992)
Temporal orientation	96.420**	95.749**	-2.737	0.375
	(37.877)	(38.071)	(12.152)	(13.798)
Innovation policy	203.810	552.244	49.105	134.614
	(418.412)	(405.965)	(134.246)	(147.136)
Entrepreneurship policy	21.448	133.554	-173.942	-122.204
	(358.823)	(353.019)	(115.127)	(127.947)
_cons	22027.650	29694.560**	72264.080***	81824.250***
	(16379.72)	(13533.97)	(5255.393)	(4905.213)
Overall R-squared	0.016	0.140	0.724	0.643
R-within	0.708	0.706	0.737	0.662
R-between	0.035	0.182	0.820	0.757
F-test	4.6***	4.55***	5.31***	3.71***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To avoid the multicollinearity issue with informal and formal institutions, property rights and traditions were included as independent variables in separate regressions, along with the same set of control variables. Thus, there are two regressions with green entrepreneurship as the dependent variable and two regressions with non-green entrepreneurship as the dependent variable. These models were used to test whether the property rights' influence on green entrepreneurship is greater than their influence on non-green entrepreneurship and whether traditions' influence on green entrepreneurship is greater than their influence on non-green entrepreneurship.

Both hypothesis 1 and hypothesis 2 were accepted and proved to be true by means of the econometric testing. In relation to the first hypothesis, the coefficient for property rights was found to be positive and statistically significant at the 5% significance level, which means that formal institutions produce a strong positive effect on green entrepreneurship in Saudi Arabia. At the same time, property rights have a positive and statistically significant effect on non-green entrepreneurship in Saudi Arabia, but the coefficient for property rights in this case is smaller than that in the case of green entrepreneurship. This implies that the same level of increase in property rights leads to a larger effect on green entrepreneurship than on non-green entrepreneurship, allowing the acceptance of the first hypothesis.

In relation to the second hypothesis, the coefficient for traditions was also positive and statistically significant at the 5% significance level, which implies a strong positive role of informal institutions in the development of green entrepreneurship in Saudi Arabia. At the same time, the effect of traditions on non-green entrepreneurship was found to be positive but not statistically significant. This proves that traditions have a stronger influence on green entrepreneurship than on non-green entrepreneurship, and the hypothesis was accepted.

In all the regressions, the results of the F-test effectively refuted the null hypothesis that all the slope coefficients are jointly insignificant. This rejection was made at the 1% significance level. This proves the validity of the model and the explanatory power of the introduced variables, which make the regression stronger than the intercept-only model. Nevertheless, the coefficient of determination that showed the goodness of fit of the regression line varied from model to model. This coefficient was denoted as the overall R-squared as it evaluated the fit across both time

periods and cross-sections or cities. The highest fit of the regression model was found for non-green entrepreneurship and property rights, for which the regressors explained 72% of the variation in non-green entrepreneurship. For the regression models with green entrepreneurship, the model with informal institutions represented by traditions showed a better fit than the model with property rights. The former explains 14% of the variations in the dependent variable, whereas the latter explains only 1.68%. The differences in the fit of the regression lines can be explained by the differences in the volatility of green and non-green entrepreneurship, as was reported in the descriptive statistics.

The next set of panel regressions attempted to test the following hypotheses.

Table 6.5: Regression models with property rights as a predictor of sustainable development

	Economic activity	Employment rate	Unemployment	Density of banks	Government expenditure on education	Government expenditure on health	Government expenditure on security	Social projects for quality of life	Basic services	Recycling rate	Management of waste	Environmental preservation	Preservation and protection of the environment
Green entrepreneurship	-0.000**	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.174**	0.000**	0.000***	1.342***	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.081)	(0.000)	(0.000)	(0.174)	(0.000)	(0.000)
Environmental consciousness	-0.006	-0.092***	-0.011*	-0.031***	-0.032*	-0.014	0.002	-119.554	-0.017	-0.035	-486.775	-0.113	-0.005
	(0.007)	(0.034)	(0.006)	(0.011)	(0.017)	(0.033)	(0.011)	(139.554)	(0.068)	(0.025)	(299.856)	(0.077)	(0.009)
Temporal orientation	0.000	0.044	-0.000	0.025	-0.003	-0.016	0.019	188.921	-0.017	0.009	235.065	0.176*	0.014
	(0.009)	(0.047)	(0.008)	(0.016)	(0.0232)	(0.045)	(0.015)	(187.531)	(0.091)	(0.033)	(402.942)	(0.104)	(0.012)
Innovation policy	0.024	0.307	0.140	0.066	0.204	0.442	0.303*	-393.496	1.703*	0.220	7685.777*	-0.966	0.096
	(0.108)	(0.519)	(0.091)	(0.176)	(0.257)	(0.502)	(0.166)	(2071.508)	(1.014)	(0.373)	(4450.974)	(1.152)	(0.137)
Entrepreneurship policy	-0.088	0.513	0.125	0.348**	0.165	1.343***	0.028	-18.906	0.774	0.561*	7451.685*	-1.394	0.168
	(0.093)	(0.447)	(0.078)	(0.152)	(0.221)	(0.432)	(0.143)	(1785.891)	(0.874)	(0.321)	(3837.28)	(0.993)	(0.118)
Constant	1.066	5.657	2.191	2.344	3.833	-4.109	-0.016	10,164.280	72.342***	3.186	-9,098.807	33.871***	1.123
	(1.003)	(4.8162)	(0.846)	(1.639)	(2.386)	(4.656)	(1.544)	(19212.16)	(9.407)	(3.461)	(41280.46)	(10.692)	(1.279)
R-squared	0.074	0.518	0.803	0.484	0.375	0.356	0.459	0.237	0.222	0.420	0.563	0.217	0.391
Wald test	8.720	53.650	139.570	51.860	34.090	33.880	29.210	5.860	9.050	47.540	67.910	10.620	29.720
Sargan test	4.928	3.695	0.954	2.832	5.528	2.650	4.864	2.902	1.574	0.781	8.894	2.877	2.974
p-value	0.294	0.448	0.916	0.586	0.237	0.617	0.301	0.574	0.813	0.940	0.063	0.578	0.562

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The Sargan test was applied to check the quality of the instruments used in the regressions. The null hypothesis of the test is that the instruments are exogenous. This hypothesis was accepted for all the regression models at the 95% confidence level. It can be seen that green entrepreneurship, as explained by property rights and traditions, produces a statistically significant positive effect on the economic, social, and environmental dimensions, with different degrees of statistical significance. The effects of green entrepreneurship on the economic dimension were found to be positive and significant at the 1% level. The effects on the environmental dimension were also found to be positive and significant at the 1% level. At the same time, the effect on the social dimension was shown to be positive and statistically significant at the 5% and 1% levels. This indicates that green entrepreneurship has a similar significant effect on the economic, social, and environmental dimensions of sustainable development. In line with the expectations, these effects are positive, which means that the protection of property rights is essential not only for economic development but also for environmental protection and social development. Thus, based on the results of the 2SLS regressions with instrumental variables, it is possible to accept hypothesis 1a, hypothesis 1b, and hypothesis 1c.

This procedure was repeated for green entrepreneurship explained by traditions and their role in the sustainable development of Saudi Arabia. The last set of panel regressions tested whether green entrepreneurship, as determined by traditions, is positively associated with the social dimension, the economic dimension, and the environmental dimension.

Table 6.6: Regression models with traditions as a predictor of sustainable development

	Employment rate	Unemployment	Density of banks	Government expenditure on education	Government expenditure on health	Government expenditure on security	Social projects for quality of life	Basic services	Recycling rate	Management of waste	Environmental preservation	Preservation and protection of the environment
Green entrepreneurship	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.139	0.000*	0.000***	1.469***	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.086)	(0.000)	(0.000)	(0.195)	(0.000)	(0.000)
Environmental consciousness	-0.094***	-0.011*	-0.031***	-0.033*	-0.015	0.002	-108.045	-0.013	-0.035	-528.482*	-0.115	-0.004
	(0.035)	(0.006)	(0.012)	(0.017)	(0.034)	(0.011)	(141.706)	(0.068)	(0.025)	(320.094)	(0.077)	(0.009)
Temporal orientation	0.046	-0.000	0.025	-0.002	-0.015	0.020	177.415	-0.020	0.01	276.760	0.178*	0.013
	(0.048)	(0.008)	(0.0162)	(0.023)	(0.045)	(0.015)	(190.266)	(0.092)	(0.034)	(429.784)	(0.104)	(0.012)
Innovation policy	0.285	0.138	0.060	0.193	0.434	0.300*	-269.921	1.741*	0.216	7,237.981	-0.985	0.104
	(0.531)	(0.092)	(0.1799)	(0.262)	(0.506)	(0.167)	(2101.594)	(1.016)	(0.376)	(4747.212)	(1.155)	(0.136)
Entrepreneurship policy	0.550	0.128	0.356**	0.183	1.356***	0.033	-221.488	0.711	0.569*	8185.776**	-1.364	0.156
	(0.459)	(0.079)	(0.155)	(0.227)	(0.437)	(0.144)	(1816.402)	(0.878)	(0.325)	(4103.003)	(0.998)	(0.117)
Constant	5.218	2.157**	2.238	3.611	-4.266	-0.076	12,605.210	73.094***	3.097	-17,943.910	33.501***	1.267
	(4.945)	(0.856)	(1.674)	(2.446)	(4.711)	(1.555)	(19557.66)	(9.462)	(3.501)	(44178.08)	(10.753)	(1.266)
R-squared	0.496	0.800	0.467	0.349	0.346	0.456	0.216	0.220	0.412	0.504	0.215	0.409
F-test	50.870	129.240	48.610	33.180	32.210	28.390	3.840	7.740	43.940	64.400	10.560	24.530
Sargan test	2.661	0.911	3.665	4.894	6.559	4.797	4.257	5.008	1.769	3.416	2.739	5.066
p-value	0.616	0.922	0.453	0.298	0.161	0.308	0.372	0.286	0.778	0.490	0.602	0.280

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The p-values of the Sargan test are greater than 0.05, which suggests that the chosen instrumental variables are truly exogenous and can be used in this regression analysis. The results appear to be consistent with those reported for the previous regressions with formal institutions represented by property rights as an instrumental variable. The latter produced significant positive effects on the economic, social, and environmental dimensions of sustainable development. The same effects were demonstrated by green entrepreneurship determined by informal institutions, which were found to have positive and significant effects on the elements of the economic, social, and environmental dimensions of sustainable development. The influence on the social dimension was positive and statistically significant at the 1% and 10% significance levels. The effect of green entrepreneurship on the economic dimension was positive and statistically significant at the 1% level. The impact of green entrepreneurship on the environmental dimension was positive and significant at the 1% level. Therefore, hypothesis 2a, hypothesis 2b, and hypothesis 2c can be accepted.

The results regarding property rights are in line with the role of formal institutions predicted by major theoretical frameworks. The greater influence of property rights on green entrepreneurship than on non-green entrepreneurship is consistent with the traditional liberal perspective on economic freedom (Bjørnskov & Foss, 2013; Johnson & Schaltegger, 2020). Protecting property rights decreases investment risks and promotes innovation (Escandon-Barbosa et al., 2019), which would explain the observed impact on green entrepreneurship. Stronger property rights also reduce contracting costs, which could help to alleviate financial barriers for new green businesses (Gregori et al., 2019). Reduced uncertainty and lower costs would also explain the observed link between property rights and the economic dimension of sustainable development. It follows that new businesses would have more resources available for addressing the demands of environmental organizations and the natural environment itself (Demirel et al., 2019), which would explain the observed impact of green entrepreneurship on the environmental aspects of sustainability.

According to social capital theory, the quality and stability of such formal institutions as property rights foster long-term investment (Ahmad & Hall, 2017), which is also consistent with the identified effect on green entrepreneurship as it focuses on sustainability in the long run. The findings on the role of property rights in the social dimension of sustainable development agree

with stronger formal institutions discouraging opportunistic behaviour (Hörisch, 2019). The results of the present analysis are also in agreement with prospect theory (Kahneman & Tversky, 1979). Indeed, this theory implies that new businesses would prefer safer investments if the risk of arbitrary expropriation is high, since the losses would be comparable to the reference point of a green firm's total value (Estrin et al., 2013b). Overall, the present analysis agrees with the existing research on formal institutions.

The findings on the impacts of tradition are consistent with the existing literature on the role of informal institutions in entrepreneurship and sustainability. The observed effect of traditions on green entrepreneurship being higher than the effect on non-green entrepreneurship agrees with institutional theory. This theory implies that organizations will be pressured towards homogenization (DiMaggio & Powell, 1983; Roy & Goll, 2014). All three isomorphism channels are applicable to green businesses, which would explain the observed influence of tradition. Indeed, tradition may exacerbate mimetic pressures, as firms seek to appear more legitimate in the context of growing environmental concerns (Johnson & Schaltegger, 2020; Thompson & Eijkemans, 2018). Social expectations could lead to new environmental regulations (Gast et al., 2017), which would result in coercive pressures on new and established businesses (Kardos et al., 2019; Yadav et al., 2018). This would also help to explain the observed indirect impact of green entrepreneurship on the environmental dimension of sustainable development. The findings on the social and economic aspects agree with stakeholder theory. Traditions may increase the salience of certain stakeholder groups, such as local communities, non-governmental organizations, and environmental institutions (Middermann et al., 2020; Qazi et al., 2020). Thus, the present results are consistent with the existing literature on the role of informal institutions.

