Strategizing for the growth and Sustainability of Green Agriculture Enterprises: a developing Country Perspective

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Abstract

Owing to continuous environmental degradation, a significant global transition in the techno-economic paradigm is presently underway; that is to restructure as a green economy worldwide. These green transitions are driven by planned adjustments to institutions, policies, and strategies, which require a thorough understanding of the determinants of sustainable growth in fundamental industries, such as agriculture. This research draws insights from Pakistan by empirically testing the conceptual framework proposed by Savastano et al. (2022), which highlights the internal and external factors that contribute to the expansion of SMEs in green agriculture. Finally, this research helps to explore the difference in trajectories of the sector's green transformations, leading to valuable implications for green policies.

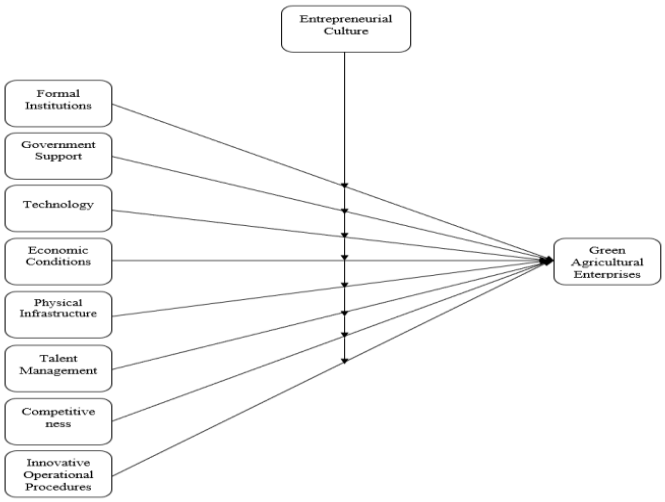
Overview

Until now, the concept of green economy and growth was confined to developed nations, while developing economies were quite hesitant to take on the issues of green sustainability. However, the gulf between green enthusiasts and traditional economists has been reversed and closer than ever in recent times. The paradigm shift can be attributed to the change in consensus about the need to move from the traditional "cleanup later model" to the more leapfrog strategy1. These leapfrog models offer alternative ways to attain sustainable growth without relying on high-pollution strategies. Thus, numerous developing nations, i.e., India, China, South Africa, Pakistan, and Brazil, are actively participating in this paradigm shift and offering valuable contributions to green sustainable transformation by promoting sustainable policies. It is widely acknowledged that these new policies aimed at improving environmental sustainability may offer new avenues for the country's social inclusion and economic growth. Thus, the efforts to bring green transformation and other techno-green paradigm movements in the country's markets, institutions, and other domains may open the window of opportunities for these underdeveloped markets to achieve a leadership role in those new green emerging industries. Lema et al. (2020) in their study highlighted the importance of structural and institutional transformation for generating new opportunities in the green economy. Furthermore, Aftab et al. (2022) found that in developing countries' industrial contexts, green innovation, environmental strategy and pro-environmental behavior facilitate the interplay between green human resource management and environmental performance. However, despite these acknowledgments, a lack of research has been observed on the internal and external factors contributing to the growth and sustainability of green agricultural enterprises in the agriculture sector. This research aims to explore quantitative insights from a developing economy, i.e., Pakistan, and their effort to achieve a sustainable green agricultural-based economy. First, this research contributes to the academic literature by understanding the determinants of green entrepreneurship and agriculture 4.0. Second, our study empirically tests the conceptual framework proposed by Savastano et al. (2022), highlighting internal and external factors that contribute to the expansion of small and medium-sized enterprises (SMEs) in green agriculture. Lastly, this research helps to explore the different trajectories of industries' green transformations.

For two key reasons, we think a new framework is necessary. First, it is crucial to turn away from the ecologically destructive paths built by the developed countries. So instead of catching up with outdated strategies from these borrowed technologies and pathways, emerging economies should come up with strategies and frameworks grounded in their context (Altenburg, 2021). Secondly, green transformation, unlike the earlier paradigm, which often only emphasizes on economic utility, inherently relies on public policy, social values, and the greater good instead of just economic utility.

