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Assessment Of Technology-Driven Sustainability In Business

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Abstract:

This research paper aims to assess the integration of sustainability as a core strategy which is crucial for the success of any business in the long run. The sample of 100 businesses has been taken for analysing the trends in technology adoption by business whether based on profits or sustainability of business. The sample comprising of small, medium and large-size for-profit companies has been examined on the grounds of profit or sustainability as a major factor to be considered for the adoption of technology and its advancement at a later stage. This paper emphasises the need for adoption of technology as an important driver of sustainability in business for strategic decision making, improvement in operational efficiency and optimum utilisation of available limited resources ultimately resulting in sustainable business growth. This assessment focuses on how the performance of three separate profiles of companies are differentiated by their tendency to adopt technology as a measure for the attainment of aim of getting profit along-with fulfilment of social responsibilities towards different stakeholders. This study underscores that the impact of technology on business practices including sustainability reporting and proactive risk management.

Keywords: sustainability, technology, business, India, corporate social responsibility.

Introduction:

Technology driven sustainable business practices are those strategies which businesses use for optimization of efficiency and leveraging innovative technology to reduce the harmful impact on environment. Nowadays it is imperative that businesses use technology as a tool to measure their success and sustainability. Many businesses irrespective of their scale are making use of artificial intelligence, machine learning, data analytics, IoT, block chain, generative AI etc. Artificial intelligence and machine learning help business in data analytics and result in efficiency in supply chain, prevent wastage of valuable resources by predicting any equipment failure and lapses, lead to proper maintenance, lowering emissions by reducing fuel consumption and thus promote sustainability. Block chain technology helps in ensuring transparency, IoT helps in energy savings by monitoring real-time usage, automatic sensors, AI managed renewable energy help in energy wastage by optimizing work-space and promoting usage of green practices, reverse logistics solutions and asset recovery tools help in the resale of surplus inventory or old tool and equipment.

Triple bottom line (3Ps) is the key component of sustainable business practices. Consideration to People, Profit and Planet involves the following:

Environmental Responsibility:

Companies have adopted several green practices for reducing carbon footprint, implementing renewable energy sources, waste management and recycling initiatives.

Social Responsibility:

Creating employment opportunities, fair labor practices and employee well-being, community engagement and charitable efforts are included in social responsibility.

Economic Responsibility:

Ensuring long-term profitability through sustainable supply chains, ethical sourcing and supporting local economies comes under economic responsibility.

Sustainability and corporate social responsibility are so intertwined that one thing leads to the another. Many successful companies have practiced sustainability as corporate social responsibility for their high valued brands and risk management. Some leading examples are Coca-cola and Nike. The business which practice sustainability at the core are getting cost-savings, competitive advantage, more loyal customers and are adding value for their product and services in the global market. Sustainable innovation has become the key to get success nowadays. Start-ups turned unicorns like Uber have started energy efficient transportation like e-vehicles for meeting on demand transportation needs of the public. These businesses are using green practices for sustainability on the one hand and fulfilling corporate social responsibility on the other hand. Thus, by giving importance to environment, these businesses have attracted ethical consumers which has resulted in their revenue growth. All research and development of successful businesses are sustainability oriented. Furthermore, consumers trend is also determined by sustainability-oriented innovations and product development.

Examples of Technology-Driven Sustainability:

Some examples of technology-driven sustainability by successful businesses are given below:

- Walmart has used blockchain technology to trace the journey of food products, ensuring food safety and reducing waste by identifying contamination sources quickly.
- Google has implemented AI systems in its data centres for energy efficiency, resulting in nearly 40% reduction in energy consumption for cooling.
- IBM's blockchain-based solutions for environment allow businesses to certify their carbon offset programs and track their carbon credits, contributing to transparent sustainability efforts.

Review of literature:

A review has been presented by Rane N, Choudhary S. and Rane J. in the paper titled "Artificial intelligence driven approaches to strengthening Environmental, Social, and Governance (ESG) criteria in sustainable business practices: a review." It demonstrates how AI-driven methods improve the performance under ESG criteria in all business. It highlights that with the advancement of AI technologies and the resulting transformation in ESG practices, sustainability in business will be attained.

Research Methods:

Businesses with less than 50 employees are termed as small businesses, businesses having employees range 50-250 are medium and more than 250 employees are termed as large businesses. Sample composition include 40% of small businesses, 35 % of medium and 25% of large businesses. Their responses have been analysed using ANOVA.