6.5 Discussion and Conclusions

The present chapter aimed to assess the role of property rights and traditions as antecedents of green entrepreneurship and sustainable development in Saudi Arabia. Little research has considered green entrepreneurship in the context of an integrative framework that encompasses both formal and informal institutions. The current chapter addressed this gap by assessing the impact of property rights and traditions on green entrepreneurship. This was achieved by employing a two-stage instrumental variable design for exploring a city-level panel dataset.

The first set of hypotheses considered whether the impact of formal and informal institutions was stronger for green entrepreneurship than for non-green entrepreneurship. The data provided evidence in support of hypothesis 1, meaning that the influence of property rights on green entrepreneurship was found to be stronger than the influence on non-green entrepreneurship. Similar findings were obtained for informal institutions, supporting hypothesis 2. More precisely, the influence of traditions on green entrepreneurship was found to be greater than the influence on non-green entrepreneurship. These findings are consistent with the predictions of major theoretical frameworks, such as social contract theory, prospect theory, institutional theory, and stakeholder theory. Thus, the results of the present chapter indicate that the impact of both formal and informal institutions, represented by property rights and traditions, respectively, is stronger for green entrepreneurship than for non-green entrepreneurship in Saudi Arabia.

The second set of hypotheses investigated whether green entrepreneurship, as determined by formal and informal institutions, had a positive effect on the dimensions of sustainable development. Firstly, the analysis provided support for all three hypotheses related to property rights, namely hypotheses 1a, 1b, and 1c. In other words, green entrepreneurship determined by property rights was found to be positively associated with the social, environmental, and economic dimensions of sustainable development. Likewise, the analysis supported all three hypotheses related to traditions, namely hypotheses 2a, 2b, and 2c. To be more precise, green entrepreneurship determined by traditions was found to be positively associated with the social, environmental, and economic dimensions of sustainable development. The findings were found to be in line with the existing theoretical frameworks of entrepreneurship. Overall, the results of the present analysis

show that green entrepreneurship as determined by formal and informal institutions, represented by property rights and traditions, respectively, has a positive effect on all three dimensions of sustainable development in Saudi Arabia.

6.5.1 Implications for Theory and the Literature

The findings from the present analysis contribute to the existing theoretical frameworks. While the attention paid to sustainability in entrepreneurship research has increased (Filser et al., 2019; Makki et al., 2020), the literature has been noted to encompass relatively independent streams of research (Casson et al., 2010; Filser et al., 2019; Gast et al., 2017). Specifically, few studies appear to have examined green entrepreneurship in a comprehensive way (Aparicio et al., 2020b). The present results contribute to the ongoing development of theoretical frameworks of sustainability by considering both formal and informal institutions. The findings provide strong evidence that environmental entrepreneurship and all the dimensions of sustainable development are directly or indirectly affected by traditions and property rights. While existing studies have often focused on specific antecedents of green entrepreneurship (Filser et al., 2019), the present chapter provided a more integrative view of green businesses. Thus, the results can be used to extend the existing theoretical frameworks to incorporate both formal and informal institutions into the decision making of green entrepreneurs.

6.5.2 Implications for Policy and Practice

The findings of the present chapter can also be used to inform the policies of governmental institutions in Saudi Arabia. Both property rights and traditions may influence the adoption of environmentally friendly business practices. Policy makers should account for both channels when developing regulatory and financial policies regarding the promotion of green entrepreneurship. More generally, the results suggest that relevant institutions should explore a variety of formal and informal factors that may influence the decisions of new entrepreneurs. The current chapter also contributes to the existing practices by highlighting the role of both formal and informal institutions in Saudi Arabia. Specifically, the quality of property rights institutions as well as socio-

cultural norms and beliefs should be taken into account when implementing the sustainability projects of the 2030 Vision programme (Alwakid et al., 2020).

6.5.3 Limitations and Recommendations for Future Research

The present study was subject to a number of methodological limitations that can be addressed in future research. The sample contained data on 13 cities in Saudi Arabia over the period from 2012 to 2017. This creates some concerns about the external validity of the study. In particular, it is not clear whether the findings can be generalized to contexts other than the selected cities in Saudi Arabia over the examined period. It is also possible that the relationship between formal and informal institutions, green entrepreneurship, and sustainable development varies over time. Future studies may cover a longer sample period that includes observations made during an economic crisis. This would allow an assessment of whether the impact of regulatory and socio-cultural pressures faced by green businesses is stronger during recessions.

While the data employed in the present chapter covered a variety of cities, it may be helpful to consider a larger sample to introduce more city-level variability. Including other economies from the MENA region as well as Western developing countries in the sample is also recommended to control for country-level differences in the antecedents of green entrepreneurship. The present analysis included a variety of proxies for each dimension of sustainable development, which constitutes a major strength of the study's methodology. However, no robustness analysis was conducted with regard to the proxies for green and non-green entrepreneurship. Future research may expand on the operationalization of green entrepreneurship to enhance the internal validity of the analysis.

Chapter 7: General Conclusions

7. General Conclusions

7.1 Main Conclusions

Saudi Arabia is a strategic nation in the world. Vision 2030 and the 2020 National Transformation Program provide the country with defined goals and critical measures for long-term survival, sustainable development, and balanced growth. These strategic programmes stipulate comprehensive objectives and goals capable of transforming Saudi Arabia into a sustainable and diverse economy positioned at the heart of international trade. Vision 2030 has a strong emphasis on and sets out expectations for improving sustainable development aimed at reducing the overdependence on oil and contributing to the global efforts to reduce carbon emissions (Albanawi, 2015; Rana & Alayed, 2018). The proactive steps that the Saudi Government has taken include transformative plans to achieve a sustainable economy, generate green jobs, promote environmentally friendly businesses, and establish socially inclusive organizations. The success of these supportive government policies depends on the effective involvement and empowerment of all relevant stakeholders at all levels in Saudi Arabia. This is in addition to developing comprehensive strategies, green entrepreneurial policies, and mechanisms to guide progress towards effective and efficient sustainability.

Typical strategies and government policies employed in Saudi Arabia to improve green entrepreneurial activities include encouraging all the relevant stakeholders, including government agencies, businesses, and local and international staff, to support and develop greener infrastructure through educational initiatives. Education promotes and highlights the benefits of sustainability and green entrepreneurial activities in Saudi Arabia. Another strategy is to train all the relevant stakeholders, including government agencies, businesses, and local and international staff, on green technologies, entrepreneurial activities, and sustainable planning and construction, including training on green building and implementing accreditations such as Leadership in Energy and Environmental Design (LEED). The Saudi Government encourages all developers to satisfy the established noise, water, and air pollution requirements in accordance with the national

standards and international specifications. These initiatives are geared towards facilitating the transition to green entrepreneurial activities and sustainability in Saudi Arabia.

Using the institutional approach as a theoretical framework, the current study analysed the influence of formal and informal institutions on green entrepreneurial activities and their impact on sustainable development in the context of Saudi Arabia. The main findings of this study showed that institutions (such as property rights and culture) contribute positively to green (vs. non-green) entrepreneurship, with a positive influence on sustainable development in Saudi Arabia. The results also demonstrated that green entrepreneurship contributes positively to the economic, social, and environmental components of sustainable development, whereas non-green entrepreneurship has no effect.

Concerning the phases of the study, after Section 2 (systematic literature review; see Table 7.1), Section 3 explained that supportive environmental, innovation, and entrepreneurship policies exert a significantly positive influence on green entrepreneurship, showing government support for progress. Consistent with Minniti (2008), this realization, in turn, has generated a significant amount of interest in how government policies could be instrumental in fostering entrepreneurial activity and whether their effects are consistent across countries. There appears to be a requirement to adopt a package of policies to accelerate and encourage innovation, whereas a more targeted choice among policies is necessary to enhance the exploration of opportunity (Mohnen & Röller, 2005). Accordingly, Section 3 showed that environmental, innovation, and entrepreneurship policies exert a significantly positive influence on green entrepreneurship in Saudi Arabia. Implications about policymaking and managerial decisions related to targeted awareness raising and environmental care in the future can be derived from this study.

Table 7.1: Summary of the main results of the research

	Section	Theoretical framework	Dependent variable	Independent variable	Methodology	Main conclusions
Phase 1: Literature review	2	-	-	-	Bibliometric analysis: systematic review of the literature on sustainable entrepreneurship from January 2002 to December 2020, bringing the review up to date, using a combination of research tools and Scopus and VOSviewer as analytic aids.	The last three years, 2018–2020, have witnessed a 45% increase in publications on the subject, signalling the increased importance of sustainable entrepreneurship and its growth across the globe.
Phase 2: Governmental supportive policies for green entrepreneurship	3	Institutional economics	Green entrepreneurship	Environmental policy Innovation policy	Fixed- and random-effect models	The main findings show that supportive environmental, innovation, and entrepreneurship policies exert a significantly positive influence on green entrepreneurship.

Phase 3: Cultural antecedents of green entrepreneurship	4	Institutional economics	Green entrepreneurship	Environmental actions Environmental consciousness Time orientation	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.
Phase 4: The influence of green entrepreneurship on the sustainable development	5	Institutional economics	Sustainable development	Green entrepreneurship Non-green entrepreneurship	Panel data models	The results show that green entrepreneurship contributes positively to the economic, social, and environmental components of sustainable development and that non-green entrepreneurship has no effect. This was also the case with entrepreneurship policy, introduced as a moderator,

						which showed that Saudi Arabian initiatives reflect the need to align entrepreneurial activity with the principles of social, environmental, and economic sustainability.
Phase 5: Property rights and traditions as antecedents of green entrepreneurship and sustainable development	6	Institutional economics	Economic components Social components Environmental components Green entrepreneurship Non-green entrepreneurship	Traditions Property rights	Panel data models	The results show a stronger impact of property rights and traditions on green entrepreneurship than non-green entrepreneurship. Green entrepreneurship, determined by property rights and traditions, is positively associated with the economic, social, and environmental aspects of sustainable development. The results are consistent with the existing literature and indicate that researchers and

policymakers should incorporate formal and informal institutions into their frameworks when considering the antecedents of green entrepreneurship.

Regarding the simultaneity issues, additional implications might be derived from this research. Section 4 examined the influence of cultural factors on green entrepreneurial activity in Saudi Arabia. Institutional economics (North, 1990, 2005) was used to enhance our comprehension of such cultural influences (i.e., informal institutions). It is also vital to comprehend how entrepreneurship accounts for social values, beliefs, and culture, which change over time and space (Audretsch & Keilbach, 2008; Baumol & Strom, 2007). In this regard, organizational processes have a temporal dimension, often implicit and without discourse, that clearly characterizes the entrepreneurial process (Bird & West, 1998). It is still unknown, however, whether the institutional cultural factors of environmental actions, environmental consciousness, and temporal orientation directly explain green entrepreneurship (Allen & Malin, 2008; Gibbs & O'Neill, 2014; Meek et al., 2010) in developing countries such as Saudi Arabia. Section 4 showed that these cultural characteristics increase the level of green entrepreneurial activity across cities in Saudi Arabia. The findings of this study contribute to the existing knowledge on green entrepreneurship and to the discussion of implications for policy and practice related to environmentally friendly productive activities.

Section 5 discussed the influence of green entrepreneurship on the sustainable development of Saudi Arabia. This study adopted the common approach of dividing sustainable development into economic, social, and environmental components. Additionally, Section 5 noted the lack of

attention paid to sustainable development, and this study extends the previously available frameworks, such as endogenous growth theory and the Schumpeterian theory of entrepreneurship, by treating sustainable development as a composite index with economic, social, and environmental elements (Potluri & Phani, 2020). It fills a gap in the existing literature because the entrepreneurship policies implemented in Saudi Arabia cover several dimensions of sustainability. Terán-Yépez et al. (2020) noted that there is no readily available theoretical framework to explain fully the relationship between green entrepreneurship and sustainable development. In addition, Section 5 showed that green entrepreneurship contributes positively to the economic, social, and environmental components of sustainable development, whereas non-green entrepreneurship has no effect. This was also the case when entrepreneurship policy was introduced as a moderator, showing that Saudi Arabian initiatives reflect the need to align entrepreneurial activity with the principles of social, environmental, and economic sustainability.

Section 6 might be important in terms of offering new evidence concerning the role of property rights and traditions in green entrepreneurship and sustainable development in Saudi Arabia. Little research has been conducted on the antecedents of green entrepreneurship within an integrative framework that encompasses both formal and informal institutions. Consistent with the institutional economics point of view (North, 1990, 2005), considering the role of formal institutions (property rights) and informal institutions (traditions), generally, institutions can be viewed as the rules within society that shape human interactions (North, 1990). Meek et al. (2010) and Roy and Goll (2014) also discussed how formal and informal institutional factors may explain different types of entrepreneurial activities, including green entrepreneurship. Furthermore, Section 6 showed that there are stronger impacts of property rights and traditions on green entrepreneurship than on non-green entrepreneurship. It was also found that green entrepreneurship, determined by property rights and traditions, is positively associated with the economic, social, and environmental aspects of sustainable development. The results are consistent with the existing literature and indicate that researchers and policymakers should incorporate formal and informal institutions into their frameworks when considering the antecedents of green entrepreneurship.

