

Born Green: Drivers and Competencies of Green Entrepreneurship

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Abstract: Sustainable development is one of the most prominent discussions of our times and promoting green new ventures can help reduce ecological footprints and meet the climate change goals. Despite its importance for the next decades, the study of green entrepreneurship (GE) is still very poor and being an emerging field of study can be considered still in its infancy. (Demirel et al, 2019; Sher et al, 2020). The current paper aims at providing a contribute to management science and business management practice by focusing on the research questions: (a) what are the most relevant theoretical frameworks researching drivers that trigger green entrepreneurial intention (GEI), and (b) what are the main theoretical frameworks investigating competencies that might favour or enhance the specific form of green entrepreneurial intention. Several theories have been developed to explain the classic entrepreneurial intention (EI) being the most noted the theory of planned behaviour (TPB) (Ajzen, 1991), and theory of entrepreneurial event (TEE) (Shapero and Sokol, 1982). A different stream of literature focus on individual competencies that can allow key issues to be captured and influence entrepreneurial intentions which are variable and can be acquired and learned over time (Mitchelmore and Rowley, 2010; Man et al, 2002). Nevertheless, these models do not contemplate on the role of the entrepreneurial intentions for a specific form like GE (Sher et al, 2020). We conducted a systematic literature review aiming at analysing quantitatively and qualitatively the relevant articles in indexed journals based on the PRISMA approach - Preferred Reporting Items for Systematic Reviews and Meta-Analyses. Main findings are that recent relevant studies mainly adapt TPB to the determinants of GE by inserting new specific precedent variables. As to GE competencies, main authors depart from classic theoretical frameworks and finetune their approach to the more specific and broader dimensions of GE.

Keywords: green entrepreneurship, drivers, competencies, higher education, born green

1. Introduction

Nobody argues the importance of entrepreneurship. The development of a culture of entrepreneurship in society is a basic tool for the economic and social development to improve the competitiveness of a country (Robles and Rodriguez, 2014). And yet the study of green entrepreneurship is still undoubtedly poor (Potluri and Phani, 2020) although fundamental for the necessary change in business management in order to meet the climate change goals and all of the environmental challenges for the next decades.

Green entrepreneurship (GE) is an emerging field of study and still in its infancy (Demirel et al, 2019; Potluri and Phani, 2020) and being a theme with immense topicality the growth of peer-reviewed articles in indexed journals has grown exponentially over the last years.

Furthermore, research on GE is also gaining increased visibility due to social awareness of corporate responsibility toward environment, and the growing importance of ecological sustainability in strategic business development (Demirel et al, 2019) and it's becoming an important subfield of entrepreneurship (Gast et al, 2017).

"Born green" firms, used interchangeably with "green start-ups", follow the need for a greener approach to business providing practical and innovative solutions for pursuing both economic and environmental goals (Demirel et al, 2019).

According to recent articles in top ranking journals further research on green entrepreneurship (GE) is undoubtedly needed both from the academic perspective and managerial perspective namely in what regards its explanations/motivations and ways to promote it including via Higher Education (HE) (Fichter and Tiemann, 2018). There is still a lack of a theoretical framework for GE, so this field needs to be analysed, organised, and synthetized to bring clarity (Terán-Yépez, et al, 2020).

This paper intends to provide a contribute to management science by reflecting the status of literature on GE drivers and competencies fields also providing a better understanding of what are the main drivers that trigger green entrepreneurial intention (GEI), what are the main competencies to engage in green new ventures and establish future challenges for research.

The contribution of this study consists of examining what are the most adequate and specific theoretical models and variables applicable both to the drivers of green entrepreneurial intention and to the competencies that enhance green entrepreneurial intention.

Research questions are (a) what are the most relevant theoretical frameworks researching drivers that trigger green entrepreneurial intention (GEI), and (b) what are the main theoretical frameworks investigating competencies that might favour or enhance the specific form of green entrepreneurial intention.

2. Green Entrepreneurship drivers and competencies

Green Entrepreneurship (GE) can be defined (among many other definitions) as the entrepreneurship process that combines profit orientation with technological innovations that addresses global environment issues (Potluri and Phani, 2020).

On the other hand, drivers are factors, personality characteristics, traits, leading to Green Entrepreneurial Intention (GEI) (Sher et al, 2020). With that perspective they depend on the individual characteristics, personality, and upbringing (family, social, economic) and cannot be taught.

