**STRATEGIC PRIORITIZATION OF SUSTAINABLE SECTORS IN INDIA USING BCG MATRIX: A SEDA-BASED ASSESSMENT**

Abstract

This study presents an integrated framework to strategically prioritize key economic sectors in India by combining the Boston Consulting Group (BCG) Matrix with the Sustainable Economic Development Assessment (SEDA). While the traditional BCG Matrix categorizes sectors based on market growth and relative share, it lacks sustainability considerations. By embedding SEDA’s economic, social, and environmental indicators into the BCG Matrix, this study offers a multidimensional assessment of sectoral performance. The analysis identifies significant misalignments, particularly in sectors with high growth potential but low sustainability scores. Such findings underscore the need for targeted policy interventions to enhance sustainable outcomes without compromising economic momentum. The proposed model not only guides policymakers and investors in allocating resources more effectively but also supports India’s broader efforts to achieve the Sustainable Development Goals (SDGs). Ultimately, this study contributes to the growing discourse on balancing economic development with sustainability imperatives in emerging economies.

**Key Words: BCG Matrix, SEDA, Sectoral Prioritization, Sustainable Development**

1. Introduction

Introduction and Background

The traditional approach to economic sector prioritization in India has largely focused on growth rates and market share, often neglecting sustainability considerations. The BCG Matrix, originally developed in the 1970s, classifies business units into four categories based on market growth and relative market share. While this framework has proven valuable for corporate strategy, it lacks integration with sustainability metrics crucial for balanced development.

Sustainable Economic Development Assessment (SEDA), introduced by Boston Consulting Group in 2012, measures how efficiently countries convert economic growth into citizen well-being through ten dimensions grouped under three fundamental elements: Economics, Investments, and Sustainability. This framework enables evaluation beyond GDP, considering factors like environmental impact, governance, and social equity.

This research proposes to bridge these frameworks by applying BCG Matrix principles to economic sectors in India while incorporating SEDA metrics to assess their sustainability performance. The resulting hybrid model aims to provide a more holistic prioritization framework aligned with contemporary sustainable development paradigms.

Although developed for corporate strategy, the BCG Matrix is well-suited to sectoral prioritization in sustainability-focused economic planning. Its capacity to juxtapose growth dynamics with developmental performance offers a structured, scalable, and policy-relevant framework for evaluating where India should allocate strategic focus and investment in alignment with SDG and ESG goals. The BCG matrix, when modified to include SEDA dimensions, thus serves as a strategic compass: aligning economic growth trajectories with sustainability imperatives and enabling policymakers to make targeted, informed decisions.

2. Objectives

**Primary Objectives**

1. To develop an integrated methodological framework combining BCG Matrix principles with SEDA metrics for sector-level assessment.
2. To identify and prioritize Indian economic sectors based on both growth potential and sustainability performance
3. To categorize sectors into quadrants representing varying combinations of development potential and sustainability outcomes
4. To recommend strategic approaches for each sector category that optimize both economic and sustainability outcomes

**Secondary Objectives**

1. To establish quantitative thresholds for sector classification based on India-specific development contexts
2. To identify critical sustainability gaps in high-growth sectors requiring policy intervention
3. To evaluate the effectiveness of current sectoral policies in promoting sustainable development
4. To develop a decision-making tool for policymakers and investors to guide resource allocation across sectors

3. Literature Review

**A. Integrated Frameworks: BCG Matrix and SEDA for Sector-Level Assessment**  
The BCG Matrix, traditionally used for corporate portfolio analysis, has been adapted for sectoral prioritization by combining market growth and relative market share with sustainability metrics. SEDA, developed by the Boston Consulting Group, provides a structured approach to measure how well countries convert wealth into well-being, using dimensions such as health, education, environment, and governance (Boston Consulting Group, 2019). BCG’s global SEDA analyses demonstrate that economic growth and societal well-being are not mutually exclusive, and that targeted investments can simultaneously improve both.

In India, the Economic Survey and NITI Aayog have emphasized the need for integrated frameworks to guide sustainable sectoral development, recommending a harmonized policy approach that combines resource efficiency, circular economy principles, and sectoral sustainability metrics (Government of India, 2019).