7.1.1 Limitations and Future Research

A central strength of this study was its ability to extrapolate the significant effects of property rights and traditions on shaping green entrepreneurship in Saudi Arabia, a nation that is facing the challenge of accelerating sustainability to meet its long-term Vision 2030 objectives. At the same time, this narrow focus weakened the generalizability of the outputs, narrowing the transferrable insights and results according to the scope and focus of the evidential streams. Therefore, it is acknowledged that, to overcome this limitation and weakness, additional research will be needed in the future. From this point of view, that future work could compare the Saudi "Vision 2030" with the United Nations' Sustainable Development Goals (SDGs), as laid out in the "Agenda 2030", and this comparison will build new lines for future research. A key recommendation for future research would be to assess the fundamental intrinsic and extrinsic relationships between green entrepreneurship and sustainable development, including the use of social, environmental, and economic factors. The sample of this study included data on 13 cities in Saudi Arabia (Sections 3–6). An additional task for future research would be to evaluate and assess different approaches to green entrepreneurship in the Middle East. This may create some concerns about the external validity of the study. Future researchers could carry out more cross-sectional and longer-term analyses by investigating other countries in the Gulf Cooperation Council region to extend the present study.

Along with the theoretical limitations, this research is limited by some formal institutions, such as supportive government policies (Section 3) and property rights (Section 6), and informal institutions, such as culture (Section 4) and traditions (Section 6), to test their influence on green entrepreneurial activity in Saudi Arabia. Future research should provide more elements for formal and informal institutions to analyse their effect on green entrepreneurship in many cities. Additionally, future research could provide comparisons of the effects of those institutions on green entrepreneurship in different cities.

Although some implications can be derived from the present research, there is still much to undertake. Thus, the study has several limitations. Motivated by lacuna identified in the previous chapters, it found that there are no global databases for green entrepreneurship, so future

researchers could experiment with various proxies for green entrepreneurship and determine whether the results remain stable across variables and techniques. We are aware that a lack of data sources presents 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 (Schillo et al., 2016). Further efforts are needed to create homogeneous information concerning green entrepreneurship as well as its antecedents and the consequences beyond economic terms (Aparicio et al., 2020b). The present study's limitations are also partly due to the lack of a ready definition of sustainable development in the literature, as reported in Section 5. It is recommended that future researchers test the relationship between green entrepreneurship and sustainable development by using different proxies for social, environmental, and economic aspects to ensure confidence in the policy application of their findings. Future research should improve the quality and scope of the indicators, for both dependent and independent variables, which could increase the reliability of research and its ability to analyse causal relationships in a cross-sectional setting (Urbano et al., 2019). Furthermore, it is recommended that future researchers test the relationship between green entrepreneurship, sustainable development, and different types of formal and informal institutions, which will create new lines for future research.

7.1.2. Comparison with Other Research Works in the Same Field

Building on the extant literature on green entrepreneurial activity, sustainable entrepreneurial practices need to be implemented to achieve not only economic aims but also social and environmental objectives. For example, researchers have focused their attention on studying the drivers of sustainable entrepreneurship (Cohen & Winn, 2007; Crals & Vereeck, 2004; Kuckertz & Wagner, 2010; Rodgers, 2010; Schaltegger & Wagner, 2011; Shepherd & Patzelt, 2011). In particular, the influence of governmental policies on entrepreneurship was explored (Juma et al., 2017; Mohamad et al., 2013) as governments play an integral role in facilitating or hindering entrepreneurial development (Juma et al., 2017) (as reported in Section 3).

It is also important to comprehend how entrepreneurship accounts for social values, beliefs, and culture, which change over time and space (Audretsch & Keilbach, 2008; Baumol & Strom, 2007). In our study, we focused on environmental actions, environmental consciousness, and temporal

orientation; however, it is still unknown whether these three institutional factors as cultural characteristics directly explain green entrepreneurship (Allen & Malin, 2008; Gibbs & O'Neill, 2014; Meek et al., 2010) in Saudi Arabia (as mentioned in Section 4). Following the work of Lee (2015), the analysis was constructed as a set of composite indices based on factors that potentially affect internal reliability (as evidenced by the Cronbach's alpha test) to test the relationship between green entrepreneurship and sustainable development by using proxies for social, environmental, and economic aspects (as reported in Section 5).

Little research has investigated an integrative framework for sustainable entrepreneurship (Casson et al., 2010; Filser et al., 2019) in which formal and informal institutions affect environmental entrepreneurship. This chapter helps to bridge this gap by considering the formal (equity) and informal (traditional) institutional precedents for green entrepreneurship (as mentioned in Section 6).

8. References

Acs, Z. J., Estrin, S., Mickiewicz, T., & Szerb, L. (2018). Entrepreneurship, institutional economics, and economic growth: An ecosystem perspective. *Small Business Economics*, *51*(2), 501–514.

Adekola, G., & Egbo, N. C. (2016). Traditions and customs in community development: The case of Nkanu West and Nkanu East local government areas of Enugu State, Nigeria. *Journal of Education and Practice*, *7*(18), 120–127.

Adler, N. J. (1983). Cross-cultural management research: The ostrich and the trend. *Academy of Management Review, 8*(2), 226–232.

Aghelie, A., Sorooshian, S., & Azizan, N. A. (2016). Research gap in sustainopreneurship. *Indian Journal Science and Technology*, *9*. doi:.org/10.17485/ijst/2016/v9i12/77648

Ahmad, M., & Hall, S. G. (2017). Trust-based social capital, economic growth and property rights: Explaining the relationship. *International Journal of Social Economics, 44*(1), 21–52. doi:.org/10.1108/IJSE-11-2014-0223

Aidis, R., Estrin, S., & Mickiewicz, T. (2008). Institutions and entrepreneurship development in Russia: A comparative perspective. *Journal of Business Venturing*, *23*(6), 656–672.

Al Bawaba. (2014). Green flag, green economy: Saudi Arabian investments in green projects to exceed $26 billion. Retrieved 9 September 2015, from http://www.albawaba.com/business/saudi- Arabia-building-sustainability-603019

Al Rajhi, A., Al Salamah, A., Malik, M., & Wilson, R. (2012). *Economic development in Saudi Arabia 8*(16), 243–338.

Albanawi, N. I. (2015). Saudi Arabian green economy infrastructure: Barriers, strategies and opportunity – An analysis. *International Journal of Business and Economic Development (IJBED)*, *3*(3), 90–96.

Al-Barawi, A. K. J., Al-Habshi, M. A., Al-Shennawi, A. S., & Ibrahim, M. (2017). The reality of educational transformations as an entry point for the realization of the knowledge society in Palestine as seen by the private education schools' principals and teachers. *Journal of Reading and Knowledge – Egypt*, *183*, 207–235.

Alessa, A., & Alajmi, S. (2017). The development of Saudi Arabian entrepreneurship and knowledge society. *International Journal of Management Excellence*, *9*(3), 1155.

Ali, A. J., & Al-Aali, A. (2012). Corporate social responsibility in Saudi Arabia. *Middle East Policy*, *19*(4), 40–53.

Allen, J. C., & Malin, S. (2008). Green entrepreneurship: A method for managing natural resources? *Society and Natural Resources*, *21*(9), 828–844.

Alwakid, W., Aparicio, S., & Urbano, D. (2020). Cultural antecedents of green entrepreneurship in Saudi Arabia: An institutional approach. *Sustainability*, *12*(9), 3673.

Amirabadi Farahani, H., Mousavi Shafaee, M., & Assadi, A. A. (2021). Ranking and evaluating effective propellants of Saudi Arabia's future reforms under Vision 2030. *Journal of Research in Humanities*, *27*(4), 77–102.

Amran, Y. A., Amran, Y. M., Alyousef, R., & Alabduljabbar, H. (2020). Renewable and sustainable energy production in Saudi Arabia according to Saudi Vision 2030: Current status and prospects. *Journal of Cleaner Production*, *247*, 119602.

Anbari, F. T., Khilkhanova, E. V., Romanova, M. V., & Umpleby, S. A. (2003). Cross cultural differences and their implications for managing international projects. Retrieved 30 January 2020, from http://www.gwu.edu/~umpleby/recent_chapter/2003_cross_cultural_differences_managi_international_projects_anbari_khilkhanova_romanova_umpleby.htm

Andries, P., & Stephan, U. (2019). Environmental innovation and firm performance: How firm size and motives matter. *Sustainability*, *11*(13), 3585.

Antolin-Lopez, R., Martinez-del-Rio, J., & Cespedes-Lorente, J. J. (2019). Environmental entrepreneurship as a multi-component and dynamic construct: Duality of goals, environmental agency, and environmental value creation. *Business Ethics: A European Review*, *28*(4), 407–422. doi:.org/10.1111/beer.12229

Aparicio, S., Audretsch, D., & Urbano, D. (2020a). Does entrepreneurship matter for inclusive growth? The role of social progress orientation. *Entrepreneurship Research Journal*. In press, doi: 10.1515/erj-2019-0308

Aparicio, S., Turro, A., & Noguera, M. (2020b). Entrepreneurship and intrapreneurship in social, sustainable, and economic development: Opportunities and challenges for future research. *Sustainability*, *12*(21). doi:.org/10.3390/su12218958

Aparicio, S., Audretsch, D., & Urbano, D. (2021a). Does entrepreneurship matter for inclusive growth? The role of social progress orientation. *Entrepreneurship Research Journal*, *11*(4), 20190308.

Aparicio, S., Audretsch, D., & Urbano, D. (2021b). Why is export-oriented entrepreneurship more prevalent in some countries than others? Contextual antecedents and economic consequences. *Journal of World Business, 56(*3), 101177.

Aparicio, S., Urbano, D., & Audretsch, D. (2016). Institutional factors, opportunity entrepreneurship and economic growth: Panel data evidence. *Technological Forecasting and Social Change*, *102*, 45–61.

Aparicio, S., Urbano, D., & Stenholm, P. (2021c). Attracting the Entrepreneurial Potential: A Multilevel Institutional Approach. *Technological Forecasting and Social Change*, *168*, 120748.

Arora, S., & Casson, T. N. (1996). Why do firms volunteer to exceed environmental regulations? Understanding participation in EPA's 33/50 program. *Land Economics, 72,* 413–432.

Ashri, O. (2019). On the fast track: Saudi Arabia's entrepreneurship ecosystem. *Entrepreneur Middle East*. https://www.entrepreneur.com/article/336766

Audretsch, D., Belitski, M., & Desai, S. (2018). National business regulations and city entrepreneurship in Europe: A nested multi-level analysis. *Entrepreneurship Theory and Practice*, *43*(6), 1148–1165.

Audretsch, D. B., & Keilbach, M. (2008). Resolving the knowledge paradox: Knowledge-spillover entrepreneurship and economic growth. *Research Policy*, *37*(10), 1697–1705.

Baltagi, B. (2008). *Econometric analysis of panel data*. John Wiley and Sons.

Bansal, P., & DesJardine, M. R. (2014). Business sustainability: It is about time. *Strategic Organization*, *12*(1), 70–78.

Bansal, P., & Song, H. C. (2016). Similar but not the same: Differentiating corporate sustainability from corporate responsibility. *Academy of Management Annals*, *11*(1), 105–149.

Bansal, S., Garg, I., & Sharma, G. D. (2019). Social entrepreneurship as a path for social change and driver of sustainable development: A systematic review and research agenda. *Sustainability*, *11*(4), 1091.

Barrett, S. (1991). Environmental regulations for competitive advantage. *Business Strategy Review*, *2*, 1–15.

Baumgartner, F. R., & Jones B. D. (1993). *Agendas and instability in American politics*. University of Chicago Press.

Baumol, W. J. (1990). Entrepreneurship: Productive, unproductive, and destructive. *Journal of Political Economy*, *98*(5), 893–921.

Baumol, W. J., & Strom, R. J. (2007). Entrepreneurship and economic growth. *Strategic Entrepreneurship Journal*, *1*(3–4), 233–237.

Belz, F. M., & Binder, J. K. (2017). Sustainable entrepreneurship: A convergent process model. *Business, Strategy and Environment*, *26*, 1–17. doi:.org/10.1002/bse.1887

Berglann, H., Moen, E. R., Røed, K., & Skogstrøm, J. F. (2011). Entrepreneurship: Origins and returns. *Labour Economics*, *18*(2), 180–193.

Beugelsdijk, S., & Welzel, C. (2018). Dimensions and dynamics of national culture: Synthesizing Hofstede with Inglehart. *Journal of Cross-Cultural Psychology*, *49*(10), 1469–1505. doi:.org/10.1177/0022022118798505

Bird, B. J. (1992). The operation of intentions in time: The emergence of the new venture. *Entrepreneurship Theory and Practice*, *17*(1), 11–20.

Bird, B. J., & West III, G. P. (1998). Time and entrepreneurship. *Entrepreneurship Theory and Practice*, *22*(2), 5–9.

Björklund, J. C. (2018). Barriers to sustainable business model innovation in Swedish agriculture. *Journal of Entrepreneurship, Management and Innovation*, *14*(1), 65–90. doi:.org/10.7341/20181414

Bjørnskov, C., & Foss, N. (2013). How strategic entrepreneurship and the institutional context drive economic growth. *Strategic Entrepreneurship Journal*, *7*(1), 50–69. doi:.org/10.1002/sej.1148

Bjørnskov, C., & Foss, N. J. (2016). Institutions, entrepreneurship, and economic growth: What do we know and what do we still need to know? *Academy of Management Perspectives*, *30*(3), 292–315.

Bondell, H. D., Krishna, A., & Ghosh, S. K. (2010). Joint variable selection for fixed and random effects in linear mixed-effects models. *Biometrics*, *66*(4), 1069–1077.

Bosma, N., Content, J., Sanders, M., & Stam, E. (2018). Institutions, entrepreneurship, and economic growth in Europe. *Small Business Economics*, *51*(2), 483–499.