Differently from drivers, entrepreneurial competencies (EC) are sets of acquired abilities, skills, characteristics, and behaviours necessary to engage in effective new ventures (Mitchelmore and Rowley, 2010). With that perspective in mind most scholars defend that they can be acquired and learned over time and that education and especially higher education plays an important role in the acquisition of those competencies.

(Classic) entrepreneurship intentions and its drivers are extensively studied and there is also vast literature on entrepreneurship skills and competencies. However, the green entrepreneurial intention (GEI) is poorly studied and moreover there is scarce literature on this new subfield of research (Demirel et al, 2019; Potluri and Phani, 2020, Gast et al, 2017) namely in what respects to its drivers and necessary competencies.

Several theories have been developed to explain the classic entrepreneurial intention (EI) and two different streams of literature emerge: (a) Drivers/Traits approach and (b) Competencies based approach.

2.1 Entrepreneurial drivers' approach

This approach emphasizes personality traits, characteristics, behaviours and perceptions, and most commonly used models are theory of planned behaviour (TPB) (Ajzen, 1991), and theory of entrepreneurial event (TEE) (Shapero and Sokol, 1982).

In TPB – Theory of planned behaviour entrepreneurial intention (EI) is influenced by (1) Attitude, (2) Perceived social norms, (3) Perceived behavioural control. On the other hand, in theory of entrepreneurial event (TEE) entrepreneurial intention (EI) is triggered by event(s) and influenced by drivers like (1) Perceived propensity, (2) Perceived desirability, and (3) Perceived feasibility.

Nevertheless, these models do not contemplate on the role of the entrepreneurial intentions for a specific form like green entrepreneurship (GE) and, therefore, existing entrepreneurial intention models create a research gap being unable to provide the answer for the green (sustainable) entrepreneurial research (Sher et al, 2020).

With that in mind most relevant recent studies have adapted some theories like classic entrepreneurship theory and mainly TPB - theory of planned behaviour to the specific characteristics of GE namely in introducing new antecedent variables of GE drivers like self-efficacy, environmental values, education, attitude, and sustainable orientation (Vuorio et al, 2018; Sher et al, 2020; Romero-Colmenares, 2022).

2.2 Competencies approach

On this approach a focus on individual competencies can allow key issues to be captured and influence entrepreneurial intentions (EI). The competencies approach identifies the competencies of individuals which are variable and can be acquired and learned over time (Mitchelmore and Rowley, 2010; Man et al, 2002).

Lans et al (2014) identifies five generic competencies as basis of EI: (1) Opportunity competencies, (2) Self-efficacy competencies (3) Business competencies, (4) Industry-specific competencies, and (5) Social/Environmental competencies. On a more macro perspective recently the European Commission defined EntreComp - the European Entrepreneurship Competence Framework developing an integrated set of fifteen individual competencies that can favour EI (McCallum et al, 2018).

However, despite extensive research on topic of entrepreneurship competencies and skills have been conducted which includes the works of Man et al (2002), Gibb and Hannon (2006), Linan (2008), Mitchelmore and Rowley (2010), Boyles (2012), Kyndt and Baert (2015), among many others, the competencies for the specify form of green entrepreneurship are still poorly studied.

Recent relevant studies identified key individual competencies for sustainable entrepreneurship (SE) as (1) Systems thinking competence, (2) Embracing diversity and interdisciplinary competence, (3) Foresighted thinking competence, (4) Normative competence, (5) Action competence, (6) interpersonal competence, and (7) Strategic management competence (Lans et al, 2014). Building upon these findings Bloom et al (2018) proposed a competence framework for sustainable entrepreneurship composed of six key competences basically merging two variables (strategic management and action competence) into one single “strategic action competence”. Nevertheless, these authors clearly recognize the need for further empirical evidence on these findings.

2.3 The role of higher education

Several authors posit the moderating role of Higher Education (HE) on EI and recent studies suggest that a growing number of universities are embracing the notion that sustainability should and can be integrated into the university educational and support system for entrepreneurship (Fichter and Tiemann, 2018).

Findings of recent studies may reveal that attitude towards sustainable entrepreneurship, perceived entrepreneurial desirability and perceived entrepreneurial feasibility complement students’ sustainability-driven entrepreneurial intentions (Sher et al, 2020).

Moreover, according to some authors future findings on GE research would support the government, policy makers, and university authorities in developing awareness and improved curriculum that could offer greater inclination toward green and sustainable education (Soomro et al, 2020).