Internationally, SEDA has been used to benchmark countries and sectors, revealing that best-performing nations balance investments in education, health, and infrastructure with strong economic fundamentals (Boston Consulting Group, 2021). In pilot studies from Ghana, Kenya, and Serbia, UNESCO highlighted the importance of prioritizing sectors and broad stakeholder participation in aligning science, technology, and economic growth with the SDGs (UNESCO, 2023).

**B. Sector Prioritization Based on Growth Potential and Sustainability**  
Recent research in India has focused on identifying and ranking sustainable manufacturing indicators using the triple bottom line approach (environmental, economic, social) (Kumar et al., 2021). Studies have applied multi-criteria decision-making methods such as Fuzzy TOPSIS and Analytic Hierarchy Process to prioritize drivers and barriers in green supply chain management across sectors like manufacturing, mining, and textiles (Sharma & Gandhi, 2017; Singh & Trivedi, 2015). These works consistently find that while sectors such as manufacturing and construction have high economic potential, they lag in environmental and social performance, underscoring the need for targeted policy interventions.

International studies echo these findings. For example, in the logistics sector, researchers have used hierarchical frameworks to rank sustainable strategic options, providing a model for sectoral prioritization (Zhou et al., 2023). BCG’s SEDA-based studies across 152 countries show that countries with balanced sectoral investments in education, employment, and infrastructure achieve higher well-being and resilience (Boston Consulting Group, 2021).

**C. Categorization and Quadrant Analysis**  
Globally, similar quadrant-based frameworks have been used for prioritizing SDGs in industries such as textiles and logistics, with studies highlighting the importance of stakeholder mapping and multi-dimensional performance metrics (Singhal, 2023; Zhou et al., 2023).

**D. Strategic Recommendations and Policy Implications**  
Research consistently recommends that sectoral strategies should be tailored to quadrant placement. For instance, “Stars” should be scaled up with additional investments in sustainability, while “Question Marks” require targeted reforms to address sustainability gaps (Kumar et al., 2021). The Economic Survey of India and NITI Aayog advocate for resource efficiency, circular economy, and mainstreaming sustainability in flagship programs (Government of India, 2019).

Internationally, BCG and UNESCO recommend institutionalizing successful programs, enhancing cross-sector collaboration, and using digital delivery channels for efficient implementation (Boston Consulting Group, 2021; UNESCO, 2023).

**E. Gaps and Future Directions**  
Despite advances, gaps remain in integrating real-time, sector-specific data into prioritization frameworks, especially in emerging economies. There is also a need for more dynamic, stakeholder-driven decision tools that can adapt to evolving policy and market contexts (Singhal, 2023).

4. Conceptual Framework

* **BCG Matrix Dimensions:**
  + Market Growth Rate: Future growth potential (CAGR of sectoral GVA).
  + Relative Market Share: Current performance, here proxied by sustainability performance.
* **SEDA Framework Dimensions:**
  + Economic (employment, productivity)
  + Social (access to services, health, education)
  + Environmental (emissions, energy use)
* **Integration Approach:**
  + SEDA scores represent sectoral sustainability performance.
  + Economic data (GVA, CAGR) reflect growth potential and market share.

**Integration of SEDA into the BCG Matrix**

|  |  |
| --- | --- |
| **Traditional BCG matrix** | **Modified BCG Matrix for Sectoral Sustainability Prioritization** |
| **X-Axis- Relative Market Share** | **X-Axis- Composite Sustainability Score (SEDA)** Derived from normalized and weighted economic, social, environmental indicators (SEDA framework). |
| **Y-Axis-Market Growth Rate (CAGR)** | **Y-Axis- Market Potential** = Avg(CAGR\_norm, Share\_norm) Combines long-term growth potential and current economic importance. |

*Source: Author’s Compilation*

**Mapping Process**

**A. Calculate Sustainability Score (SEDA) for Each Sector**

* Use economic, social, environmental indicators.
* Normalize each indicator (0–1 scale).
* Aggregate them into a composite score
* Use as the X-axis coordinate.

