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# GREEN OCEAN STRATEGY AND SUSTAINABILITY OF AUTOMOBILE INDUSTRY: A STUDY OF INNOSON VEHICLES MANUFACTURING COMPANY LIMITED, NNEWI

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***Abstract***
*As the automobile industry grapples with the imperative of sustainability, the risk of obsolescence looms large for organizations that have not embraced innovative production processes. This challenge necessitated search for viable strategy that led to the discovery of the novel green ocean strategy. The study examined the relationship between green ocean strategy and sustainability within the automotive industry. Specifically, the study examined the critical nexus between market differentiation and economic viability; and between lifecycle thinking and environmental conservation. Descriptive survey method was adopted in gathering the data for the research and* Pearson Product Moment Correlation Coefficient on Statistical Packages for Social Sciences (Version 27) at 5% level of significance *was utilized in analyzing the data obtained from 92 respondents from Innoson Vehicles Manufacturing Company Limited, Nnewi, Anambra State, Nigeria. Results from the first hypothesis indicated a strong correlation coefficient (r = 0.923) with a p-value of 0.026. This indicated that IVM should continue to prioritize and invest in market differentiation strategies. Result from the second hypothesis displayed positive relationship between technological advancement and environmental conservation in IVM, as evidenced*

*by a correlation coefficient (r) of 0.748 with a p-value of 0.030. Conclusively, findings from the statistical analyses of the two hypotheses provided clear evidence that embracing GOS plays significant role in the sustainability efforts of automobile manufacturers. The study recommended amongst others that IVM has to tailor their products and services to meet specific market demands and preferences in order to enhance their economic viability and competitiveness in the automotive industry; to prioritize integrating lifecycle assessment into their production processes and implement strategies to extend product lifespan, alongside fostering partnerships for sustainable resource management. This research contributes to knowledge by way of enriching automobile's industry journal. It also helps to bring to open, the contents of United Nations Sustainable Development Goals 7, 9, and 11, and human obligations.*

***KEY WORDS:*** Green Ocean Strategy, Sustainability, environmental Conservation, Strategy, Automobile.

## *1. Introduction*

Few inventions have actually touched the lives of human, profoundly as the automobile industry has done. To put succinctly, Green Ocean Strategy, Sustainability, environmental Conservation, Strategy, Automobile. Some would even say that American culture would not exist without cars (Doyle, 2023). The industry no doubt has provided millions of jobs globally, fostered economic development, enables trade, powers businesses, connects workers to their jobs, creates opportunities for struggling communities (Puentes, 2015). According to Hill, Cooper, and Menk (2010), the industry directly employs over 1.7 million people engaged in designing, engineering, manufacturing, and supplying parts and components to assemble, sell and service new motor vehicles in America alone including whole lots of commercial activities.

However, despite these robust contributions, the automobile industry finds itself at a crossroads due to its entrenched reliance on outdated practices. The traditional model of mass production and huge resources consumption have led to excessive resource exploitation, environmental degradation, and worsening air quality in the global scale. One report estimated that the 86 million cars that were sold in just one year (2018) accounted

for 9% of global greenhouse gas emissions (Pohl, 2021). Air pollution stands out as challenges. The challenges of climate change, severe impact on both public and individual health, leading to increased rates of morbidity and mortality (Manisalidis, Stavropoulou, Stavropoulou, & Bezirtzoglou, 2020). Additionally, the industry's heavy reliance on fossil fuels has contributed to climate change, with transportation accounting for a significant proportion of global greenhouse gas emissions.

As the world grapples with the urgent need to transition towards sustainable practices, the automobile industry faces mounting pressure to adapt or face obsolescence and extinction. The growing demand for electric vehicles (EVs), advancement in renewable energy infrastructure and solar powered vehicles (SPVs), and shifting consumer preferences towards eco-friendly transportation options potent a mounting pressure on the automotive landscape and requiring significant desire for paradigm shift in the 21stcentury. Companies like Tesla, Rivian, and Lucid Motors are set for this transition of technology leading the change towards electrification and innovation, challenging the status quo and reshaping the future of mobility, but the whole continents would need to embrace the transition or else, it risks becoming obsolete in the face of mounting environmental and economic challenges. For instance, the recent deregulation of petroleum products importation in Nigeria (subsidy removal) led to hike in prices of the products which caused automobile industry in Nigeria and neighbouring countries to witness inward contractions in quantity demanded of automobile being a complementary product to all petroleum products. It is imperative for stakeholders to collaborate, invest in research and development, and prioritize sustainability to ensure the longevity and relevance of the automobile industry in the years to come. Strategies are being formulated at interval to achieve the needed sustainable goal. One of such is the Green Ocean Strategy (GOS), which strives to navigate the tortious '*valley of death*' that exist within the circles of the Blue and Red ocean strategies with the quest to achieve environmental and economic sustainability through innovation. The GOS seeks to address environmental challenges while simultaneously creating new market

opportunities for industry players. It focuses on the development of eco-friendly technologies, sustainable manufacturing processes, and efficient resources management to guarantee business going concern.