[1] The Leapfrog strategy refers to the tendency of nations to skip the traditional stage of development to directly jump to new technology(stage-skipping) or look for an alternate course of technical progress involving emerging technology with new advantages and prospects (Path-creation).

Figure 1. The analytical framework: Determinants of Green Agricultural Enterprises



Source: The green agriculture support framework (GASF) proposed by Savastano et al. (2022)

The conceptual framework of this research is presented in Figure 1. At its core, the determinants, i.e., Formal Institutions, Government Support, competitiveness, Technology, Economic Conditions, Innovative operational procedures, Physical Infrastructure, and Talent management of Green agricultural enterprises, are empirically analyzed in terms of their positive/negative influence on the enterprises' growth, along with the moderating role of entrepreneurial culture in the linkage between these determinants and Green agricultural enterprise. The study opts for the Confirmatory factor analysis (CFA) to confirm the underlying dimensions behind constructs and whether the used factors are applicable in our context (Pakistan), along with the Logit model to empirically test the applied GASF model on green agricultural enterprises. The data is collected from individuals involved in the top and middle management level roles and their employees working in agriculture enterprises located in Pakistan. Table 1, containing the empirical findings of this research, presents contrasting results, with most of the determinants being empirically significant and having a positive influence on green agriculture enterprises. Except for competitiveness, formal institutions, and culture; in these three determents the insignificant impact was there. Though, the economic conditions were negatively associated with green enterprises' growth (β=-0.397***). Similarly, Entrepreneurial culture did not much moderate the relationships between these determinants, except for talent management, which was now insignificant here. Moreover, the most significant influence on the growth of green agriculture enterprises was from internal factors of an organization, i.e., physical infrastructure and talent management and innovative operational procedures (β=0.3245***, β=0.314***, β=0.309***), whereas some external factors were either insignificant here (Competitiveness, culture) or contained negative influence on the growth of green enterprises (Economic conditions β=-0.397***).

Most of these primary determinants behind green growth are favorable but time-bound, which require continuous affirmative actions to promote a green economy in a country. Similarly, these primary forces behind green growth are essentially imposed through macro-level policies and institutional efforts, but they are also influenced by industry-specific efforts and technological transformations such as green-oriented policies in the solar industry stem technological changes, which led to higher demand, incentivized private research and development, and overall public procurement.

Table 1. Logit Model Results

Hypothesis	Relationship	Standardized βeta	SE	CR	p-value	Decision
H1	EC → GAE	-0.397***	0.033	7.77	0.000	Supported
H2	GS → GAE	0.200***	0.045	4.41	0.000	Supported
H3	FI → GAE	0.067	0.027	1.57	0.112	Not Suppor
H4	CP → GAE	0.028	0.027	0.62	0.463	Not Suppor
H4	T → GAE	0.028**	0.027	0.62	0.033	Supported
H5	IOP → GAE	0.309***	0.031	6.32	0.000	Supported
H6	C→ GAE	0.028	0.027	0.62	0.533	Not Suppor
H7	PI → GAE	0.324***	0.031	6.32	0.000	Supported
H8	TM→ GAE	0.314***	0.031	6.32	0.000	Supported

Note(s): Level of significance: *p < 0.050, **p < 0.010, ***p < 0.001, EC=Economic Condit
GS=Government Support, FI=Formal Institutions, CP=Competitiveness, C=Cult
IOP=Innovative Operational Procedures, T=Technology, PI=Physical Infrastruct
TM=Talent Management, GAE=Green Agriculture Enterprises.