Bostanci, S. C. (2020). Use of waste marble dust and recycled glass for sustainable concrete production. *Journal of Cleaner Production*, *251*, 119785.

Bowen, H., & De Clercq, D. (2008). Institutional context and the allocation of entrepreneurial effort. *Journal of International Business Studies*, *39*(4), 747–767.

Breuer, H., Fichter, K., Lüdeke Freund, F., & Tiemann, I. (2018). Sustainability-oriented business model development: Principles, criteria and tools. *International Journal of Entrepreneurial Venturing*, *10*, 256–286. doi:.org/10.1504/IJEV.2018.092715

Brocke, J. V., Recker, J., & Seidel, S. (2012). *Green business process management: Towards the sustainable enterprise*. Springer-Verlag.

Brown, K., Adger, W. N., Devine-Wright, P., Anderies, J. M., Barr, S., Bousquet, F., Butler, C., Evans, L., Marshall, N., & Quinn, T. (2019). Empathy, place and identity interactions for sustainability. *Global Environmental Change*, *56*, 11–17.

Brundtland, G., Khalid, M., Agnelli, S., Al-Athel, S., Chidzero, B., Fadika, L., … et al. (1987). *Our common future* ('Brundtland report'). Oxford chapterback reference. Oxford University Press.

Bruton, G. D., Ahlstrom, D., & Li, H.-L. (2010). Institutional theory and entrepreneurship: Where are we now and where do we need to move in the future? *Entrepreneurship Theory and Practice*, *34*(3), 421–440. doi: 10.1111/j.1540-6520.2010.00390.x

Bygrave, W. D., & Hofer, C. W. (1992). Theorizing about entrepreneurship. *Entrepreneurship Theory and Practice*, *16*(2), 13–22.

Cai, W. G., & Zhou, X. L. (2014). On the drivers of eco-innovation: Empirical evidence from China. *Journal of Cleaner Production*, *79*, 239–248.

Cantele, S., & Zardini, A. (2018). Is sustainability a competitive advantage for small businesses? An empirical analysis of possible mediators in the sustainability–financial performance relationship. *Journal of Cleaner Production*, *182*, 166–176.

Capasso, M., Hansen, T., Heiberg, J., Klitkou, A., & Steen, M. (2019). Green growth – A synthesis of scientific findings. *Technological Forecasting and Social Change*, *146*, 390–402.

Capobianco-Uriarte, M. M., Casado-Belmonte, M. P., Marín-Carrillo, G. M., & Terán-Yépez, E. (2019). A bibliometric analysis of international competitiveness (1983–2017). *Sustainability*, *11*, 1877. doi:.org/10.3390/su11071877

Caprar, D. V., & Neville, B. A. (2012). "Norming" and "conforming": Integrating cultural and institutional explanations for sustainability adoption in business. *Journal of Business Ethics*, *110*(2), 231–245.

Caradonna, J. L. (2014). *Sustainability: A history*. Oxford University Press.

Casson, M. C., Della Giusta, M., & Kambhampati, U. S. (2010). Formal and informal institutions and development. *World Development*, *38*(2), 137–141. doi:.org/10.1016/j.worlddev.2009.10.008

Castillo-Vergara, M., Alvarez-Marin, A., & Placencio-Hidalgo, D. (2018). A bibliometric analysis of creativity in the field of business economics. *Journal of Business Research*, *85*, 1–9. doi:.org/10.1016/j.jbusres.2017.12.011

Chick, A. (2008). Green entrepreneurship: A sustainable development challenge. *Entrepreneurship for everyone. London: Sage*,139-150.

Choi, S., & Ng, A. (2011). Environmental and economic dimensions of sustainability and price effects on consumer responses. *Journal of Business Ethics*, *104*(2), 269–282.

Cleron, J. (2020). *Saudi Arabia 2000 (RLE Saudi Arabia): A strategy for growth* (pp. 480, 510). Routledge.

Coad, J. (2012). *Green technology*. Raintree.

Cobo, M. J., Martínez, M. A., Gutierrez-Salcedo, M., Fujita, H., & Herrera-Viedma, E. (2015). 25 years at Knowledge-Based Systems: A bibliometric analysis. *Knowledge-Based Systems*, *80*, 3–13. doi:.org/10.1016/J.KNOSYS.2014.12.035

Cohen, B., & Winn, M. I. (2007). Market imperfections, opportunity and sustainable entrepreneurship. *Journal of Business Venturing*, *22*(1), 29–49.

Cowan, D. (2018). *The coming economic implosion of Saudi Arabia: A behavioral perspective*. Cham: Palgrave Macmillan.

Crals, E., & Vereeck, L. (2004). *Sustainable entrepreneurship in SMEs. Theory and practice*. Belgium: Limburgs Universitair Centrum.

Crals, E., & Vereeck, L. (2005). The affordability of sustainable entrepreneurship certification for SMEs. *International Journal of Substantiable Development and World Ecology*, *12*, 173–183. doi:.org/ 10.1080/13504500509469628

Criado-Gomis, A., Cervera-Taulet, A., & Iniesta-Bonillo, M. A. (2017). Sustainable entrepreneurial orientation: A business strategic approach for sustainable development. *Sustainability Times*, *9*, 1–20. doi:.org/10.3390/su9091667

Cumming, D. J., Johan, S. A., & Zhang, M. (2014). The economic impact of entrepreneurship: Comparing international datasets. *Corporate Governance: An International Review*, *22*(2), 162–178.

Dai, W., & Si, S. (2018). Government policies and firms' entrepreneurial orientation: Strategic choice and institutional perspectives. *Journal of Business Research*, *93*, 23–36.

De Marchi, V., & Grandinetti, R. (2013). Knowledge strategies for environmental innovations: The case of Italian manufacturing firms. *Journal of Knowledge Management*, *17*(4), 569–582.

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.

Del Mar Martínez-Bravo, M., Martínez-del-Río, J., & Antolín-López, R. (2019). Trade-offs among urban sustainability, pollution and livability in European cities. *Journal of Cleaner Production*, *224*, 651–660.

Del Rio, P., Carrillo-Hermossilla, J., & Könnöla, T. (2010). Policy strategies to promote eco-innovation: An integrated framework. *Journal of Industrial Ecology*, *14*(4), 541–557.

Del Río, P., Romero-Jordán, D., & Peñasco, C. (2015). Analysing firm-specific and type-specific determinants of eco-innovation. *Technological and Economic Development of Economy*, *23*(2), 270–295.

Delai, I., & Takahashi, S. (2011). Sustainability measurement system: A reference model proposal. *Social Responsibility Journal*, *7*(3), 438–471.

Demirel, P., Li, Q. C., Rentocchini, F., & Tamvada, J. P. (2019). Born to be green: New insights into the economics and management of green entrepreneurship. *Small Business Economics*, *52*(4), 759–771. doi:.org/10.1007/s11187-017-9933-z

DesRoches, C. T. (2020). The preservation paradox and natural capital. *Ecosystem Services*, *41*, 1.

Díez-Martín, F., Blanco-González, A., & Prado-Román, C. (2016). Explaining nation-wide differences in entrepreneurial activity: A legitimacy perspective. *International Entrepreneurship and Management Journal*, *12*(4), 1079–1102.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American sociological review*, 147-160.

Dixon, S., & Clifford, A. (2007). Ecopreneurship – A new approach to managing the triple bottom line. *Journal of Organizational Change Management*, *20*(3), 326–345.

Doh, J. P., Jones, J., Lumpkin, G. T., Ramesh, A., & Sarason, Y. A. (2019, July). Impact, sustainable, social and environmental entrepreneurship. In *Academy of Management Proceedings*, *1*, 11242. Academy of Management.

Domańska, A., Żukowska, B., & Zajkowski, R. (2018). Green entrepreneurship as a connector among social, environmental and economic pillars of sustainable development. Why some countries are more agile? *Problemy Ekorozwoju*, *13*(2), 67–76.

Doran, J., & Ryan, G. (2012). Regulation and firm perception, eco-innovation and firm performance. *European Journal of Innovation Management*, *15*(4), 421–441.

Dvouletý, O., Gordievskaya, A., & Procházka, D. A. (2018). Investigating the relationship between entrepreneurship and regional development: Case of developing countries. *Journal of Global Entrepreneurship Research*, *8*(1), 16.

Edler, J., & Fagerberg, J. (2017). Innovation policy: What, why, and how. *Oxford Review of Economic Policy*, *33*(1), 2–23.

Egri, C. P., Khilji, S. E., Ralston, D. A., Palmer, I., Girson, I., Milton, L., ... & Mockaitis, A. (2012). Do Anglo countries still form a values cluster? Evidence of the complexity of value change. *Journal of World Business*, *47*(2), 267–276.

El Mallakh, R. (2015). *Saudi Arabia: Rush to development (RLE Economy of Middle East): Profile of an energy economy and investment* (pp. 105–187). Routledge.

Elkington, J. (1994). Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California Management Review*, *36*, 90–100. doi.org/10.2307/41165746

Erbaugh, J., Bierbaum, R., Castilleja, G., da Fonseca, G. A., and Hansen, S. C. B. (2019). Toward sustainable agriculture in the tropics. *World Development*, *121*, 158–162.

Ertz, M., & Leblanc-Proulx, S. (2018). Sustainability in the collaborative economy: A bibliometric analysis reveals emerging interest. *Journal of Cleaner Production*, *196*, 1073–1085.

Escandon-Barbosa, D., Urbano-Pulido, D., & Hurtado-Ayala, A. (2019). Exploring the relationship between formal and informal institutions, social capital, and entrepreneurial activity in developing and developed countries. *Sustainability*, *11*(2), 550–569. doi:.org/10.3390/su11020550

Estrin, S., Korosteleva, J., & Mickiewicz, T. (2013a). Which institutions encourage entrepreneurial growth aspirations? *Journal of Business Venturing*, *28*(4), 564–580. doi:.org/10.1016/j.jbusvent.2012.05.001

Estrin, S., Mickiewicz, T., & Stephan, U. (2013b). Entrepreneurship, social capital, and institutions: Social and commercial entrepreneurship across nations. *Entrepreneurship Theory and Practice*, *37*(3), 479–504.

Eustachio, J. H. P. P., Caldana, A. C. F., Liboni, L. B., & Martinelli, D. P. (2019). Systemic indicator of sustainable development: Proposal and application of a framework. *Journal of Cleaner Production*, *241*, 118383.

Evans, D., & Abrahamse, W. (2009). Beyond rhetoric: The possibilities of and for "sustainable lifestyles". *Environmental Politics*, *18*(4), 486–502.

Farinelli, F., Bottini, M., Akkoyunlu, S., & Aerni, P. (2011). Green entrepreneurship: The missing link towards a greener economy. *ATDF Journal*, *8*(3/4), 42–48.

Fernandes, C. I., Veiga, P. M., Ferreira, J. J., & Hughes, M. (2021). Green growth versus economic growth: Do sustainable technology transfer and innovations lead to an imperfect choice?. *Business Strategy and the Environment*, *30*(4), 2021-2037.

Filser, M., Kraus, S., Roig-Tierno, N., Kailer, N., & Fischer, U. (2019). Entrepreneurship as catalyst for sustainable development: Opening the black box. *Sustainability*, *11*(16), 4503–4520. doi:.org/10.3390/su11164503

Galdeano-Gómez, E., Aznar-Sánchez, J. A., & Pérez-Mesa, J. C. (2013). Sustainability dimensions related to agricultural-based development: the experience of 50 years of intensive farming in Almería (Spain). *International Journal of Agricultural Sustainability*, 11(2), 125-143.

Gast, J., Gundolf, K., & Cesinger, B. (2017). Doing business in a green way: A systematic review of the ecological sustainability entrepreneurship literature and future research directions. *Journal of Cleaner Production*, *147*, 44–56. doi:.org/10.1016/j.jclepro.2017.01.065.

General Authority for Statistics. (2020). *Statistics*. Retrieved 18 March 2020, from https://www.stats.gov.sa/en

General Organization for Statistics. (2019). *The total population of Saudi Arabia for 2018 (people)*. Retrieved 1 March 2019, from https://www.stats.gov.sa/en/indicators/1

Gevrenova, T. (2015). Nature and characteristics of green entrepreneurship. *Trakia Journal of Science*, *13*(2), 321–323.

Gibbs, D. (2006). Sustainability entrepreneurs, ecopreneurs and the development of a sustainable economy. *Greener Management International*, *55*, 63–78.

Gibbs, D. (2009). Industrial ecology and eco-industrial development – The UK's National Industrial Symbiosis Programme (NISP). *EnviroInfo*, *2*, 245–251.

Gibbs, D., & O'Neill, K. (2014). Building a green economy? Sustainability transitions in the UK building sector. *Geoforum*, *59*, 133–141.

Gliedt, T., & Parker, P. (2007). Green community entrepreneurship: Creative destruction in the social economy. *International Journal of Social Economics*, *34*, 538–553.

Goldstein, D. (2001). Financial sector reform and sustainable development: the case of Costa Rica. *Ecological Economics*, 37(2), 199-215.

Goodland, R. (1995). The concept of environmental sustainability. *Annual Review of Ecology and Systematics*, *26*, 1–24.

Gregori, P., Wdowiak, M. A., Schwarz, E. J., & Holzmann, P. (2019). Exploring value creation in sustainable entrepreneurship: Insights from the institutional logics perspective and the business model lens. *Sustainability*, *11*(9), 2505–2532. doi:.org/10.3390/su11092505

Grinevich, V., Huber, F., Karataş-Özkan, M., & Yavuz, Ç. (2019). Green entrepreneurship in the sharing economy: Utilising multiplicity of institutional logics. *Small Business Economics*, *52*(4), 859–876.