The broad-based objective of this study is to examine in holistic perspective; the relationship between GOS and Sustainability within the context of automobile industry. In specific term, the study will explore the interplay between market differentiation and economic viability and between lifecycle thinking and environmental conservation in the wider consideration of adopting green ocean strategy in the automobile industry.

Tentatively, the study postulated that there is positive correlation between market differentiation implementation and economic viability; and that there is substantial relationship between lifecycle thinking implementation and environmental conservation efforts of Innoson Vehicle Manufacturing Company Limited.

The intersection of GOS and Sustainability of automobile industry significantly met the United Nations Sustainable Development goals seven (affordable and clean energy); nine (industry, innovation, infrastructure); and eleven (sustainable cities and communities), which substantially define economic, social, and good governance in the automobile industry.

**Review of Related Literatures**

**Green Concept and Principles:** The concept and principle of "Green" has gained attention in recent years, as individuals and societies become increasingly aware of the pressing need for sustainable development. The green concept refers to a metaphoric colouration of a greenish environment that depicts environmentally friendly practice aim at minimizing environmental impact, conserve natural resources, and promote the well-being of the ecosystem (Dehghan, et al., 2023). It is a flourishing garden of means, end, and equity both for man, insects and the universe. The GOS entails the identification and development of eco-friendly products, processes, and practices that not only address

environmental concerns but also create new market opportunities and enhance competitiveness (Su, Fan, & Wang, 2018). Unlike a traditional "Red Ocean" approach characterized by fierce competition in existing markets, a Green Ocean Strategy focuses on creating value through innovation while simultaneously addressing ecological challenges. Pablo & Dylan (2022) wrote, “The field on which companies compete on their environmental, social, and governance (ESG) performance is vast, making it all but impossible for any company to successfully excel across all areas.” This is obvious because organizations in the same line of business and amongst competing industries organizations would compete for same ESG (Pablo & Dylan, 2022), such for green fuel.

Green Ocean Strategy is a balanced approach that considers long-term benefits alongside immediate financial implications. It requires strong leadership commitment, cross-functional collaboration, and a culture that encourages innovation and responsible decision-making (Dangelico & Pujari, 2010). Strategic alliances with stakeholders and partnerships across industries can also enhance the feasibility of sustainable ventures (Hockerts & Wüstenhagen, 2010). The GOS seeks congruence between positive environmental, social, and governance (ESG) impacts and financial profitability (Vinay, Anshuman, Ernesto, & Naveen, 2024). Studies exploring the integration of GOS and drive towards sustainable growth reveal that organizations pursuing environmentally friendly innovations can create unique value propositions and carve out new market spaces (Sarkar & Costa, 2008). The adoption of renewable energy sources, circular economy models, and sustainable supply chain practices are shown to foster innovation while improving cost efficiencies (Bocken, Short, Rana, & Evans, (2016). Research conducted by Markopoulos, Kirane, Piper, and Vanharanta, (2020), also pointed out that the evolution of classical innovation to the integration of the social, shared value and environmental dimensions can impact desired sustainability needed to assure wide applicability, fast return on investment

and strong competitive advantage. The GOS is based primarily on two key pillars and they include market differentiation and lifecycle thinking.

**Market Differentiation:**

Market differentiation is a crucial determinant of GOS. It involves distinguishing a product or service from those of competitors in order to create a unique and desirable position in the marketplace. According to Weinstein (2020), Strategic differentiation combined with technology and choice could impact industry disruption and if a company makes product differentiation through innovations, its business performance will increase (Ida & Doddy, 2023). Market differentiation can be achieved through various means, such as product features (Spacey, 2023), quality and reliability (Pixabay, 2023), price (Ait-Sahalia, Parker, & Yogo, 2004), customer Service (Frampton, 2020), and (FasterCapital, 2024).