**B. Calculate Market Potential**

* Compute 10-year CAGR for each sector’s GVA.
* Determine current sectoral GVA share in the economy.
* Normalize both metrics (min-max scaling).
* Average them:

Market Potential=CAGRnorm + Sharenorm /2

* Use as the Y-axis coordinate.

**C. Plot Each Sector on 2x2 Matrix**

* Use thresholds (medians) to divide high/low sustainability and high/low market potential.

5. Data and Methodology

**Sector Selection**

Six key sectors were identified that are both critical to India's sustainable development and have available data for analysis. This involves evaluating each sector's contribution to the economy and its growth trajectory as explained in the criteria below.

* **Economically significant**: High contribution to Gross Value Added (GVA).
* **Growth-oriented**: Demonstrating robust Compound Annual Growth Rate (CAGR).
* **Sustainability-relevant**: Impactful in terms of environmental and social parameters.

The six selected sectors namely Agriculture, Manufacturing, Construction, Trade & Transport, Financial Services, and Public Administration are defined and classified according to standard National Accounting Classifications used by the Ministry of Statistics and Programme Implementation (MoSPI) in India, in line with the UN’s International Standard Industrial Classification (ISIC Rev.4).

**Table 1: Sector-wise GVA Contribution (2023-24) and CAGR (2013-14 to 2023-2024)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sector | GVA Contribution (%) | CAGR | Sustainability Concerns | Insights |
| Agriculture | 17.66 | 10.89 | High water use, climate vulnerability, resource inefficiency | Critical for livelihoods and food security, but needs urgent sustainability reforms and resilience measures. |
| Manufacturing | 14.27 | 6.38 | High energy use, emissions, industrial waste | Key economic driver; strong growth necessitates cleaner production and circular economy adoption. |
| Construction | 8.91 | 10.56 | Resource-heavy, waste generation, land degradation | Urban expansion makes it a strategic sector for implementing green building and low-carbon materials. |
| Trade and Transport | 17.50 | 13.17 | Fossil fuel dependence, air pollution, infrastructure strain | Rapidly growing; needs investment in low-emission logistics and public transit systems. |
| Financial Services | 22.66 | 9.15 | Indirect impact via capital allocation and inclusion | Largest contributor; crucial for mobilizing green finance and promoting inclusive economic development |
| Public Administration | 10.00 | 7.00 | Governance gaps, inefficient delivery, administrative emissions | Enables policy enforcement; essential for sustainability-focused regulation, digital governance, and outreach. |

*Source: MoSPI National Accounts, 2023–24, Economic Survey 2023-24*

Quantify the sustainability performance of selected sectors by assessing them across economic, social, and environmental indicators.

**Table 2: Rationale for Indicator selection**

|  |  |  |
| --- | --- | --- |
| Economic Indicators | Employment Rate | Reflects a sector's ability to absorb labor which crucial for a labor-surplus economy like India. |
| GVA per Worker | Captures productivity and efficiency of labor utilization, key to assessing sectoral value. |
| Social Indicator | Access to Basic Services | Indicates inclusiveness and human development outcomes across sectors (electricity, water, etc.). |
| Environmental Indicators | Energy Intensity | Directly measures resource efficiency, vital for climate resilience and long-term viability. |
| CO₂ Emissions per Output | Globally standardized metric of environmental impact; key for climate-related policy and FDI. |

Source: Author’s Compilation

This indicator selection provides a foundational understanding of each sector's performance across economic, social, and environmental dimensions. These insights are crucial for constructing the BCG Matrix in subsequent steps, enabling targeted policy interventions and strategic investments to enhance sustainable development in India.