3. Sustainable or green entrepreneurial intentions

Intentions precede human behaviour as they are a mental state that refer to the readiness to perform a given behaviour (Ajzen, 1991). Therefore, entrepreneurial intentions can be defined as self-acknowledged conviction of the individual to start a new business and to plan to accomplish in the future (Lortie and Castogianni, 2015; ; Agu et al, 2021, Romero-Colmenares, 2022).

In the context of sustainability dimensions green entrepreneurial intentions can be acknowledged as “a mental state that shows conviction and commitment by a person to set up in the future a new business venture that creates economic, social and environmental values” (Agu et al, 2021).

In studying the specific dimensions of GE we distinguish a sustainable entrepreneur from a conventional entrepreneur. The classic entrepreneur mainly focuses on economic aspects while the green entrepreneur widely focuses on economic, social, and environmental dimensions, therefore conferring him, a broader set of goals and a broader view and mentality (Arru, 2020; Romero-Colmenares, 2022).

4. Methodology

This paper adopts bibliometric analysis aiming at analysing quantitatively and qualitatively the relevant articles in indexed journals. We conducted a systematic literature review based on PRISMA approach (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) in the following five steps: (a) definition of the field of study, (b) database selection, (c) research criteria, (d) relevance/exclusion criteria, (e) codification of recovered material, (f) quantitative/qualitative analysis of the information. Methods and results are described on table 1.

Table 1: Methodology flowchart and results

Step 1 Definition of the field of study	Drivers and competencies of green entrepreneurship	
Step 2 Database selection	Scopus	
Step 3 Research criteria	(1) "Green entrepreneur*" OR "sustainable entrepreneur*" OR ecopreneur* OR eco-entrepreneur* AND drivers OR determinants on title, abstract or keywords.	(2) "Green entrepreneur*" OR "sustainable entrepreneur*" OR ecopreneur* OR eco-entrepreneur* AND competenc* OR skills OR knowledge OR know-how on title, abstract or keywords.
Step 4 Relevance/exclusion criteria	Published > 2002(i) and <1st Q 2022 (145 publications)	Published > 2002(i) and <1st Q 2022 (192 publications)
	(i) only articles (ii) only journals (iii) publication phase final; (iv) in English; Duplicates removed. (111 articles)	(i) only articles (ii) only journals (iii) publication phase final; (iv) in English; Duplicates removed. (134 articles)
Step 5 Codification	Keywords; Cluster of Authors; Number of Citations; csv and ris format analysed in Scimat, excel, VOSviewer	Keywords; Cluster of Authors; Number of Citations; csv and ris format analysed in Scimat, excel, VOSviewer
Outputs	Descriptive Figures, Tables, Strategic Diagrams	Descriptive Figures, Tables, Strategic Diagrams
Step 5 Examination of Results	Analysis and Discussion of Results: Descriptive Analysis and Content Analysis	Analysis and Discussion of Results: Descriptive Analysis and Content Analysis

(i) First document from query is published in 2003; Source: Authors

The results presented the most relevant sources/journals, countries, affiliations, subjects, authors, co-authors, citations, keywords, co-occurrences, and more recent models, theoretical frameworks, and variables to better understand the phenomena of specific green entrepreneurship intention.

5. Results and discussion

Research on scientific production of a specific field is relevant for understanding the evolution, research trends, organizing past research and suggest future research lines (Aghelie et al, 2016; Terán-Yépes, 2020). With those objectives in mind first we establish the summarized results of the descriptive analysis performed on evolution of literature, sources, authors, and citations and secondly a content analysis mainly focused on keywords, co-authorship, research fields, theoretical frameworks, and main research trends.

5.1 Evolution of scientific literature production

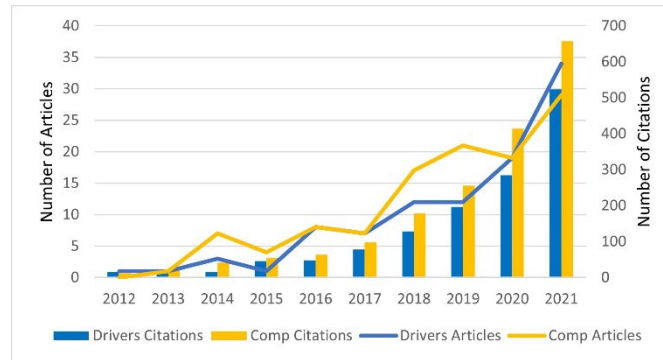
From the search criteria after the exclusion parameters, we obtained a total of 111 articles for green entrepreneurship drivers (GED) and 134 articles for green entrepreneurship competencies (GEC) with respectively 1561 and 2024 citations as detailed on table 2.