**Lifecycle Thinking:**

Lifecycle thinking has gained significant attention in recent years as medium suitable for mitigating environmental impact of human activities. Lifecycle thinking, also known as life cycle assessment (LCA), is a quantification and classification of all effects at all life stages and provides direct and indirect possible environmental interactions (Kowalska, Grobelak, Kacprzak, and Lyng, 2021), or activity from cradle to grave in the grave of organizations. It encompasses the entire life cycle stages, including raw material extraction, manufacturing, distribution, use, and disposal. It takes holistic view of the production, consumption, reuse/recycling and disposal of the residuals of a product (for example, biofuel) to evaluate its environmental impacts throughout its entire life cycle (Ghosh, Sengupta, Singh, & Shahay, 2020). The basis of the life cycle thinking, when assessing the merits of a technology, is to account for its whole life cycle (Ghosh, Sengupta, Singh, & Shahay, 2020). One of the primary goals of lifecycle thinking is to prevent the shifting of environmental burdens from one stage of the lifecycle to another. It provides the necessary

assessment tools and methodologies to identify the environmental hotspots and potential improvements throughout the product lifecycle, supporting the transition towards a circular economy. It can be used to evaluate the environmental impacts of different vehicle technologies, fuel choices, and production methods. Combining the LCT with CE, the automobile industry can guide decisions to invest in more fuel-efficient vehicles, transition to electric or hybrid vehicles, and implement closed-loop systems for recycling and reusing vehicle components.

**Sustainability in the Automobile Industry**:

The automobile industry is a critical contributor to global economic growth. As already known, this is not without numerous challenges to both the industry and the environment. These challenges are related to ethical issues, environmental impact, resource consumption, or economic challenges. The long-term sustainability of the industry therefore hinges on its ability to balance financial success with environmental responsibility and between downstream sustainability and upstream sustainability (Wajon & Farbstein, 2024). The upstream sustainability being a focus on how to improve manufacturing practices, sourcing green energy, and conducting supplier assessment whereas the downstream sustainability focuses on providing assistance to suppliers, dealers, and customers. Car producers are often considered the main polluters and therefore, they plan enormous investments in green product-development (Jaderna, Eva, & Prikrylovva, 2018). They must act as green producers, accept green solutions in buying green resources, practice green production and logistics, and save natural resources anywhere, anytime ((Jaderna, Eva, & Prikrylovva, 2018). The forgoing defines economic viability of the automobile industry. Another of the surest method to achieve early sustainability in this sector is by aligning with growing environmental concern. This is because more and more consumers are becoming environmentally conscious at least, the impact of today aligning business with sustainability targets is crucial for companies to

contribute to a more sustainable future. By incorporating sustainability into their operations, businesses can not only reduce their environmental impact but also create long-term value and resilience (Sharma & Lobo, 2023).

**Economic Viability**

Economic viability in the automobile industry refers to the ability of companies in the sector to generate sustainable profits and maintain growth over time. This viability is influenced by a range of factors, including market demand, cost structures, competition, technological advancements, and regulatory environments. In a more specific term, economic viable towards sustainability in automobile industry must take cognizance of four critical elements, viz;

**Market Demand:** The economic viability of the automobile industry heavily depends on consumer demand for vehicles. Market trends and preferences play a crucial role in determining the industry's profitability. For instance, the shift towards electric vehicles (EVs) due to environmental concerns and government incentives has created new opportunities and challenges for automakers. According to a report by BloombergNEF, global EV sales are projected to grow from 1.7 million in 2020 to 8.5 million in 2025, representing a compound annual growth rate of 31% (BloombergNEF, 2021). Additionally, a survey conducted by Deloitte found that 35% of consumers are willing to consider purchasing an EV as their next vehicle (Deloitte, 2020).

**Cost Structures:** Efficient cost management is essential for economic viability in the automobile industry. Companies must invest in research and development (R&D), production facilities, and supply chain management to maintain competitiveness. At the same time, they need to control costs to ensure profitability. The Deloitte Global Automotive Supplier Study found that automakers and suppliers are focusing on improving operational efficiency and reducing manufacturing costs to enhance economic viability (Deloitte, 2020).

**Competition:** The automobile industry is highly competitive, and economic viability requires companies to navigate intense competition effectively. This includes factors such as product differentiation, pricing strategies, marketing efforts, and brand value. Instead of trying to build a relatively affordable car that it could mass-produce and market, Tesla took the opposite approach focusing instead, creating a compelling car that would create a demand for electric vehicle (Zucchi, 2022) using an inimitable strategy of product differentiation.

**Technological Advancements:** Rapid advancements in automotive technology, such as autonomous driving, connectivity, and electrification, present both opportunities and challenges for economic viability. Companies must adapt and invest in research and development to stay ahead of the curve. The Boston Consulting Group predicts that by 2030, up to a quarter of new cars sold worldwide could be fully autonomous vehicles. This offers potential revenue streams, including new mobility services (BCG, 2019).

