



Overcoming Challenges: Promoting Green Entrepreneurship in Developing Muslim Countries Through Digital Innovation

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ABSTRACT

Keywords

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This research aims to address the challenges in promoting green entrepreneurship in developing muslim countries through digital innovation. The research methods used Qualitative comparative analysis by comparing 7 developing Muslim countries with 3 developed countries that successfully adopted green entrepreneurship. The results of this study show that Green entrepreneurship is becoming increasingly relevant in the face of climate change impacts and diminishing natural resources. This research presents practical recommendations for governments, businesses and civil society in developing countries to accelerate the growth of green entrepreneurship through digital innovation. By addressing the challenges and maximizing the potential of digital technology, developing Muslim countries can move towards a sustainable and environmentally friendly economic model. The research also explores policy strategies that can help overcome these barriers and encourage the adoption of digital innovation in the green entrepreneurship sector.

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Introduction

Green entrepreneurship is a concept that is growing worldwide, including in developing muslim countries. This concept includes business initiatives that focus on innovative solutions to environmental and social challenges with the aim of achieving sustainable economic growth. As awareness of the negative impacts of climate change and environmental degradation increases, many countries, including developing muslim countries, are beginning to recognize the importance of green entrepreneurship as a way

to mitigate negative impacts and promote sustainable growth. This is reflected in policies and support from governments, international organizations, and private institutions to promote and support green entrepreneurship initiatives.

Digital innovation has been an important driver in accelerating and expanding green entrepreneurship in developing muslim countries. Information and communication technology, e-commerce, big data, artificial intelligence, and other technologies have opened up new opportunities for green entrepreneurs to improve efficiency, reach wider markets, and optimize the environmental benefits of their businesses. With the adoption of digital technologies, green entrepreneurs are increasingly connected and able to compete in the global marketplace.

However, while digital innovation offers great potential to drive green entrepreneurship in developing muslim countries, there are still several challenges that need to be overcome. These include limited access to digital technologies and adequate infrastructure, lack of digital literacy, and cybersecurity and privacy issues. Therefore, an in-depth understanding of digital infrastructure readiness and the state of digital ecosystems in developing muslim countries is critical to support the sustainable growth of green entrepreneurship.

Previous research on green entrepreneurship in developing muslim countries has provided valuable insights into the challenges and opportunities faced by green entrepreneurs and the impact of digital innovation in supporting the growth of the sector. This prior research has contributed to an understanding of how government policies, institutional support, and partnerships can play an important role in shaping a resilient and innovative green entrepreneurship ecosystem.

It is important to continue to develop research in this area to improve our understanding of the potential of digital innovation to foster green entrepreneurship in developing muslim countries, and to find the best ways to overcome the challenges. By doing so, we can expect green entrepreneurship to grow and make a greater contribution to addressing environmental and social challenges in the future.

"The Influence of Emerging Green Markets on Green Entrepreneurship and Sustainable Development in Knowledge-Based Enterprises" is a study conducted by Maryam Lotfi. The outcome of the study was to explore the relationship between green entrepreneurship, sustainable development, and emerging green markets. This research provides a theoretical framework and research model to understand the impact of green

entrepreneurship on economic growth and development (Lotfi et al, 2018).

Patrick Holzmann with his research *"The role of digital technologies for sustainable entrepreneurship: A systematic literature review and research agenda,"* This study reviews the literature on the use of digital technologies for sustainable entrepreneurship. The study identified key themes and research gaps, and proposed a research agenda for future studies (Holzmann & Gregori, 2023).

The research entitled *"Digital Sustainability and Entrepreneurship: How Digital Innovation Helps Address Climate Change and Sustainable Development"* by Gerard George. This study examines how digital technologies are being used to address the grand challenges of climate change and sustainable development. The study provides examples of digital innovation and its impact on sustainability (Gao et al., 2023).

"Green economy transition: challenges of technological change for sustainability" by Patrik Söderholm. This study addresses the challenges of transitioning to a green economy, including the development and adoption of sustainable technologies. The study highlights the role of sustainability entrepreneurs in disrupting established business models and reshaping existing institutions (Söderholm, 2020).

"The Effect of Green Entrepreneurship on Sustainable Development in Saudi Arabia: The Role of Formal Institutions" by Wafa Alwakid, et al. The results of this study explore the influence of green entrepreneurship on sustainable development in Saudi Arabia. This study uses institutional economics to analyze the role of formal institutions in shaping green entrepreneurial activities (Gao et al., 2023).