Table 2: Final databases

Data	GE Drivers	GE Competencies
Number of Articles	111	134
Number of Journals	54	74
Number of Authors	307	386
Number of Affiliations	241	286
Number of Countries	49	59
Number of Citations	1561	2024

Source: Authors based on Scopus 2022

Data obtained in this study seems to confirm that GE drivers and GE competencies are emerging fields of study as the number of published articles has been increasing constantly since 2012 being the prior publications number merely residual. Moreover, recent years are more productive as 73,9% of total GED articles and 70,1% of GEC articles were published in the period 2017-2022. Citations have grown in parallel from 2012 onwards and these findings are consistent with previous studies (Terán-Yépes et al, 2020).



Source: Authors based on Scopus 2022; Software: Scimat, Excel

Figure 1: Evolution of published articles and citations from 2012 to 2021

Figure 1 and table 2 show that the most recent years (2018-2021) are the most productive with an average of 19,25 articles per year for GED and 21,5 articles published for GEC, well above the averages for the last ten complete years (2012-2021), enhancing the embryonic stage of both topics. Furthermore, low average number of citations per article on the last ten years, 9,47 for GED and 8,14 for GEC, as detailed on table 3 might also be explained by the exploratory stage of the research.

5.2 Sources/journals

This study retrieved data from 54 indexed journals for GED and 74 indexed journals for GEC database as table 2 illustrates. Most productive journals for GE drivers literature are Sustainability (29 articles), Journal Of Cleaner Production (4 articles), International Journal of Entrepreneurial Behaviour and Research (6 articles), Entrepreneurship And Sustainability Issues (4 articles) that globally represent 38,7% of total articles published.

As to GE competencies Sustainability (24 articles), Journal Of Cleaner Production (11 articles), International Journal of Entrepreneurial Behaviour and Research (5 articles), Small Business Economics (4 articles), Entrepreneurship and Sustainability Issues 4 (articles), International Journal of Management Education (3 articles), and International Journal of Social Ecology and Sustainable Development (3 articles) represent 40,3% of retrieved literature. Nevertheless, fragmentation is one of the most prominent characteristics of sources analysed as vast majority of journals only account for 1 article published. Only a minority accounts for 2 or more publications and we observed an average of articles per journal of 1,29 for GED and 1,39 for GEC.

Table 3: Characteristics of articles on GE drivers and GE competencies from 2002 to 2022 (First Quarter)

Year	Drivers					Competencies				
	A	C	C/A	J	A/J	A	C	C/A	J	A/J
<2012	8	31	3,88	7	1,14	13	12	0,92	12	1,08
2012	1	16	5,22	1	1,00	0	12	1,85	0	-
2013	1	21	6,80	1	1,00	1	28	3,71	1	1,00
2014	3	16	6,46	3	1,00	7	41	4,43	7	1,00
2015	1	46	9,29	1	1,00	4	55	5,92	4	1,00
2016	8	48	8,09	8	1,00	8	63	6,39	8	1,00
2017	7	78	8,83	7	1,00	7	98	7,73	5	1,40
2018	12	128	9,37	6	2,00	17	179	8,56	7	2,43
2019	12	196	10,94	8	1,50	21	255	9,53	14	1,50
2020	19	285	12,01	13	1,46	19	414	11,93	13	1,46
2021	34	523	13,09	15	2,27	29	657	14,40	14	2,07
20221Q	5	173	14,06	5	1,00	8	210	15,10	8	1,00
AVG	9,36	139,09	9,47	6,18	1,29	11,00	182,91	8,14	7,36	1,39

A: Number of Articles; C: Number of Citations; C/A: Average Citations per article (citation total since 2003/total articles since 2003; J: Number of Journals; A/J: Average number of articles per journal; AVG: Total average from 2013 to 2021; Source: Authors based on Scopus 2022; Software: Scimat and Excel

5.3 Authors, citations, and main frameworks

Most cited authors on retrieved literature are important to establish the structure of past research and detect main research trends. Table 4 highlights the most cited authors on the analysed period. On the topic of GE drivers Wagner, M. and Kuckertz, A. play a key role, but their most relevant and cited article is from 2010. Focusing on more recent literature most prominent authors are Vuorio, A.M., Kraus, S., Jabeen, F., Tur-Porcar, A., and Fischer, D. all with just one published article from 2017 onwards on retrieved literature.