**Environmental Conservation:**

Aligning business with environmental consciousness is also crucial for the automobile industry to achieve fast transition to long-term profitability. A conscious approach to environmental conservation would require concerted efforts towards institutionalizing lifecycle thinking in conjunction with circular economy to arrive at sustainable environment. In this wise, a drive towards sustainability of the automobile industry would require that organizations:

**Promote electric vehicles (EVs):** Choosing EVs over fossil-fuel vehicles is a major step towards saving the environment (Farrukh, et. al., 2024). One of the touted benefits of electric vehicles is that they reduce local air pollution. They are not just better for the climate, they clean up our air too (Ritchie, 2023). This shift towards EVs aligns with the goals of environmental sustainability and reduces the industry's reliance on finite fossil fuels. For instance, global sales of electric vehicles surpassed 3 million units in 2021, and

in this 2024, it has already been forecasted that 25% of all new passenger car registrations will be electric, exceeding 17 million units in sales globally (Ukpanah, 2024). This figure excludes private automobile global sales records.

**Invest in sustainable materials and manufacturing processes:** Environmental conservation can drive the automobile industry towards sustainability by encouraging the use of eco-friendly materials and manufacturing processes. Companies that prioritize green production and adopt sustainable manufacturing practices are more likely to achieve favorable environmental outcomes (Hermawan, et al., 2023). Additionally, integrating renewable energy solutions into the manufacturing industry presents a critical pathway towards achieving sustainability and reducing carbon footprints (Usman, et al., 2024). For example, Tesla's Gigafactory in Nevada utilizes solar panels and wind turbines to generate clean energy, demonstrating the feasibility and benefits of sustainable manufacturing practices.

**Support Green Infrastructure and Urban Planning:** Environmental conservation efforts can promote the development of green infrastructure and sustainable urban planning where nature and urbanity coalesce for resilient and sustainable urban environments (Gidiaga, el al., 2024). The development of an efficient transportation system is critical for the improvement of living standards and can contribute to the mitigation of current environmental concerns, notably climate change (IGPCC, 2014). Initiatives like car-sharing programs and ride-hailing services contribute to reducing traffic congestion and emissions. As an illustration, cities like Copenhagen and Amsterdam have implemented comprehensive cycling infrastructure and efficient public transportation systems, resulting in reduced air pollution and improved quality of life for residents (FasterCapital, 2024).

**Theoretical Framework:**

John Elkington introduced the triple bottom line theory, which the study is anchored upon, in 1994. Elkingson argued that companies should consider three dimensions of

performance: social, environmental, and economic. Company able to engage their stakeholders with a clear vision of their shared future and, in the process, to outperform their competitors against the triple bottom line will be much better placed to win people's hearts and minds – along with their money (Jeurissen, 2000). Specifically, the theory suggested that companies have responsibilities beyond financial performance. Their burdens should transcend financial profit into horizon of social, environmental, and economic impacts. This is exactly what the GOS seeks to achieve for organization. Several of United Nations Sustainable Development Goals are genuinely taken care of by the GOS.

**Empirical Review:**

There are avalanche of reviews of relevant modern literature pointing to the fact that GOS application might enable sustainability. Creativity and thinking outside the box innovation philosophy of the novel GOS could have relevant impacts on organizational sustainability. Scholars have severally suggested this idea. For instance;

In recent year, (Alaa, 2022), in "The Role of Green Ocean Strategy in Mediating Stimulating Continuous Innovation to Achieve Strategic Victory: An Exploration Study in the General Company for Leather Industry" conducted a researc work. After determining his objective, questionnaire was adopted and distributed to (84) samples of employees of the General Company for Leather Industries in the city of Baghdad. The study findings provided that green ocean strategy have direct impact on the strategic victory and indirect effects through continuous innovation represented in (worker's creativity, commercial knowledge marketing, strategic flexibility).

Same year, still on related issue, "Sustainable Entrepreneurship: A literature Review" is a research article carried out by (Rosana, Cruz, & Raimundo, 2022) in the Portugal. With the objective of analyzing to the depth of existing pieces of literature on sustainable entrepreneurship, its definitions, and its applications in business practices, the authors relied upon a literature search on the SCOPUS database around the keywords

'Sustainability and 'Sustainable Entrepreneurship'. The scientific software VOS viewer was also effectively used to better illustrate the linkage of major categories and correspondent trends, related with both business growth and maintenance of ecological systems. The review focuses on sustainable innovation and entrepreneurship and explores different strategies for achieving sustainability goals. It analyzes how green ocean strategies can facilitate sustainable innovation and drive positive environmental outcomes. The review concluded nevertheless, that achieving the desired levels of sustainability requires collaborations between markets, governments, and corporations.