"Entrepreneurship and Environmental Sustainability in the Digital Age: Regional and Institutional Perspectives" by Qing Ye, et al. The results of this study examined the challenges faced by green entrepreneurs in the digital age. The study discusses the role of regional and institutional factors in promoting environmental awareness and increasing the adoption of sustainable practices (Ye et al., 2020).

The current research focuses on addressing the challenges of fostering green entrepreneurship in developing muslim countries through digital innovation. Green entrepreneurship has gained considerable attention as a sustainable business model to address environmental issues and drive economic growth. However, developing countries face unique barriers such as limited resources, inadequate infrastructure and regulatory constraints, which hinder the development of green entrepreneurship. The main objective of this research is to explore the potential of digital innovation in

overcoming these barriers and fostering the growth of green entrepreneurship in these countries. developing countries. By harnessing the power of digital technologies, including information and communications technology, big data, artificial intelligence, and e-commerce, green entrepreneurs can access new markets, improve efficiency, and implement sustainable business practices.

Method

The research methods used qualitative comparative analysis by comparing 7 developing Muslim countries with 3 developed countries that successfully adopted green entrepreneurship. The data collected was then analyzed using qualitative approaches to understand the key factors development of green entrepreneurship.

The literature study will be the first step in this research. The researcher will conduct an in-depth review of relevant sources, including scientific articles, research reports, books and other relevant documents. The purpose of this desk study is to understand the theoretical foundation and practical context related to green entrepreneurship, the challenges faced by developing muslim countries, and the role of digital innovation in promoting green entrepreneurship.

The researcher will design and distribute a survey to green entrepreneurs in developing muslim countries. The survey will aim to collect data on the experiences, barriers and opportunities faced by green entrepreneurs in growing their businesses. The questions in the survey will focus on the use of digital technologies, the benefits gained, as well as the challenges faced in adopting digital innovations.

Interview methods will be used to gain deeper insights from key stakeholders, including businesses, governments, private institutions, and civil society involved in green entrepreneurship in developing muslim countries. Interviews will be an opportunity to explore their views and experiences related to the use of digital innovations in green entrepreneurship, as well as the constraints and opportunities they face.

Researchers will select several case studies of successful green entrepreneurship in developing muslim countries that have adopted digital innovations successfully. These case studies will provide real-life examples of how the use of digital technologies has improved business performance, created a positive impact on the environment, and addressed specific challenges in the context of developing muslim countries.

The researcher will conduct a comparative analysis between developing muslim countries that have adopted digital innovations in green entrepreneurship and those that still face barriers in this regard. This analysis will provide a deeper understanding of the differences and similarities that influence the adoption of digital innovations in green entrepreneurship in developing muslim countries.

Result and Discussion

1. Definition and Concept of Green Entrepreneurship:

Green entrepreneurship is a form of business that focuses on creating and managing business ventures or initiatives with the primary objective of addressing environmental and social challenges, while achieving sustainable economic growth. The concept encompasses the development of products, services, or business processes that prioritize resource efficiency, reduce negative impacts on the environment, and provide significant social benefits.

The concept of green entrepreneurship reflects the spirit of finding innovative solutions to climate change and the environmental crisis, and creating a more sustainable and civilized world. By integrating business and environmental and social values, green entrepreneurship becomes an important force in achieving sustainable development and maintaining the balance of the earth's ecosystems (Saari, U.A., Joensuu-Salo, S. 2019).

2. Environmental and Social Challenges in Developing Countries

Environmental and social challenges in developing countries demand collaborative efforts and innovative solutions to achieve sustainable development and address negative impacts on the environment and society. Green entrepreneurship utilizing digital innovation has an important role to play in finding solutions and meeting these challenges to create a more sustainable and equitable future for all people.

3. The Role of Green Entrepreneurship in Addressing Environmental and Social Challenges

The role of Green Entrepreneurship in Addressing Environmental and Social Challenges is crucial in finding innovative and sustainable solutions to address environmental and social issues faced by developing countries. The role of green

entrepreneurship is key in shaping the transition to a sustainable economy that focuses on environmental sustainability and social well-being. By integrating social, economic and environmental aspects in innovation and business ventures, green entrepreneurship has the potential to make a significant contribution to addressing the complex challenges faced by developing countries and creating a more sustainable future for future generations.