Most important theoretical frameworks used are TPB – theory of planned behaviour specifically adapted to best depict GE intention namely in what concerns the antecedents of GE drivers like self-efficacy, environmental values, education, and SE orientation. TPB is prominently used by Vuorio, A.M, among others, and SE orientation is analysed by Jabeen, F., Tur-Porcar, A., and Soo Sung, C. Entrepreneurship Theory is used by Kuckertz, A, and Wagner, M. among others adapting its conventional approach to the GE phenomena.

Table 4: Most cited authors on GE drivers

Authors	Article	Citations	C/A	Pub Years	Focus / Framework
Kuckertz, A.	3	362	120,7	2010-2012	Sustainability orientation of HE students on GEI; Entrepreneurship Theory
Vuorio, A.M.	1	80	80,0	2018	Drivers of entrepreneurial intentions in SE; Adapted TPB - Theory of Planned Behaviour
O'Neill, K.	2	78	39,0	2014-2016	GE narratives and Evolving nature of becoming a green entrepreneur
Crals, E.	1	74	74,0	2005	Financial conditions for implementation of SE business practices by SMEs
Kraus, S.	1	58	58,0	2018	SMEs internal culture and resources are determinants for adopting SEO
Randjelovic, J.	1	53	53,0	2003	Emergence of Green Venture Capital
Jabeen, F.	1	42	42,0	2017	Factors influencing mindset in choosing entrepreneurship as employment
Tur-Porcar, A.	1	40	40,0	2018	Environmental/Business and Behavioural/Human Relations Factors based on TPB.
Fischer, D.	1	31	31,0	2018	Regulatory Focus Theory
Sunny, S.A.	1	27	27,0	2019	How institutional factors affect entrepreneurial firm formation in the USA
Soo Sung, C.	1	27	27,0	2018	Sustainability orientation and opportunity recognition on SEI

C/A: average number of citations; Source: Authors based on Scopus 2022 and content analysis

On the topic of GE competencies Carayannis, E.G. is the most cited author, as described on table 5, with an average of 115 citations per article being his focus the relation between innovation, knowledge, and the environment and not directly GE intention. The most recent cited authors are Lans, T., Jiang, W, Demirel, P., and Fichter, K., commonly referred as being the main reference authors in recent years.

Most important recent models referred are the Seven Competencies Framework for SE used by Lans, T, among others, Patzer and Shepherd's Opportunity Recognition Model and Quintuple Helix framework used by Carayannis, E.G.

From retrieved data analysing the twenty most cited authors only one author (Fischer, D) is observed in both databases which suggests that, as expected, there appears to be two separate streams of literature on GE intention, the first focusing on main drivers and the second focusing on competencies and skills, with little characteristics, variables, and theoretical frameworks in common.

5.4 Keywords and co-authorship occurrences, clusters, and networks

Figure 2 represents the overlay visualization of GE drivers database with VOSviewer software. Main results present main 40 keywords on title and abstract fields. We can observe a network of 579 links and 3 main clusters of keywords. Main keywords are entrepreneur, intention, students/university/education, SE and SE intention and GE and GE intention, among others. Moreover, most recent keywords suggest that recent research is

research could question the possible links between them namely by questioning if competencies play a moderator role between the GE drivers and the GE intention.

The role of education and higher education is much in focus on recent literature and keywords as student, education, university are clearly highlighted, and many empirical studies are built upon questionnaires on students and/or focus groups comprised of professors, experts, and alumni.

Future research should also aim at identifying the similarities and differences between the different streams of though bringing more clarity to the topic of green entrepreneurship and solve theoretical and definitional dilemmas (Gast et al, 2017)

The limitations of this study are mainly linked to the choice of database (Scopus) and definition of inclusion/exclusion criteria on queries and therefore the sample may differ. Also concerns about the objectivity of the content data analysis as its interpretation can be considered subjective. Nevertheless, Scopus is a widely used database for GE topic and almost 84% of articles of WoS can be found in Scopus (Terán -Yépes, 2020). Also, we are convinced that this study analyses a very representative sample of literature on a very broad time range. We believe that the conclusions of this study are useful for understanding the evolution, detecting research trends, consolidate past research and suggest future research lines on green entrepreneurship, its main drivers and main competencies, clearly emerging fields of research.

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