Also, *(*Khanra *et al.2021),* in their research work; "A Resource-Based View of Green Innovation as a Strategic Firm Resource: Present Status and Future Directions" conducted in India, the authors extensively discussed the sustainable development dilemma of green innovations through the theoretical perspective of the resource-based view of the firm using comprehensive bibliometric analysis of 951 relevant articles. The study revealed that business strategy, environmental management and green energy are the three management domains in which research on green innovation as a firm resource is predominantly concentrated. Green supply chain management, green product design, corporate environmental responsibilities and social sustainability are also said to have capacity to guide decision-making by policymakers and practitioners alike.

Further to the above, the article; "Translating Green Strategic Intent into Green Process Innovation Performance: The Role of Green Intellectual Capital", by Jirakraisiri, Badir, and Frank, (2021), in China provided a realistic studies of firm's green strategic intent and confirmed that GSI has positive effects on the three aspects of green intellectual capital (i.e., human, organizational and relational capital). In turn, these three aspects have positive effects on GPIP. In their word; in order to implement a green strategy successfully, especially in polluted industries such as the chemical industry, managers need to develop not only the firm's tangible resources but also its intangible resources. The more they invest

in green organizational capital, the higher the level of GPIP that can be achieved. Moreover, green organizational capital positively moderates the effect of green relational capital on GPIP, whereas it negatively moderates the effect of human capital on GPIP. They arrived at the conclusion relying on results of analysis of data collected from 198 Chinese manufacturing firms.

**Methodology**

The design of this research was descriptive. In conducting the survey, structured questionnaires were administered to obtain data from 92 respondents from the sampled population of 120. IVM serves as a point of study for the research due to its reputation as an innovative African automobile manufacturer with a focus on sustainability. The study allows for an in-depth exploration of the company's strategic decisions, practices, and outcomes within the broader context of the automobile industry and environmental challenges. The population of this study consist of all employee of Innoson Vehicles Manufacturing (IVM) Company, Nnewi, Anambra State. IVM has population of 224 workforce scattered across twenty-two (22) departments. With the knowledge that the area of concentration is technical and academic, the study was limited to a sampling population of the top management staff (15), middle level management staff (30), and knowledge officers (75) making a total of 120 senior cadre personnel. The data generated from the various sources were effectively analyzed using descriptive statistics tools. In the same vein, the hypotheses were equally analyzed using Pearson Product Moment Correlation Coefficient on Statistical Packages for Social Sciences (Version 27) at 5% level of significance.

**Testing of Hypotheses:**

Analyzed data from hypothesis one indicated a significant positive relationship between Market Differentiation implementation and Economic Viability with r = 0.923 (92.3%), n = 92 and p(rho) of 0.026 ($p<0.05$). Therefore, we accept the alternative hypothesis and

conclude that there are significant positive relationship between Market Differentiation implementation and Economic Viability.

Also, the analyzed data from the second hypothesis indicated a significant correlation between Lifecycle Thinking implementation and Environmental Conservation Practices with r = 0.907 (90,7%), n = 92 and p(rho) of 0.021 ($p<0.05$). Therefore, we accept the alternative hypothesis and conclude that Lifecycle Thinking implementation has significant positive relationship with Environmental Conservation Practices.

**Findings:**

The test of the first hypothesis revealed that there is a very strong positive relationship between Market Differentiation implementation and Economic Viability in Innoson Vehicles Manufacturing company with r = 0.923 (92.3%), n = 92, and p(rho) of 0.026 ($p<0.05$). With this statistical result, the alternative hypothesis is accepted indicating a strong positive relationship between market differentiation and economic viability. This finding is in consonant with (Retnaningtyas Widuri and Jennifer Evelin Sutanto, 2019).

The test of the second hypothesis also indicated significant positive correlation between Lifecycle Thinking implementation and Environmental Conservation Practices with r = 0.748 (74.8%), n = 92, and p(rho) of 0.030 ($p<0.05$). With this statistical result, the alternative hypothesis is accepted. This indicated that there is a significant relationship between Technological Advancement implementation and Environmental Conservation Practices. This finding aligns with the submission of (Xudong & Mingjun, 2023).

**Recommendations:**

Based on the analyses of these variables, several recommendations emerged particularly for IVM and other organizations in general to guarantee efficient business practices towards sustainable growth.

- It is hereby recommended that IVM prioritize and invest in market differentiation strategies. By tailoring their products or services to meet specific market demands

and preferences, they can enhance their economic viability and competitiveness in the automotive industry.

- It is also recommended to IVM to adopt lifecycle-thinking practices in order to ensure sustainable environmental for the overall interest of IVM.

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