4. Development of Green Entrepreneurship in Developing Muslim Countries vs Developed Countries

The development of Green Entrepreneurship in developing muslim countries covers several aspects that are important indicators in measuring its growth and impact in facing environmental and social challenges. Here are some points related to the development of green entrepreneurship in developing countries:

a. Green Business Growth Trends:

The growth trend of green entrepreneurship in developing countries has shown a significant increase in recent years. More and more entrepreneurs and companies understand the importance of sustainable aspects in their business and are looking for ways to integrate them. Green business covers a wide range of sectors, such as renewable energy, waste management, sustainable agriculture, eco-friendly transportation, and green products.

b. Increased number of green businesses:

The number of green businesses in developing countries is growing. Green entrepreneurs are setting up different types of businesses that focus on innovative solutions to environmental and social challenges. The increase in the number of green businesses reflects the growing awareness and interest in addressing environmental and social issues through entrepreneurship.

c. The Role of Technology and Digital Innovation:

The development of green entrepreneurship in developing countries is driven by the role of technology and digital innovation. The use of digital technology, artificial intelligence, and online platforms has facilitated connections between green entrepreneurs and consumers, partners, and global markets. Technological innovation is key in creating more efficient and impactful solutions to environmental and social challenges.

d. Favorable Government Policy Changes:

Some developing countries are beginning to adopt government policies that support the development of green entrepreneurship. These include fiscal incentives for green businesses, removal of regulatory barriers, financial assistance or technical support from the government, and awareness campaigns to encourage public interest in green products and services.

e. Limited access to Resources and Financing:

One of the main challenges faced by green entrepreneurs in developing countries is limited access to resources and financing. Some green businesses may face difficulties in obtaining start-up capital or access to the technology and infrastructure needed to grow their enterprises.

f. Consciousness and Education:

Another challenge is public awareness of the importance of green entrepreneurship and sustainable practices. Public education and awareness on environmental and social issues are key in creating greater market demand for green products and services.

g. Green Business Scalability:

For some green businesses, scalability is an important issue in addressing broader environmental and social challenges. Scalability allows green businesses to create greater positive impact and stretch the reach of sustainable solutions to greater heights.

The development of green entrepreneurship in developing countries offers great potential in addressing environmental and social challenges. With positive trends, changes in government policies, and technological innovations, it is expected that green entrepreneurship will continue to grow and make a significant impact in realizing sustainable development around the world. However, challenges such as limited access to resources and financing, as well as public awareness remain to be addressed to create a more conducive environment for the growth of green entrepreneurship.

Study Green Entrepreneurship Works in Developing Muslim Countries with Digital Innovation Adoption.

a. Pakistan's Eco-Friendly E-Commerce Platform.

In Pakistan, an entrepreneur has launched an e-commerce platform dedicated to promoting and selling eco-friendly products. Through the website and

mobile app, consumers can easily access a wide range of sustainable goods, from organic textiles to solar-powered gadgets. The platform not only encourages green consumption but also provides a marketplace for local artisans and manufacturers committed to environmentally friendly practices. Pakistan's Eco-Friendly E-Commerce Platform demonstrates how digital innovation can positively impact the economy, the environment, and community well-being by promoting and facilitating sustainable consumption.

b. Jordan's Waste Management App

In Jordan, a startup has developed a mobile application that facilitates efficient waste management. The app allows users to schedule waste pickups, track recycling efforts, and receive educational content on waste reduction. By incorporating digital technology, this initiative enhances the country's waste disposal infrastructure, reduces environmental impact, and aligns with Islamic principles of responsible resource management. The positive impacts of Jordan's Waste Management mobile application include: Efficient Waste Handling, Encourages community participation in waste reduction efforts, Provides real-time data on waste collection and disposal, Environmental Conservation, Public Awareness and Education, Promotes the adoption of technology in traditionally non-digital sector, Optimizing waste management processes through the application can lead to cost reductions for municipalities, Smart Resource Allocation, and Public Awareness and Education

c. Bangladesh's Sustainable Agriculture Network

Network of farmers in Bangladesh has embraced digital innovation to promote sustainable agriculture. Through a mobile platform, farmers receive guidance on organic farming methods, weather forecasts, and market prices for eco-friendly produce. This digital ecosystem not only improves agricultural practices but also connects farmers directly with environmentally conscious consumers, fostering a sustainable and ethical supply chain. Bangladesh's Sustainable Agriculture Network demonstrates how the integration of digital innovation into traditional farming practices can lead to positive outcomes for both farmers and the environment.

d. Malaysia's Green Tech Incubator

In Malaysia, a green tech incubator supported by digital platforms has emerged to nurture environmentally focused startups. Entrepreneurs with innovative ideas for renewable energy, waste reduction, and sustainable technologies receive mentorship, access to funding through online channels, and a platform to showcase their solutions. This initiative contributes to Malaysia's commitment to green initiatives while harnessing the power of digital networks for innovation and collaboration. Malaysia's Green Tech Incubator, with its digital platform support, plays a crucial role in fostering a sustainable ecosystem for green entrepreneurship, bringing about positive economic, technological, and environmental impacts

e. Morocco where green entrepreneurship is thriving with the adoption of digital innovation.