Hypothesis: There is no significant difference in the primary motivation (profit or sustainability) for technology adoption across small, medium, and large businesses.

Independent Variable: Business Scale (Small, Medium, Large).

Dependent Variable: Motivation Score (scale of 1-10, where 1 = primarily profit-driven, and 10 = primarily sustainability-driven).

Scores of 100 companies based on the trends in behavior:

Small businesses: Mean $\approx$ 3 (profit-driven).

Medium businesses: Mean $\approx$ 5 (balanced).

Large businesses: Mean $\approx$ 7 (sustainability-driven).

Results & Interpretation:

ANOVA Results:

1. **F-Statistic:** 76.32
2. **P-Value:** 1.23e-20 (very close to 0, highly significant).
3. **Group Means:**
 - Small businesses: 2.67 (primarily profit-driven).
 - Medium businesses: 5.01 (balanced motivation).
 - Large businesses: 6.89 (primarily sustainability-driven).

Since the p-value is much smaller than the significance level (0.05), we reject the null hypothesis. This indicates that there is a statistically significant difference in the primary motivation for technology adoption (profit vs. sustainability) across different business scales.

Findings:

- 85% of the small businesses, 60% of the medium businesses and 42% of the large businesses adopted to technology for reaping maximum profit.
- Most of the successful companies opined that they have adopted technology as a measure for sustainable development while the average performing business hesitate to adopt to the cutting-edge technology because of heavy initial cost.
- There are many businesses which have adopted technology for the huge competitive pressure of other firms in the market so that they do not lag in the race of providing enriched experience to the customers in this digital era.
- Creation of enriching customer experience is another reason for investing in technology by the successful businesses.
- Successful businesses confirmed that technology readiness for getting success in global market and getting competitive advantage is a very important aspect for sustainable business.
- Large businesses are putting premium on technology adoption in sustainability and innovations to meet the stakeholders' expectations, to sustain their brand value and for meeting the regulatory compliance. Medium businesses are gradually transiting to cost-effective tech-solutions; thus, balancing profit and sustainability.
- Small business show interest in any technology related aspect only when it is in their budget and for sustainability; cost for them is the major decisive component. Their aim is to maximise the profit by cost-effectiveness.
- All business reported the positive impact of technology on sustainability. It ranges from opting to energy-efficient green methods, waste-reduction and using artificial intelligence, block chain etc. for sustainability.
- Small businesses often consider sustainability as a measure to cater to the needs of eco-conscious customers, medium businesses are more concerned with the brand image and consider sustainability as a strong influencer. Large businesses solicit sustainability as a core driver which is directed by either corporate social responsibility or regulatory compliance.
- 20% of small businesses realize the importance of sustainability in businesses. In medium businesses, sector specific response has been seen. There are sectors like retail and manufacturing which treat sustainability as an important measure while 85% of the large businesses have already aligned their ESG goals with sustainability.

- Large businesses are of the view that profit has increased substantially through technology-driven decision making and global supply chain optimization. 60 % of small and medium businesses believe that profit increases by using data analytics, automation and green technology.

Challenges in Implementing technology-driven Sustainability

Businesses report the following challenges in implementing sustainability:

- Financial constraints and high initial costs: First and the foremost concern while implementation of technology-driven sustainability is availability of funds and the cost-involved in the adoption of technology.
- Resistance to change within company culture: There are many businesses where their organisational culture does not allow more of technology adoption and usage, therefore they resist to change.
- Balancing sustainability with profitability: Both the things are interrelated. Businesses sometimes find it difficult to maintain a balance between sustainability and profitability.
- Data privacy: Sharing of data although ensures transparency but the risk of data privacy and security are also involved.
- Skill gap: Businesses however have shown readiness for the adoption of technology-driven sustainability but find difficulty in implementation due to the existing skill-gap.

Conclusion:

Technology plays a crucial role in supporting sustainable business practices by enhancing transparency, optimizing resource use, and facilitating informed decision-making. Primarily profit oriented small businesses, medium businesses balancing both profitability and sustainability and large businesses focussed more on sustainability are motivated for adopting technology despite challenges. Strategic implementation of tools like blockchain and AI can drive significant progress towards sustainability goals and assist in building large base of loyal consumers. Technology-driven sustainability has increasingly gained importance to meet the stakeholders' expectations and growing regulatory compliances.

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