Gu, W., Wang, J., Hua, X., & Liu, Z. (2020). Entrepreneurship and high-quality economic development: Based on the triple bottom line of sustainable development. *International Entrepreneurship and Management Journal*, 1–27.

Gundry, L. K., Kickul, J. R., Griffiths, M. D., & Bacq, S. C. (2011). Creating social change out of nothing: The role of entrepreneurial bricolage in social entrepreneurs' catalytic innovations. In *Social and sustainable entrepreneurship* (pp. 1–24). Emerald Group Publishing Limited.

Hair, J. F. (2010). *Multivariate data analysis: A global perspective* (7th ed.). Pearson.

Hair, J., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson Education International.

Haldar, S. (2019a). Green entrepreneurship in theory and practice: Insights from India. *International Journal of Green Economics*, *13*(2), 99–119. doi:.org/10.1504/IJGE.2019.103232

Haldar, S. (2019b). Towards a conceptual understanding of sustainability-driven entrepreneurship. *Corporate Social Responsibility and Environmental Management*, *26*(6), 1157–1170.

Hamdouch, A., & Depret, M. H. (2010). Policy integration strategy and the development of the "green economy": Foundations and implementation patterns. *Journal of Environmental Planning and Management*, *53*(4), 473–490.

Handler, R., & Linnekin, J. (1984). Tradition, genuine or spurious. *The Journal of American Folklore*, 97(385), 273-290.

Harini, V., & Meenakshi, D. T. (2012). Green entrepreneurship alternative (business) solution to save environment. *Asia Pacific Journal of Management and Entrepreneurship Research*, *1*(3), 79.

Harms, R., Schulz, A., Kraus, S., & Fink, M. (2009). The conceptualisation of "opportunity" in strategic management research. *International Journal of Entrepreneurial Venturing*, *1*(1), 57–71. www.researchgate.net

Haxhi, I., & Van Ees, H. (2009). Explaining diversity in the worldwide diffusion of codes of good governance. *Journal of International Business Studies*, *41*(4), 710–726.

He, K., Zhang, J., Feng, J., Hu, T., & Zhang, L. (2016). The impact of social capital on farmers' willingness to reuse agricultural waste for sustainable development. *Sustainable Development*, *24*(2), 101–108.

Hines, F., & Marin, O. (2004). Editorial building innovations for sustainability: 11th international conference of the greening of industry network. *Business Strategy and Development, 13*, 201–208. doi:10.1002/bse.412

Hockerts, K., & Wüstenhagen, R. (2010). Greening Goliaths versus emerging Davids – Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *Journal of Business Venturing, 25*, 481–492. doi:.org/10.1016/ j.jbusvent.2009.07.005

Hojnik, J., & Ruzzier, M. (2016). What drives eco-innovation? A review of an emerging literature. *Environmental Innovation and Societal Transitions, 19*, 31–41.

Hoogendoorn, B., Guerra, D., & van der Zwan, P. (2015). What drives environmental practices of SMEs? *Small Business Economics*, *44*(4), 759–781.

Horbach, J., Oltra, V., & Belin, J. (2013). Determinants and specificities of eco-innovations compared to other innovations – An econometric analysis for the French and German industry based on the community innovation survey. *Industry and Innovation*, *20*(6), 523–543.

Hörisch, J. (2019). Take the money and run? Implementation and disclosure of environmentally-oriented crowdfunding projects. *Journal of Cleaner Production, 223*, 127–135. doi:.org/10.1016/j.jclepro.2019.03.100

Horne, J., Recker, M., Michelfelder, I., Jay, J., & Kratzer, J. (2020). Exploring entrepreneurship related to the sustainable development goals – Mapping new venture activities with semi-automated content analysis. *Journal of Cleaner Production, 242*, 118052.

Huang, X. X., Hu, Z. P., Liu, C. S., Yu, D. J., & Yu, L. F. (2016). The relationships between regulatory and customer pressure, green organizational responses, and green innovation performance. *Journal of Cleaner Production, 112*, 3423–3433.

Iarossi, J., Miller, J., & O'Connor, J. (2013). Addressing the sustainability challenge: Insights from institutional theory and organizational learning. *Journal of Leadership, Accountability, and Ethics*, *10*(1), 76–91.

Inglehart, R. F. (2018). *Cultural evolution*. Cambridge, UK: Cambridge University Press.

Ioannou, I., & Serafeim, G. (2012). What drives corporate social performance? The role of nation-level institutions. *Journal of International Business Studies*, *43*(9), 834–864.

Isensee, C., Teuteberg, F., Griese, K. M., & Topi, C. (2020). The relationship between organizational culture, sustainability, and digitalization in SMEs: A systematic review. *Journal of Cleaner Production, 275*. doi:.org/10.1016/j.jclepro.2020.122944

Jakhar, S. K. (2017). Stakeholder engagement and environmental practice adoption: The mediating role of process management practices. *Sustainable Development*, *25*(1), 92–110.

Jasti, N. V. K., & Kodali, R. (2015). Lean production: Literature review and trends. *International Journal of Production Research*, *53*(3), 867–885.

Jiang, W., Chai, H., Shao, J., & Feng, T. (2018). Green entrepreneurial orientation for enhancing firm performance: A dynamic capability perspective. *Journal of Cleaner Production*, *198*, 1311–1323. doi:.org/10.1016/j.jclepro.2018.07.104

Johnson, M. P., & Schaltegger, S. (2020). Entrepreneurship for sustainable development: A review and multilevel causal mechanism framework. *Entrepreneurship Theory and Practice*, *44*(6), 1141–1173. doi:.org/10.1177/1042258719885368

Jolink, A., & Niesten, E. (2013). Sustainable development and business models of entrepreneurs in the organic food industry. *Business Strategy and the Environment*, *24*(6), 386–401.

Juma, N., James, C., & Kwesiga, E. (2017). Sustainable entrepreneurship in Sub-Saharan Africa: The collaborative multi-system model. *Journal of Small Business and Entrepreneurship*, *29*(3), 211–235.

Kabanshi, A. (2020). Are we overestimating the benefits of emission reduction measures? *Sustainability*, *12*(3), 808–816.

Kahneman, D., & Tversky, A. (1979). Econometrica. *Econometrica*, 47(2), 263-292.

Kardos, M., Gabor, M. R., & Cristache, N. (2019). Green marketing's roles in sustainability and ecopreneurship. Case study: Green packaging's impact on Romanian young consumers' environmental responsibility. *Sustainability*, *11*(3), 873. doi:.org/10.3390/su11030873

Karimi, R. F., & Nabavi Chashmi, S. A. (2019). Designing green entrepreneurship model in sustainable development consistent with the performance of Tehran industrial towns. *Journal of Business-to-Business Marketing*, *26*(1), 95–102.

Kaysi, I., & Chaaban, F. B. (2013). Transitioning to the green economy: The Arab transport sector policy brief. *International Journal of Sustainable Development and Planning*, *8*(3), 305–320.

Kazzi, H. (2014). Green growth and sustainable development in the Arab countries. *European Scientific Journal*, *10*(14), 109-120.

Khan, E. A., Dewan, M. N. A., & Chowdhury, M. H. (2016). Reflective or formative measurement model of sustainability factor: A three industry comparison. *Corporate Ownership and Control Journal*, *12*(2), 84–94.

Khan, E. A., Royhan, P., Rahman, M. A., Rahman, M. M., & Mostafa, A. (2020). The impact of enviropreneurial orientation on small firms' business performance: The mediation of green marketing mix and eco-labeling strategies. *Sustainability*, *12*(1), 221–237.

Khan, M. K. (2018). *Research, innovation, and entrepreneurship in Saudi Arabia: Vision 2030*. Routledge.

Khan, M. R. (2013). Mapping entrepreneurship ecosystem of Saudi Arabia. *World Journal of Entrepreneurship, Management and Sustainable Development*, *9*(1), 28–54.

Khoday, K., Perch, L., & Scott, T. (2015). Green economy pathways in the Arab Gulf: Global perspectives and opportunities. In M. A. Raouf & M. Luomi (Eds.), *The green economy in the Gulf* (p. 238). Routledge.

Kingdom of Saudi Arabia. (2018). *Sustainable development goals 1st voluntary national review*. https://sustainabledevelopment.un.org/content/documents/20230SDGs_English_Report972018_FINAL.pdf

Kirkwood, J., & Walton, S. (2014). How green is green? Ecopreneurs balancing environmental concerns and business goals. *Australasian Journal of Environmental Management*, *21*(1), 37–51.

Kitchenham, B., Brereton, O. P., Budgen, D., Turner, M., Bailey, J., & Linkman, S. (2009). Systematic literature reviews in software engineering – A systematic literature review. *Information and Software Technology*, *51*(1), 7–15.

Klasing, M. J. (2013). Cultural dimensions, collective values and their importance for institutions. *Journal of Comparative Economics*, *41*(2), 447–467.

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* (pp. 388–433). Harvard University Press.

Kluckhohn, F. R., & Strodtbeck, F. L. (1961). *Variations in value orientations*. Row, Peterson.

Konar, S., & Cohen, M. A. (1997). Information as regulation: The influence of community right to know laws on toxic emissions. *Journal of Environmental Economics and Management*, *32*, 109–124.

Kraus, P., Stokes, P., Cooper, S. C., Liu, Y., Moore, N., Britzelmaier, B., & Tarba, S. (2020). Cultural antecedents of sustainability and regional economic development – A study of SME "Mittelstand" firms in Baden-Württemberg (Germany). *Entrepreneurship and Regional Development*, 1–25.

Kraus, S., Burtscher, J., Vallaster, C., & Angerer, M. (2018). Sustainable entrepreneurship orientation: A reflection on status-quo research on factors facilitating responsible managerial practices. *Sustainability Times*, *10*(2), 444. doi:.org/10.3390/ su10020444

Krueger, N. F. (2005). Sustainable entrepreneurship: Broadening the definition of "opportunity". *SSRN Accepted Chapter Series, 7: Entrepreneurship in a Diverse World*.

Kshetri, N. (2010). Business perceptions of regulative institutions in Central and Eastern Europe. *Baltic Journal of Management*, *5*(3), 356–377.

Kücher, A., Mayr, S., Mitter, C., Duller, C., & Feldbauer-Durstmüller, B. (2020). Firm age dynamics and causes of corporate bankruptcy: Age dependent explanations for business failure. *Review of Managerial Science*, *14*(3), 633–661.

Kuckertz, A., & Wagner, M. (2010). The influence of sustainability orientation on entrepreneurial intentions: Investigating the role of business experience. *Journal of Business Venturing*, *25*(5), 524–539.

Lans, T., Blok, V., & Wesselink, R. (2014). Learning apart and together: Towards an integrated competence framework for sustainable entrepreneurship in higher education. *Journal of Cleaner Production*, *62*, 37–47. doi:.org/10.1016/ J.JCLEPRO.2013.03.036

Larsson, M., Milestad, R., Hahn, T., & von Oelreich, J. (2016). The resilience of a sustainability entrepreneur in the Swedish food system. *Sustainability Times*, *8*(6), 550. doi.org/10.3390/su8060550

Lee, K. H. (2015). Drivers and barriers to energy efficiency management for sustainable development. *Sustainable Development*, *23*(1), 16–25.

Le, T. H., Chuc, A. T., & Taghizadeh-Hesary, F. (2019). Financial inclusion and its impact on financial efficiency and sustainability: Empirical evidence from Asia. *Borsa Istanbul Review*, 19(4), 310-322.

Lévesque, M., & Stephan, U. (2019). It's time we talk about time in entrepreneurship. *Entrepreneurship Theory and Practice*, *44*(2), 163–184.

Levinsohn, D. (2013). Disembedded and beheaded? A critical review of the emerging field of sustainability entrepreneurship. *International Journal of Entrepreneurship and Small Business*, *19*, 190–211. doi:.org/10.1504/IJESB.2013.054963

Linnanen, L. (2005). An insider's experiences with environmental entrepreneurship. In *Making ecopreneurs: Developing sustainable entrepreneurship* (pp. 72–88).

Linnenluecke, M. K., Marrone, M., & Singh, A. K. (2020). Conducting systematic literature reviews and bibliometric analyses. *Australian Journal of Management*, *45*(2), 175–194.

Lioutas, E. D., & Charatsari, C. (2018). Green innovativeness in farm enterprises: What makes farmers think green? *Sustainable Development*, *26*(4), 337–349.

Liu, S. (2014). Study on the function of government in the innovation and development process for SMEs in China. In *2nd International Conference on Applied Social Science Research (ICASSR 2014)*. Atlantis Press. Retrieved 20 May 2020, from doi:.org/10.2991/icassr-14.2014.18

Liu, W., & Xin, J. (2014). *Modeling fractional outcomes with SAS*. SAS Support Resource.

Isaak, R. (1998). *Green logic: Ecopreneurship, theory and ethics*. Greenleaf.

Lorek, S., & Spangenberg, J. H. (2014). Sustainable consumption within a sustainable economy – Beyond green growth and green economies. *Journal of Cleaner Production*, *63*, 33–44.

Lotfi, M., Yousefi, A., & Jafari, S. (2018). The effect of emerging green market on green entrepreneurship and sustainable development in knowledge-based companies. *Sustainability*, *10*(2308), 1–18.