In Morocco, there's a growing trend of solar energy startups leveraging digital platforms. Entrepreneurs are utilizing mobile apps to connect with rural communities and provide them with access to clean and sustainable energy solutions. Through these applications, users can monitor their energy consumption, receive insights on optimizing usage, and even participate in community-based solar projects. The integration of solar energy startups with digital platforms in Morocco brings about positive impacts on environmental sustainability, economic development, and community empowerment. This integration of digital tools not only empowers local communities with green energy but also fosters economic development and job creation. It showcases how the synergy of green entrepreneurship and digital innovation can drive positive change in developing Muslim countries like Morocco.

f. Malaysia's Green Tech Incubator

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digital platforms, plays a crucial role in fostering a sustainable ecosystem for green entrepreneurship, bringing about positive economic, technological, and environmental impacts

g. Sustainable Agriculture Tech Platform in Indonesia

In Indonesia, a startup named "EcoHarvest" has emerged, leveraging digital innovation to promote sustainable agriculture practices. The platform connects farmers with eco-friendly solutions, emphasizing organic farming, efficient water use, and responsible pest management. Positive impact of the EcoHarvest Program in Indonesia are Increased Crop Yield, Resource Optimization, Market Access and Fair Trade, Financial Inclusion, Educational Outreach, Community Empowerment, Carbon Footprint Reduction, Government Collaboration, Investment in Renewable Energy, and International Recognition.

While developed countries have adopted digital innovation in environmentally friendly entrepreneurship, developed countries have also successfully integrated digital innovation into environmentally friendly entrepreneurship. Some developed countries that have successfully combined digital technology with environmental awareness in the context of entrepreneurship include:

- a. **Sweden:** Sweden has been one of the leaders in adopting renewable energy and environmentally friendly technology. Many Swedish companies have incorporated digital innovation into their solutions to reduce carbon footprints. Sweden is also active in developing smart grid technology and sustainable transportation solutions.
- b. **Germany:** Germany is known as one of the leaders in Europe in promoting renewable energy and sustainability. In the entrepreneurial sector, German companies use digital technology to enhance production efficiency, support renewable energy, and manage waste more sustainably.
- c. **Singapore:** Singapore is one of the developed countries in Asia that has adopted digital innovation to advance environmentally friendly entrepreneurship. The government and companies in Singapore have developed smart solutions for energy management, waste management, and sustainable transportation. These innovations are often supported by government investments and regulations that promote sustainability.

Each country has its own unique approach to environmentally friendly entrepreneurship, but the use of digital technology is a key element in these efforts. Companies in these developed countries tend to leverage technologies such as the Internet of Things (IoT), big data, and artificial intelligence to create more efficient and sustainable solutions. These developed countries demonstrate that the adoption of digital technology in environmentally friendly entrepreneurship is not only a trend in developing countries but is also occurring in developed countries striving to address global environmental challenges. This development is continually evolving, and other countries may also adopt similar practices over time.

5. Digital Innovation in Green Entrepreneurship

Digital Innovation in Green Entrepreneurship has a significant role to play in improving efficiency, resilience, and positive impact on the environment and society. The following is an explanation of the most relevant digital technologies for green entrepreneurship, how these technologies can be applied in green businesses, as well as the benefits that result from using digital innovations: IoT technology and sensors play an important role in collecting environmental data and monitoring the sustainability aspects of green business. By using internet-connected sensors, green entrepreneurs can monitor energy consumption, water usage, air quality, and ambient temperature in real time. This data can help in optimizing resource usage, identifying efficiencies, and reducing wastage.

Data Analytics and Big Data: The use of data analytics and big data in green entrepreneurship helps in analyzing large volumes of structured and unstructured data to gain valuable insights. This data can help green entrepreneurs identify trends, patterns, and business opportunities that can support their sustainability efforts and optimize their operations.