Source: Self Conducted survey-based results

Sectorial Trajectories in Green Transformation

The potential of green entrepreneurship in addressing environmental sustainability issues has gained widespread acceptance among academicians and policymakers globally (Matos & Hall, 2020). Accordingly, Menon and Menon (1997) claimed that corporations integrate environmental management with their business operations and marketing strategy to remain competitive and exploit new opportunities. OECD (2010) suggested that SMEs are important actors in developing eco-friendly sectors and are the major forces behind green entrepreneurship. Noting this promising role of SMEs in green growth, governments around the world put the promotion of green agriculture SMEs on their top economic priority (Mukonza, 2020; Alvarez-Risco et al., 2021).

Though, the efforts required to turn a traditional sector into a green one is not uniform in nature, as they vary from industry to industry. All involved stakeholders, including private and public actors, and

the nature/intensity of their actions determine the trajectory of their green transformation. Moreover, sectorial trajectories are highly dependent on the tradability and technological maturity of green technologies in the specific industry. Thus, it is relatively easier to catch up with emerging green technologies in mature sectors with standardized products and knowledge than in underdeveloped sectors. Similarly, at grass root levels, firms usually aim to acquire basic capabilities to exploit global green opportunities. So, mature sectors and their incumbent organizations find it simple to adopt green methods due to their adequate capital means and overall capabilities in comparison to small sectors. For instance, in pursuit of lower carbon emissions in the cement industry, DG cement started producing Sulphate Resistant cement by implementing designs drawn on foreign standards (Ali, 2023). This sustainable practice was enabled by the availability of high capital investment and overall standardized product/knowledge in this specific industry, which is the core determinant of a mature industry.

The enhanced interactions between suppliers, leading firms, and technology providers within the supply chain have also helped strengthen the sectorial innovation trajectories. For instance, the high level of responsiveness/interaction within the domestic sectorial system was crucial to the technological advancement of the solar photovoltaic industry (Binz et al., 2020). However, in undeveloped industries like the Wind sector, local businesses fail to gain market control due to the incapacity of the system to go from technological absorption and domestic deployment to technological leadership in the international markets. The above discussion indicates that thorough implementation of green transformation requires an innovation ecosystem that is dynamic and constantly adapts to the unique characteristics of the sectors. Thus, the applied policies must be tailored fit and based on the needs of sectors.

Policy implications

This research explicitly explores the determinants of green agriculture enterprises in an underdeveloped economy, i.e., Pakistan, along with a brief synopsis of a paradigm shift towards a green economy and how sectors vary in their trajectories of Green Transformation. In this regard, there are some policy implications that need to be contemplated in further discussions:

1. This research helps in understanding the external and internal factors necessary for fostering green agriculture enterprises that will support green agricultural enterprise generation and socio-economic sustainability in both underdeveloped and developed economies. By thoroughly exploring the green determinants, this research will help policymakers to pinpoint the areas that need to be worked on for the efficient development of the green agriculture sector in an economy.
2. The logit model results suggest the substantial influence of internal factors on the growth of green enterprises and the lack thereof of external factors. Thus, policymakers must be more focused on developing methods/policies for improving internal aspects, i.e., innovative operational procedures, physical infrastructure, and talent management of an organization, and cautious of external factors like excessive competition in the market that may hinder the growth of such enterprises.
3. As per this research, emerging economies pursuing a green transformation have several significant prospects, but policymakers must be prudent in developing a synergy between relatively diverse policy areas and varying industries. For instance, energy and environmental policies are essential for the establishment of green transitions due to their enormous impact through mandatory domestic implementations. Similarly, innovation and industrial policies help to generate a firm's capacity to respond to green opportunities. That's why there must be systematically interlinked co-design procedures to develop a dynamic synergy among these contrasting domains, i.e., varying technological needs, capital intensiveness, and required R&D efforts of the industry during policymaking.
4. Developed and emerging economies can equally obtain benefits from green evolution. The efforts concerning the Internalization of R&D, trade and investment policies can speed up the pace of the transition to a greener economy in nations that actively seek to improve their technological capabilities.
5. This research provides a model framework for other fields as well, concerning the road leading to the green evolution in their sectors, such as digital infrastructure and public health, which are essential for creating an inclusive society.

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