Lumpkin, G. T., & Bacq, S. (2019). Civic wealth creation: A new view of stakeholder engagement and societal impact. *Academy of Management Perspectives*, *33*(4), 383–404.

Makki, A. A., Alidrisi, H., Iqbal, A., & Al-Sasi, B. O. (2020). Barriers to green entrepreneurship: An ISM-based investigation. *Journal of Risk and Financial Management*, *13*(11), 249–265. doi:.org/10.3390/jrfm13110249

Mamede, P., & Gomes, C. F. (2014). Corporate sustainability measurement in service organizations: A case study from Portugal. *Environmental Quality Management*, *23*(3), 49–73.

Marchildon, A. (2016). Corporate responsibility or corporate power? CSR and the shaping of the definitions and solutions to our public problems. *Journal of Political Power*, *9*(1), 45–64.

Markman, G. D., Waldron, T. L., Gianiodis, P. T., & Espina, M. I. (2019). E pluribus unum: Impact entrepreneurship as a solution to grand challenges. *Academy of Management Perspectives*, *33*(4), 371–382.

Marom, S., & Lussier, R. N. (2014). A business success versus failure prediction model for small businesses in Israel. *Business and Economic Research*, *4*(2), 63.

Maskay, B. K. (2006). *Millennium development goals: Opportunities and challenges*. Rotary Club of Rajdhani.

Mason, C. H., & Perreault Jr, W. D. (1991). Collinearity, power, and interpretation of multiple regression analysis. *Journal of Marketing Research*, *28*(3), 268–280.

McAdam, M., Crowley, C., & Harrison, R. T. (2018, July). The emancipatory potential of female digital entrepreneurship: Institutional voids in Saudi Arabia. In *Academy of Management Proceedings* (Vol. 2018, No. 1, p. 10255). Academy of Management.

Meek, W. R., Pacheco, D. F., & York, J. G. (2010). The impact of social norms on entrepreneurial action: Evidence from the environmental entrepreneurship context. *Journal of Business Venturing*, *25*(5), 493–509.

Melay, I., & Kraus, S. (2012). Green entrepreneurship: Definitions of related concepts. *International Journal of Strategic Management*, *12*, 1–12.

Ministry of Environment, Water, and Agriculture (MEWA). (2019). *Sustainable development*. Retrieved 27 March 2019, from https://www.mewa.gov.sa/en/Ministry/initiatives/SustainableDevelopment/Pages/default.aspx

Middermann, L. H., Kratzer, J., & Perner, S. (2020). The impact of environmental risk exposure on the determinants of sustainable entrepreneurship. *Sustainability*, *12*(4), 1534. doi:.org/10.3390/su12041534

Ministry of Education – Kingdom of Saudi Arabia. (2019). Ministry of Education portal. Retrieved 28 April 2020, from https://www.moe.gov.sa/en/Pages/StatisticalInformation.aspx

Minniti, M. (2008). The role of government policy on entrepreneurial activity: Productive, unproductive, or destructive? *Entrepreneurship Theory and Practice*, *32*(5), 779–790.

Miska, C., Szőcs, I., & Schiffinger, M. (2018). Culture's effects on corporate sustainability practices: A multi-domain and multi-level view. *Journal of World Business*, *53*(2), 263–279.

Mohamad, Z., Ibrahim, Y., Muda, M., & Moklis, S. (2013). Government supports and sustainability of tourism entrepreneurs in Malaysia. *International Journal of Social Sciences*, *11*(1), 46–51.

Mohnen, P., & Röller, L. (2005). Complementarities in innovation policy. *European Economic Review*, *49*(6), 1431–1450.

Munoz, P., & Cohen, B. (2018). Sustainable entrepreneurship research: Taking stock and looking ahead. *Business, Strategy and the Environment, 27,* 300–322. doi:.org/10.1002/ bse.2000

Murgado-Armenteros, E. M., Gutierrez-Salcedo, M., Torres-Ruiz, F. J., & Cobo, M. J. (2015). Analysing the conceptual evolution of qualitative marketing research through science mapping analysis. *Scientometrics*, *102*, 519–557. doi:.org/ 10.1007/s11192-014-1443-z

Mutisya, E., & Yarime, M. (2014). Moving towards urban sustainability in Kenya: A framework for integration of environmental, economic, social and governance dimensions. *Sustainability Science*, *9*(2), 205–215.

Myers, R. (1990). *Classical and modern regression with applications* (2nd ed.). Duxbury.

Nadeem, S., & de Luque, M. F. S. (2020). Developing an understanding of the human resource (HR) complexities in Pakistan with a GLOBE cultural lens. *Journal of Management and Organization*, *26*(4), 483–501. doi:.org/10.1017/jmo.2017.79

Nader, S., & Faghih, N. (2015). Studying entrepreneurial marketing for information technology SMEs based on the classic grounded theory. *QScience Connect*, *9*, 2–13.

Nalband, N. A., Alkelabi, S., & Jaber, D. A. (2016). Innovation practices in Saudi Arabian businesses. *International Journal of Business and Management*, *11*(4), 136–160.

Ndubisi, N. O., & Nair, S. R. (2009). Green entrepreneurship (GE) and green value added (GVA): A conceptual framework. *International Journal of Entrepreneurship*, *13*, 21.

Nehrt, C. (1998). Maintainability of first-mover advantages when environmental regulations differ between countries. *Academy of Management Review*, *23*(1), 77–97.

Niblock, T. (2015). *State, society and economy in Saudi Arabia (RLE Saudi Arabia)* (pp. 99, 422). Routledge.

Niblock, T., & Malik, M. (2007). *The political economy of Saudi Arabia* (pp. 201, 315). Routledge.

Nikolaou, E. I., Ierapetritis, D., & Tsagarakis, K. P. (2011). An evaluation of the prospects of green entrepreneurship development using a SWOT analysis. *International Journal of Sustainable Development and World Ecology*, *18*(1), 1–16.

Nordin, R., & Hassan, R. A. (2019). The role of opportunities for green entrepreneurship towards investigating the practice of green entrepreneurship among SMEs in Malaysia. *Review of Integrative Business and Economics Research*, *8*, 99–116.

North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.

North, D. C. (2005). *Understanding the process of economic change*. Princeton University Press.

Nurunnabi, M. (2017). The transformation from an oil-based economy to a knowledge-based economy in Saudi Arabia: The direction of Saudi vision 2030. *Journal of the Knowledge Economy*, *8*(2), 536–564.

Obaji, N. O., & Olugu, M. U. (2014). The role of government policy in entrepreneurship development. *Science Journal of Business and Management*, *2*(4), 109–115.

O'Neill, K., & Gibbs, D. (2016). Rethinking green entrepreneurship – Fluid narratives of the green economy. *Environment and Planning A: Economy and Space*, *48*(9), 1727–1749.

Organisation for Economic Co-operation and Development (OECD). (2011). *Entrepreneurship at a glance*. Retrieved 29 January 2020, from https://www.oecdilibrary.org/docserver/97892640977114en.pdf?expires=1558955662andid=idandaccname=guestandchecksum=142B4BCD48043481BBF787B4DB078A9

Organisation for Economic Co-operation and Development (OECD). (2020). *OECD reviews of innovation policy*. Retrieved 17 March 2020, from https://www.oecd.org/innovation/oecd-reviews-of-innovation-policy.htm

Organization of the Petroleum Exporting Companies (OPEC). (2021). *Press releases 2021*. Retrieved 12 May 2019, from https://www.opec.org/opec_web/en/press_room/6287.htm

Pacheco, D. F., Dean, T. J., & Payne, D. S. (2010). Escaping the green prison: Entrepreneurship and the creation of opportunities for sustainable development. *Journal of Business Venturing*, *25*(5), 464–480.

Papadopoulos, I., Karagouni, G., Trigkas, M., & Beltsiou, Z. (2014). Mainstreaming green product strategies: Why and how furniture companies integrate environmental sustainability. *EuroMed Journal of Business, 9*(3), 216-234.

Papia, S. P. (2006). *Factors determining success/failure in business incubators: A literature review of 17 countries*. Major Qualifying Project, Worcester Polytechnic Institute. http://www.wpi.edu/Pubs/E-project/Available/E-project-121806 084440/unrestricted/MQDF.pdf

Papke, L. E., & Wooldridge, J. M. (2008). Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics*, *145*(1–2), 121–133.

Parboteeah, K. P., Addae, H. M., & Cullen, J. B. (2012). Propensity to support sustainability initiatives: A cross-national model. *Journal of Business Ethics*, *105*(3), 403–413.

Partzsch, L., & Ziegler, R. (2011). Social entrepreneurs as change agents: A case study on power and authority in the water sector. *International Environmental Agreements: Politics, Law and Economics*, *11*(1), 63–83.

Peng, M. W., Sun, S. L., Pinkham, B., & Chen, H. (2009). The institution-based view as a third leg for a strategy tripod. *Academy of Management Perspectives*, *23*(3), 63–81.

Pillai, S. K. B. (2012). The role of venture capital in the Middle East as a catalyst of socio-economic transformation: A post 9/11 analysis. *Journal of Private Equity*, *15*(3), 77–95.

Ploum, L., Blok, V., Lans, T., & Omta, O. (2018). Exploring the relation between individual moral antecedents and entrepreneurial opportunity recognition for sustainable development. *Journal of Cleaner Production*, *172*, 1582–1591.

Potluri, S., & Phani, B. V. (2020). Incentivizing green entrepreneurship: A proposed policy prescription (a study of entrepreneurial insights from an emerging economy perspective). *Journal of Cleaner Production*, *259*, 1–11.

Pozdniakova, A. (2017). Smart sustainable cities: The concept. *Acta Innovations*, *22*, 5–19.

Purnomo, E. P., Anand, P. B., & Choi, J. W. (2018). The complexity and consequences of the policy implementation dealing with sustainable ideas. *Journal of Sustainable Forestry*, *37*(3), 270–285. doi:.org/10.1080/10549811.2017.1406373

Qazi, W., Qureshi, J. A., Raza, S. A., Khan, K. A., & Qureshi, M. A. (2020). Impact of personality traits and university green entrepreneurial support on students' green entrepreneurial intentions: The moderating role of environmental values. *Journal of Applied Research in Higher Education*. doi:.org/10.1108/JARHE-05-2020-0130

Qi, G. Y., Shen, L. Y., Zeng, S. X., & Jorge, O. J. (2010). The drivers for contractors' green innovation: An industry perspective. *Journal of Cleaner Production*, *18*(14), 1358–1365.

Radović-Marković, M., & Živanović, B. (2019). Fostering green entrepreneurship and women's empowerment through education and banks' investments in tourism: Evidence from Serbia. *Sustainability*, *11*(23), 6826.

Raines, S., & Prakash, A. (2005). Leadership matters: Policy entrepreneurship in corporate environmental policy making. *Administration and Society*, *37*(1), 3–22.

Rana, D., & Alayed, R. S. (2018). Green business: Sustainability within Saudi Vision 2030. *International Journal of Advanced Study and Research Work*, *1*(9), 2581–5997.

Raouf, M. A., and Luomi, M. (Eds.). (2015). *The green economy in the Gulf*. Routledge.

Revilla, A. J., Perez-Luno, A., & Nieto, M. J. (2016). Does family involvement in management reduce the risk of business failure? The moderating role of entrepreneurial orientation. *Family Business Review*, *29*(4), 365–379.

Ringov, D., & Zollo, M. (2007). The impact of national culture on corporate social performance. *Corporate Governance*, *7*(4), 476–485.

Rodgers, C. (2010). Sustainable entrepreneurship in SMEs: A case study analysis. *Corporate Social Responsibility and Environmental Management*, *17*(3), 125–132.

Rodrigues, M., & Franco, M. (2019). Measuring the urban sustainable development in cities through a composite index: The case of Portugal. *Sustainable Development*, *27*(4), 1–14.

Rodríguez-García, M., Guijarro-García, M., & Carrilero-Castillo, A. (2019). An overview of ecopreneurship, eco-innovation, and the ecological sector. *Sustainability*, *11*(10), 2909–2916.

Roland, G. (2004). Understanding institutional change: Fast-moving and slow-moving institutions. *Studies in Comparative International Development*, *38*(4), 109–131.

Roy, A., & Goll, I. (2014). Predictors of various facets of sustainability of nations: The role of cultural and economic factors. *International Business Review*, *23*(5), 849–861. doi:.org/10.1016/j.ibusrev.2014.01.003

Saberi, M., & Hamdan, A. (2019). The moderating role of governmental support in the relationship between entrepreneurship and economic growth: A study on the GCC countries. *Journal of Entrepreneurship in Emerging Economies*, *11*(2), 200–216.

Sarango-Lalangui, P., Santos, J. L. S., & Hormiga, E. (2018). The development of sustainable entrepreneurship research field. *Sustainability Times*, 10. doi:.org/10.3390/ su10062005

Schaltegger, S. (2002). A framework for ecopreneurship. *Greener Management International*, *38*(6) 307-329.

Schaltegger, S., Beckmann, M., & Hockerts, K. (2018). Collaborative entrepreneurship for sustainability. Creating solutions in light of the UN sustainable development goals. *International Journal of Entrepreneurial Venturing*, *10*, 131–152. doi:.org/10.1504/ ijev.2018.092709

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2016). Business models for sustainability: A co-evolutionary analysis of sustainable entrepreneurship, innovation, and transformation. *Organization and Environment*, *29*(3), 264–289.

Schaltegger, S., & Wagner, M. (2008). Types of sustainable entrepreneurship and conditions for sustainability innovation: From the administration of a technical challenge to the management of an entrepreneurial opportunity. In *Sustainable innovation and entrepreneurship* (pp. 27–48). Edward Elgar.