Cloud Computing: Cloud computing technology enables flexible, efficient, and scalable data access and storage. Green businesses can utilize cloud services to store environmental data, share information with partners, and access tools or applications required for their operations. The use of cloud computing also helps in reducing large IT infrastructure investments.

Blockchain is a technology that enables transparency, security, and accountability in the supply chain and product circulation. In green entrepreneurship,

blockchain can be used to trace the origin of raw materials, verify product sustainability certifications, and ensure the authenticity and safety of green products.

E-commerce and online platforms facilitate global market access for green businesses. Green entrepreneurs can sell their products directly to consumers through e-commerce platforms, reach a wider market, and increase the visibility of their products.

Benefits of Using Digital Innovation in Green Entrepreneurship

By using digital technologies such as IoT, sensors, and data analytics, green businesses can improve their operational efficiency. Resource management such as energy and water can be optimized, waste can be managed more efficiently, and operational costs can be reduced. The use of digital technology in green entrepreneurship helps in reducing the negative impact on the environment. Use of renewable energy, better waste management, and implementation of sustainable practices help in maintaining environmental sustainability. With access to sophisticated data, green businesses can identify market needs and develop innovative products and services that focus on sustainable solutions.

Digital technology enables green businesses to expand their reach globally through e-commerce platforms and online collaboration tools. This opens up new opportunities for growth and greater impact. Through the use of digital technology, green businesses can educate and engage the public in the sustainability movement. Easily accessible information and sharing through Digital platforms can increase public awareness and participation in environmental and social issues.

Faced with these challenges, it is important for green entrepreneurs to seek solutions that fit their context, such as partnerships with institutions or organizations that can assist in overcoming technological or digital literacy barriers. In addition, support from government and non-government organizations can also play an important role in facilitating the adoption of digital technologies in green entrepreneurship. Overall, digital innovation plays an important role in supporting green entrepreneurship by providing tools and solutions to environmental challenges.

The survey results show that digital innovations provide significant benefits to green entrepreneurs in developing countries, such as access to broader markets and better operational efficiency. However, constraints such as limited access to technology

and lack of digital literacy also need to be addressed to ensure the full potential of digital technology is accessible to green entrepreneurs (Soluk et al., 2021).

Policy Recommendation

Policy Recommendations to Support Digital-based Green Entrepreneurship for government, private institutions, and community organizations. The government should develop a digital literacy training program that includes basic and advanced digital skills training. The government can also provide fiscal incentives for green entrepreneurs who adopt digital innovations and can establish specialized institutions or agencies that aim to support digital-based green entrepreneurship.

Private institutions can invest in digital technology infrastructure to improve access to digital technology in the wider region. Private institutions also can create partnerships with innovative green startups. These partnerships can include funding, access to business networks, or the use of existing digital technologies to improve business performance and environmental sustainability.

Community organizations can initiate education and awareness programs on the importance of digital-based green entrepreneurship. Community organizations can also hold forums and meetings that focus on sharing successful experiences and challenges in adopting digital innovations. This will create space for collaboration and knowledge exchange between green entrepreneurial actors. By conduct research and collect data related to digital-based green entrepreneurship. This research will provide a deeper understanding of the trends and development potential of this sector. These policy recommendations are expected to help create a conducive environment for the development of digital-based green entrepreneurship. Through measures to improve digital literacy, strengthen digital technology infrastructure, and encourage partnerships between various stakeholders, it is expected to create sustainable growth and have a positive impact on the environment and society. This policy needs to be supported by commitment and cooperation from all relevant parties to achieve optimal results (Rahmawati et al., 2021).

Conclusion

The role of Green Entrepreneurship in Addressing Environmental and Social Challenges is crucial in finding innovative and sustainable solutions to address

environmental and social issues faced by developing countries. The adoption of digital innovations in green entrepreneurship in developing countries still faces several challenges. A comparison of 7 developing Muslim countries and 3 developed countries that have successfully adopted green entrepreneurship shows that Each country has its own unique approach to environmentally friendly entrepreneurship, but the use of digital technology is a key element in these efforts. Companies in these developed countries tend to leverage technologies such as the Internet of Things (IoT), big data, and artificial intelligence to create more efficient and sustainable solutions. These developed countries demonstrate that the adoption of digital technology in environmentally friendly entrepreneurship is not only a trend in developing countries but is also occurring in developed countries striving to address global environmental challenges. This development is continually evolving, and other countries may also adopt similar practices over time.

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