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. *Business, Strategy and the Environment*, *20*, 222–237. doi:.org/10.1002/bse.682

Schaper, M. (2016). Understanding the green entrepreneur. In *Making ecopreneurs* (pp. 27–40). Routledge.

Schillo, R. S., Persaud, A., & Jin, M. (2016). Entrepreneurial readiness in the context of national systems of entrepreneurship. *Small Business Economics*, *46*(4), 619–637.

Schlange, L. E. (2006) What drives sustainable entrepreneurs? *3rd. The Applied Business and Entrepreneurship Association International (ABEAI) Conference*, *24*, 16–20.

Schwartz, M. S., & Carroll, A. B. (2008). Integrating and unifying competing and complementary frameworks: The search for a common core in the business and society field. *Business and Society*, *47*(2), 148–186.

Secundo, G., Ndou, V., Del Vecchio, P., & De Pascale, G. (2020). Sustainable development, intellectual capital and technology policies: A structured literature review and future research agenda. *Technological Forecasting and Social Change*, *153*, 1–14.

Sengers, F., Wieczorek, A. J., & Raven, R. (2019). Experimenting for sustainability transitions: A systematic literature review. *Technological Forecasting and Social Change*, *145*, 153–164.

Shepherd, D. A., & Patzelt, H. (2011). The new field of sustainable entrepreneurship: Studying entrepreneurial action linking "what is to be sustained" with "what is to be developed". *Entrepreneurship Theory and Practice*, *35*(1), 137–163.

Sheth, J. N., Sethia, N. K., & Srinivas, S. (2011). Mindful consumption: A customer-centric approach to sustainability. *Journal of the Academy of Marketing Science*, *39*(1), 21–39.

Shipp, A. J., Edwards, J. R., & Lambert, L. S. (2009). Conceptualization and measurement of temporal focus: The subjective experience of the past, present, and future. *Organizational Behavior and Human Decision Processes*, *110*(1), 1–22.

Shuo, L. (2014). Study on the function of government in the innovation and development process for SMEs in China. In *2nd International Conference on Applied Social Science Research (ICASSR 2014)*, 82-94. Atlantis Press.

Silajdžić, I., Kurtagić, S. M., & Vučijak, B. (2015). Green entrepreneurship in transition economies: A case study of Bosnia and Herzegovina. *Journal of Cleaner Production*, *88*, 376–384.

Smith, A., Voß, J., & Grin, J. (2010). Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. *Research Policy*, *39*(4), 435–448.

Soomro, B. A., Ghumro, I. A., & Shah, N. (2019). Green entrepreneurship inclination among the younger generation: An avenue towards a green economy. *Sustainable Development*, *28*(4), 585–594.

Stephan, U., & Uhlaner, L. M. (2010). Performance-based vs socially supportive culture: A cross-national study of descriptive norms and entrepreneurship. *Journal of International Business Studies*, *41*(8), 1347–1364.

Strachan, G. (2018). Can education for sustainable development change entrepreneurship education to deliver a sustainable future? *Discourse and Communication for Sustainable Education*, *9*(1), 36–49.

Su, Z. (2020). The co-evolution of institutions and entrepreneurship. *Asia Pacific Journal of Management*, 1–24.

Suboh, A. (2015). *Entrepreneurship in Saudi Arabia*. https://www.forbesmiddleeast.com/leadership/entrepreneurship/entrepreneurship-in-saudi-arabia

Svensson, G., & Wagner, B. (2015). Implementing and managing economic, social and environmental efforts of business sustainability. *Management of Environmental Quality: An International Journal*, *26*(2), 195–213.

Taleb, H. M., & Sharples, S. (2011). Developing sustainable residential buildings in Saudi Arabia: A case study. *Applied Energy*, *88*(1), 383–391.

Taylor, S. (2021). How to approach the development of a corporate sustainability strategy. In P. Taticchi & M. Demartini (Eds.), *Corporate sustainability in practice* (pp. 143–164). Springer.

Terán-Yépez, E., Marín-Carrillo, G. M., del Pilar Casado-Belmonte, M., & de las Mercedes Capobianco-Uriarte, M. (2020). Sustainable entrepreneurship: Review of its evolution and new trends. *Journal of Cleaner Production*, *252*, 119742.

Thang, N. N., Quang, T., & Son, N. H. (2013). Knowledge creation and green entrepreneurship – A study of two Vietnamese green firms. *Asian Academy of Management Journal*, *18*(2), 129–151.

Thompson, M. C. (2017). "Saudi Vision 2030": A viable response to youth aspirations and concerns? *Asian Affairs*, *48*(2), 205–221.

Thompson, N. A., & Eijkemans, R. (2018). Why do sustainable ventures fail to attract management talent? *Sustainability*, *10*(11), 4319. doi:.org/10.3390/su10114319

Thompson, N., Kiefer, K., & York, J. G. (2011). Distinctions not dichotomies: Exploring social, sustainable, and environmental entrepreneurship. *Social and Sustainable Entrepreneurship*, 201–229.

Thornton, P. H., Ribeiro-Soriano, D., & Urbano, D. (2011). Socio-cultural factors and entrepreneurial activity: An overview. *International Small Business Journal*, *29*(2), 105–118.

Tilley, F., & Parrish, B. D. (2006). From poles to wholes: Facilitating an integrated approach to sustainable entrepreneurship. *World Review of Entrepreneurship, Management and Sustainable Development*, *2*(4), 281–294.

Tok, E. (2021). The Gulf Cooperation Council states: Crystallization of the regional cooperation and alliances amid dwindling resources. *Digest of Middle East Studies*, *30*(1), 53–69.

Uddin, M., Hindu, R. C., Alsaqour, R., Shah, A., Abubakar, A., & Saba, T. (2015). Knowledge management framework using green IT to implement sustainable entrepreneur ecosystem. *Applied Mathematics and Information Sciences*, *9*(5), 2703–2714.

Ukko, J., Saunila, M., Rantala, T., & Havukainen, J. (2018). Sustainable development: Implications and definition for open sustainability. *Sustainable Development*, *27*(3), 1–16.

United Nations Conference on Sustainable Development (UNCSD). (2020). The Future We Want. *New York, NY, US*, 20-22.

Urbaniec, M., (2018). Sustainable entrepreneurship: Innovation-related activities in European enterprises. *Political Journal of Environmental Studies*, *27*, 1773–1779. doi:.org/ 10.15244/pjoes/78155

Urbano, D., & Aparicio, S. (2016). Entrepreneurship capital types and economic growth: International evidence. *Technological Forecasting and Social Change*, *102*, 34–44.

Urbano, D., Aparicio, S., & Audretsch, D. B. (2019a). *Institutions, entrepreneurship, and economic performance*. Springer International Publishing.

Urbano, D., Aparicio, S., & Audretsch, D. (2019b). Twenty-five years of research on institutions, entrepreneurship, and economic growth: What has been learned? *Small Business Economics*, *53*(1), 21–49.

Urbano, D., Audretsch, D., Aparicio, S., & Noguera, M. (2019c). Does entrepreneurial activity matter for economic growth in developing countries? The role of the institutional environment. *International Entrepreneurship and Management Journal*. In press, doi: 10.1007/s11365-019-00621-5

Uslu, Y. D., Hancıoğlu, Y., & Demir, E. (2015). Applicability to green entrepreneurship in Turkey: A situation analysis. *Procedia – Social and Behavioral Sciences*, *195*, 1238–1245.

Van Eck, N. J., & Waltman, L. (2014). Visualizing bibliometric networks. In Y. Ding, R. Rousseau, & D. Wolfram (Eds.), *Measuring scholarly impact: Methods and practice* (pp. 285–320). Springer.

Vision 2030. (2020). *Vision 2030, laying the foundations for our future*. Retrieved 6 October 2020, from https://vision2030.gov.sa/en

Vogt, M., & Weber, C. (2019). Current challenges to the concept of sustainability. *Global Sustainability*, *2*(e4), 1–6.

Volkmann, C., Fichter, K., Klofsten, M., & Audretsch, D. B. (2019). Sustainable entrepreneurial ecosystems: An emerging field of research. *Small Business Economics*, 1–9.

Wagner, M., Schaltegger, S., Hansen, E. G., & Fichter, K. (2019). University-linked programmes for sustainable entrepreneurship and regional development: How and with what impact? *Small Business Economics*, *56*, 1141–1158. doi:.org/10.1007/s11187-019-00280-4

Wakkee, I., van der Sijde, P., Vaupell, C., & Ghuman, K. (2019). The university's role in sustainable development: Activating entrepreneurial scholars as agents of change. *Technological Forecasting and Social Change*, *141*, 195–205.

Waldman, D. A., De Luque, M. S., Washburn, N., House, R. J., Adetoun, B., Barrasa, A., ... and Dorfman, P. (2006). Cultural and leadership predictors of corporate social responsibility values of top management: A GLOBE study of 15 countries. *Journal of International Business Studies*, *37*(6), 823–837.

Welter, F. (2011). Contextualizing entrepreneurship – Conceptual challenges and ways forward. *Entrepreneurship Theory and Practice*, *35*(1), 165–184.

West III, G. P., and Meyer, G. D. (1998). Temporal dimensions of opportunistic change in technology-based ventures. *Entrepreneurship Theory and Practice*, *22*(2), 31–52.

White, M. A. (2013). Sustainability: I know it when I see it. *Ecological Economics*, *86*, 213–217.

Williams, G., & Zinkin, J. (2008). The effect of culture on consumers' willingness to punish irresponsible corporate behaviour: Applying Hofstede's typology to the punishment aspect of corporate social responsibility. *Business Ethics: A European Review*, *17*(2), 210–226.

Williamson, O. E. (2000). The new institutional economics: Taking stock, looking ahead. *Journal of Economic Literature*, *38*(3), 595–613.

World Commission on Environment and Development (WCED). (1987). *Report of the World Commission on Environment and Development: Our common future*. United Nations.

Yadav, N., Gupta, K., Rani, L., & Rawat, D. (2018). Drivers of sustainability practices and SMEs: A systematic literature review. *European Journal of Sustainable Development*, *7*(4), 531–531. doi:.org/10.14207/ejsd.2018.v7n4p531

Yale University. (2020). *Environmental performance index*. Yale University and Columbia University.

Yang, X., Liao, S., & Li, R. (2021). The evolution of new ventures' behavioral strategies and the role played by governments in the green entrepreneurship context: An evolutionary game theory perspective. *Environmental Science and Pollution Research*, 1–18. doi:.org/10.1007/s11356-021-12748-6

Yi, G. (2020). From green entrepreneurial intentions to green entrepreneurial behaviors: The role of university entrepreneurial support and external institutional support. *International Entrepreneurship and Management Journal*, 1–17. doi:.org/10.1007/s11365-020-00649-y

Yoon, B., Shin, J., & Lee, S. (2016). Open innovation projects in SMEs as an engine for sustainable growth. *Sustainability*, *8*(2), 1–27.

Yurdakul, M., & Kazan, H. (2020). Effects of eco-innovation on economic and environmental performance: Evidence from Turkey's manufacturing companies. *Sustainability*, *12*(8), 3167–3188.

Zahedi, A., & Otterpohl, R. (2015). Towards sustainable development by creation of green social entrepreneur's communities. *Procedia CIRP*, *26*, 196–201.

Zahra, S. A. (1996). Governance, ownership, and corporate entrepreneurship: The moderating impact of industry technological opportunities. *Academy of Management Journal*, *39*(6), 1713–1735.

Zahraie, B., Everett, A. M., Walton, S., & Kirkwood, J. (2016). Environmental entrepreneurs facilitating change toward sustainability: A case study of the wine industry in New Zealand. *Small Enterprise Research*, *23*(1), 39–57.

Zaydane, A. A. (2011) Entrepreneurship: The driving force of national economies, Gulf Arab Academy for Studies. *Manama Branch Bahrain, 3*, 9.

Zhai, Q., Su, J., Ye, M., & Xu, Y. (2019). How do institutions relate to entrepreneurship: An integrative model. *Entrepreneurship Research Journal*, *9*(2), 1–16.

Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. *Journal of Personality and Social Psychology*, *77*, 1271–1288.

Zimbardo, P. G., Keough, K. A., & Boyd, J. N. (1997). Present time perspective as a predictor of risky driving. *Personality and Individual Differences*, *23*(6), 1007–1023.

Appendices

Appendix 1

Table A1: Definitions of green entrepreneurship and related concepts (Chapter 4)

	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"	Gast et al. (2017)
2	Green entrepreneurship	[Green entrepreneurs engage in …] "a kind of social activity that aims at protecting and preserving the natural environment"	Yi (2020)
3	Environmental orientation	"The recognition by managers of the importance of environmental issues facing their firms by mainstreaming green product strategies"	Papadopoulos et al. (2014)
4	Green logic	"Part of a complex institutional environment, facing a sharing platform, alongside the social and economic logic"	Jolink and Niesten (2013)
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"	Silajdžić et al. (2015)

Appendix 2

Table A2: Regression for green entrepreneurship without the control variable education (Chapter 4)

	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)
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.

Appendix 3: Descriptions of the variables (Chapter 5)

Variable	Definition	Data Source
Dependent variable		
Sustainable development:		
Economic components	The economic dimension of sustainable development includes: • Growth in employment (employment rate) • Number of small businesses as a proportion of the broader economy • Density of banks (number of bank branches)	Annual reports of the General Authority for Meteorology and Environmental Protection
Social components	The social dimension of sustainable development includes: • Percentage of total government expenditure on the health and social development sector • Social investment in quality of life (total spending on development) • Percentage of total government expenditure on education • Percentage of total government expenditure on security and regional administration	
Environmental components	The environmental dimension of sustainable development includes: • Waste management • Recycling rate • Development assistance to conserve biological diversity • Agricultural Trend Index	

Independent variables		
Green entrepreneurship	Number of firms considering the environment in the city	Annual reports of the General Authority for Meteorology and Environmental Protection
Non-green entrepreneurship	Number of firms with high pollution rates	
Interaction variable		
Entrepreneurship policy	Set of incentives and government procedures that facilitate the establishment of entrepreneurial projects, measured on a 5-point scale (1 = very low, 5 = very high)	Annual reports of the Authority for Meteorology and Environmental Protection
Control variables		
Population	Number of inhabitants per region	Annual reports of the General Authority for Statistics in Saudi Arabia
Size	Area of each city (km^2)	
Annual growth rate (resources)	Annual growth rate for each city	
Environmental consciousness	Percentage of natural resources maintained at an appropriate level	
Level of education	Percentage of people with postgraduate degrees	

Basic services	Average number of beneficiaries of basic services
Economic activity	Annual growth rate per capita
Environmental preservation	Preservation and protection of the environment (measured as the percentage of spending on municipal services)
Temporal orientation	Rate of adoption of environmental measures by public and private organizations in each city
Innovation policy	Interface between technological development policy, research, and industrial policy, which aims to create a framework for bringing new ideas to the market, measured on a 5-point scale (1 = very low, 5 = very high)

Appendix 4: Summarized factor analysis (PCA) (Chapter 5)

Variable	Comp1	Comp2	Comp3	Comp4
		Economic factors		
Employment	**0.581**	-0.490	0.650	
Unemployment	**0.586**	-0.302	-0.752	
Density of banks	**0.565**	0.818	0.112	
Proportion	0.910	0.064	0.026	
KMO (total)	0.750			
		Social factors		
Education	**0.546**	0.008	-0.216	-0.809
Health	**0.472**	0.787	-0.152	0.367
Security	**0.488**	-0.176	0.849	0.101
Quality of life	**0.491**	-0.591	-0.457	0.448
Proportion	0.622	0.156	0.133	0.089
KMO (total)	0.767			
		Environmental factors		
Recycling	**0.583**	-0.178	-0.793	
Development	**0.572**	0.783	0.245	
Agricultural trend	**0.577**	-0.596	0.558	
Proportion	0.882	0.068	0.050	
KMO (total)	0.764			

Appendix 5: Regression analysis (DV = social factors) (Chapter 5)

	1	2	3	4	5	6	7	8	9
Main independent variables									
Green entr.			0.883***		2.254***		0.910***	2.182***	2.179***
			(0.112)		(0.617)		(0.118)	(0.609)	(0.666)
Non-green entr.				-4.613		-11.274*	0.208	-6.294	-6.228
				(4.796)		(6.264)	(2.318)	(5.077)	(5.342)
Interaction terms									
Green × entr. policy									-0.011
									(0.362)
Non-green × entr. policy									0.007
									(0.487)
Controls									
Entrepreneurship policy		0.286*			-0.012	0.176		-0.064	-0.079
		(0.132)			(0.167)	(0.110)		(0.154)	(0.401)
Resources	-0.083	0.253			0.406*	0.316	0.101	0.436**	0.438**
	(0.341)	(0.327)			(0.196)	(0.293)	(0.280)	(0.182)	(0.188)
Population	-0.018	-0.872*			-0.512**	-0.647	-0.041	-0.398*	-0.396
	(0.243)	(0.435)			(0.221)	(0.374)	(0.233)	(0.217)	(0.241)
City size	0.037	-0.455			-0.379	-0.433	-0.249	-0.370	-0.371
	(0.313)	(0.472)			(0.247)	(0.486)	(0.256)	(0.233)	(0.275)

Education	-0.163	0.344			-0.163	-0.116	-0.023	-0.404*	-0.398
	(0.325)	(0.522)			(0.220)	(0.440)	(0.294)	(0.222)	(0.235)
Economic activity	0.002	-0.079			0.045	-0.100	-0.040	0.030	0.028
	(0.079)	(0.098)			(0.073)	(0.111)	(0.084)	(0.081)	(0.105)
Environmental preservation	-0.155	0.310*			0.307*	0.334**	-0.133	0.320**	0.320*
	(0.154)	(0.171)			(0.144)	(0.152)	(0.123)	(0.145)	(0.161)
Basic services	-0.731	-1.688*			-0.480	-1.577	-0.640	-0.457	-0.467
	(0.837)	(0.912)			(0.713)	(0.912)	(0.685)	(0.663)	(0.789)
Environmental consciousness		0.340			-0.099	0.085		-0.228	-0.225
		(0.311)			(0.187)	(0.276)		(0.167)	(0.200)
Temporal orientation		0.464			-0.104	0.291		-0.183	-0.187
		(0.566)			(0.324)	(0.566)		(0.346)	(0.384)
Innovation policy		0.523*			0.373	0.574**		0.406	0.409
		(0.242)			(0.245)	(0.203)		(0.241)	(0.271)
Constant	1.548	0.353	1.124***	-1.745	3.179**	-2.851	2.159	1.301	1.329
	(1.496)	(2.120)	(0.142)	(1.815)	(1.397)	(2.890)	(1.767)	(1.678)	(1.800)
N	78	39	78	78	39	39	78	39	39
R^2 within	0.043	0.485	0.435	0.047	0.778	0.522	0.476	0.789	0.789
R^2 between	0.051	0.478	0.741	0.575	0.755	0.597	0.709	0.389	0.387
R^2 overall	0.000	0.311	0.658	0.414	0.735	0.525	0.644	0.305	0.302

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 6: Regression analysis (DV = economic factors) (Chapter 5)

	1	2	3	4	5	6	7	8	9
Main independent variables									
Green entr.			1.117***		1.290**		1.077***	1.185*	1.220**
			(0.139)		(0.523)		(0.142)	(0.560)	(0.431)
Non-green entr.				-7.257		-11.879	-2.053	-9.174	-10.407
				(5.204)		(7.991)	(1.179)	(5.704)	(6.070)
Interaction terms									
Green × entr. policy									-0.739*
									(0.346)
Non-green × entr. policy									1.071**
									(0.483)
Controls									
Entrepreneurship policy		0.128			-0.043	0.012		-0.119	-0.796**
		(0.155)			(0.174)	(0.155)		(0.185)	(0.281)
Resources	-0.226	-0.134			-0.047	-0.068	0.008	-0.002	-0.011
	(0.195)	(0.207)			(0.167)	(0.193)	(0.131)	(0.173)	(0.186)
Population	0.120	0.022			0.227	0.259	0.146	0.394	0.434**
	(0.113)	(0.278)			(0.177)	(0.263)	(0.085)	(0.254)	(0.191)
City size	0.455	0.041			0.084	0.064	0.119	0.098	0.272
	(0.260)	(0.272)			(0.158)	(0.336)	(0.116)	(0.226)	(0.204)
Education	-0.137	-0.052			-0.342	-0.537	0.028	-0.693	-0.625
	(0.291)	(0.406)			(0.340)	(0.387)	(0.133)	(0.406)	(0.452)
Economic activity	0.052	-0.046			0.025	-0.068	-0.013	0.003	-0.028

	(0.145)	(0.073)			(0.064)	(0.073)	(0.063)	(0.065)	(0.059)
Env. preservation	-0.070	-0.090			-0.091	-0.065	-0.050	-0.072	-0.024
	(0.094)	(0.135)			(0.095)	(0.122)	(0.062)	(0.089)	(0.111)
Basic services	0.397	0.330			1.021	0.447	0.402	1.055	1.142
	(0.412)	(0.754)			(0.641)	(0.774)	(0.310)	(0.699)	(0.674)
Environmental consciousness		-0.045			-0.296	-0.314		-0.483*	-0.253
		(0.274)			(0.170)	(0.333)		(0.230)	(0.303)
Temporal orientation		0.377			0.052	0.194		-0.063	-0.185
		(0.294)			(0.184)	(0.322)		(0.244)	(0.188)
Innovation policy		-0.068			-0.154	-0.014		-0.105	-0.194**
		(0.212)			(0.126)	(0.204)		(0.144)	(0.088)
Constant	0.018	-0.750	1.421***	-2.746	0.867	-4.126	0.078	-1.871	-2.348
	(0.923)	(0.894)	(0.177)	(1.969)	(1.078)	(2.569)	(0.687)	(2.230)	(1.952)
N	78	39	78	78	39	39	78	39	39
R^2 within	0.061	0.145	0.773	0.128	0.387	0.247	0.807	0.447	0.625
R^2 between	0.523	0.164	0.927	0.825	0.924	0.771	0.075	0.714	0.724
R^2 overall	0.410	0.113	0.890	0.631	0.899	0.735	0.031	0.676	0.684

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix 7: Regression analysis (DV = environmental factors) (Chapter 5)

	1	2	3	4	5	6	7	8	9
Main independent variables									
Green entr.			1.067***		1.182***		1.066***	1.115***	1.117***
			(0.151)		(0.320)		(0.162)	(0.322)	(0.328)
Non-green entr.				-6.368		-8.366	-0.526	-5.821	-5.848
				(5.344)		(6.707)	(2.687)	(6.028)	(5.996)
Interaction terms									
Green × entr. policy									0.004
									(0.229)
Non-green × entr. policy									-0.002
									(0.320)
Controls									
Entrepreneurship policy		0.294**			0.138	0.213*		0.090	0.096
		(0.113)			(0.107)	(0.117)		(0.117)	(0.224)
Resources	-0.185	0.013			0.093	0.060	0.036	0.121	0.121
	(0.275)	(0.172)			(0.156)	(0.150)	(0.110)	(0.135)	(0.148)
Population	0.024	-0.216			-0.027	-0.049	0.015	0.079	0.078
	(0.070)	(0.204)			(0.134)	(0.203)	(0.073)	(0.191)	(0.196)
City size	0.298	0.307			0.346**	0.323	-0.036	0.355**	0.356*
	(0.282)	(0.227)			(0.158)	(0.232)	(0.118)	(0.147)	(0.168)
Education	0.156	0.845**			0.579**	0.503	0.319**	0.356	0.353
	(0.252)	(0.288)			(0.226)	(0.349)	(0.127)	(0.315)	(0.326)
Economic activity	0.083	-0.023			0.043	-0.038	0.029	0.029	0.029

	(0.096)	(0.044)			(0.034)	(0.051)	(0.032)	(0.032)	(0.034)
Env. preservation	0.010	-0.015			-0.017	0.003	0.033	-0.004	-0.004
	(0.106)	(0.096)			(0.098)	(0.081)	(0.081)	(0.091)	(0.099)
Basic services	-0.394	-0.884			-0.251	-0.802	-0.321	-0.229	-0.225
	(0.269)	(0.560)			(0.543)	(0.569)	(0.223)	(0.540)	(0.575)
Environmental consciousness		0.619**			0.389	0.429		0.270	0.269
		(0.272)			(0.252)	(0.248)		(0.321)	(0.349)
Temporal orientation		0.366*			0.068	0.237		-0.005	-0.003
		(0.171)			(0.207)	(0.158)		(0.167)	(0.177)
Innovation policy		0.014			-0.065	0.051		-0.034	-0.036
		(0.159)			(0.088)	(0.136)		(0.091)	(0.109)
_cons	0.762	-0.470	1.359***	-2.409	1.012	-2.847	1.256	-0.725	-0.737
	(0.649)	(0.842)	(0.192)	(2.022)	(0.824)	(2.054)	(0.993)	(1.546)	(1.536)
N	78	39	78	78	39	39	78	39	39
R^2 within	0.050	0.500	0.801	0.112	0.708	0.552	0.823	0.732	0.732
R^2 between	0.275	0.004	0.853	0.751	0.874	0.736	0.860	0.636	0.637
R^2 overall	0.214	0.018	0.839	0.590	0.866	0.699	0.842	0.589	0.590

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Explanatory Summary of the Content of the Thesis

Sustainable entrepreneurship is a subject that has attracted growing research interest. Bringing together the three pillars of sustainability – society, the environment, and the economy – sustainable entrepreneurship is considered by scholars to be a practical and feasible path towards the meaningful integration of people, profit, and planet. In the context of Saudi Arabia, this study analyses the influence of formal and informal institutions on green entrepreneurial activities and their impact on sustainable development. Institutional economics was adopted to frame the hypotheses and analysis. The methodology used was quantitative (regression and panel data models), and the data were obtained from the annual reports of the Authority for Meteorology and Environmental Protection and the General Authority for Statistics (2012–2018). The main findings of this study show that institutions (such as property rights and culture) contribute positively to green (vs. non-green) entrepreneurship, with a positive influence on sustainable development, in Saudi Arabia. The results also demonstrate that green entrepreneurship contributes positively to the economic, social, and environmental components of sustainable development, whereas non-green entrepreneurship has no effect. This research has both theoretical and practical implications. In terms of the theoretical debate, the study provides empirical evidence highlighting the relevance of formal and informal institutions to green entrepreneurial activities and their influence on sustainable development. Thus, policymakers who are constantly creating strategies can take into consideration that any policy implemented affects green entrepreneurship, generating effective solutions and opportunities in green infrastructure and support for their use by governments, private companies, and all the relevant stakeholders.