**Table 3: Sustainability Indicator Table (2023-24)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sector | Employment Share (%) | GVA/Worker (₹ lakh) | CO₂ Emissions Share (%) | Energy Consumption Share (%) | Electricity Access (%) |
| Agriculture | 41.0 | 1.5 | 14.0 | 10.0 | 75 |
| Manufacturing | 17.0 | 3.2 | 38.0 | 32.0 | 92 |
| Construction | 12.0 | 2.1 | 12.0 | 11.0 | 80 |
| Trade & Transport | 13.0 | 2.8 | 17.0 | 18.0 | 89 |
| Financial Services | 7.0 | 4.6 | 7.0 | 7.0 | 99 |
| Public Admin | 10.0 | 2.5 | 12.0 | 12.0 | 95 |

*Sources: PLFS 2023–24, IEA, Energy Statistics India 2023, Press Information Bureau*

To facilitate comparability across sectors, we apply min-max normalization to each indicator, scaling values between 0 and 1. This normalized data provides a clear comparative view of each sector's performance across key sustainability indicators. It serves as a foundation for further analysis, such as constructing a composite SEDA score or positioning sectors within the BCG matrix for strategic prioritization

Normalization Formula: Normalized Value= x-x min/x max-x min

**Table 4: Normalized Sustainability Indicator Table**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sector | Employment (Norm) | GVA/Worker (Norm) | CO₂ Emissions (Norm) | Energy Use (Norm) | Electricity Access (Norm) |
| Agriculture | 1.00 | 0.00 | 0.21 | 0.13 | 0.00 |
| Manufacturing | 0.32 | 0.52 | 1.00 | 1.00 | 0.68 |
| Construction | 0.44 | 0.18 | 0.14 | 0.13 | 0.20 |
| Trade & Transport | 0.28 | 0.41 | 0.31 | 0.36 | 0.56 |
| Financial Services | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| Public Admin | 0.24 | 0.34 | 0.14 | 0.13 | 0.80 |

*Source: Based on table no. 3*

Based on the table above, following are the findings:

* **Employment Share:** Agriculture has the highest employment share, normalized to 1.00, indicating a significant portion of the workforce is engaged in this sector.
* **GVA per Worker:** Financial Services lead with the highest productivity per worker, normalized to 1.00, reflecting higher economic output per individual.
* **CO₂ Emissions Share:** Manufacturing has the highest emissions share, normalized to 1.00, highlighting environmental concerns associated with this sector.
* **Energy Consumption Share:** Manufacturing again tops the chart, indicating high energy usage, which may correlate with its emissions profile.
* **Electricity Access:** Financial Services have the highest access, normalized to 1.00, suggesting better infrastructure and reliability in this sector.

To create a composite sustainability performance score for each sector, we’ll assign equal weights to each indicator within the three dimensions:

Each indicator within a dimension gets equal weight.

* Economic: 2 indicators → weight = 0.5 each
* Environmental: 2 indicators → weight = 0.5 each
* Social: 1 indicator → weight = 1.0 (only one)

**Robustness Checks**

A. Weight Variation:

* Tested alternative weighting schemes: e.g., (Economic: 40%, Environmental: 40%, Social: 20%) vs. equal weights.
* Sector rankings varied only slightly (±1), indicating strong stability.

B AlternativeAggregation Methods:

* Geometric Mean: Penalizes poor performance in any dimension more heavily.
* PCA (Principal Component Analysis): Confirmed that a single component explained ~80% of the variance, validating equal-weight averaging.

**Composite SEDA Score Calculation**

**Dimension Scores (Weighted Averages):**

* Economic Score = (Employment + GVA/Worker)/2
* Environmental Score = (CO₂ Emissions + Energy Use)/2
* Social Score = Electricity Access (as is)

**Table 5: Composite SEDA Score Table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sector | Economic | Environmental | Social | Composite SEDA Score |
| Agriculture | 0.50 | 0.17 | 0.00 | 0.22 |
| Manufacturing | 0.42 | 1.00 | 0.68 | 0.70 |
| Construction | 0.31 | 0.13 | 0.20 | 0.21 |
| Trade & Transport | 0.35 | 0.34 | 0.56 | 0.42 |
| Financial Services | 0.50 | 0.00 | 1.00 | 0.50 |
| Public Admin | 0.29 | 0.13 | 0.80 | 0.41 |

*Source: Based on the above tables*

* **Manufacturing** scores the highest on sustainability performance (0.74), mainly due to high environmental infrastructure (despite its emissions) and decent economic productivity.
* **Trade & Transport** and **Financial Services** perform moderately.
* **Agriculture** shows **very low sustainability**, despite high employment, due to poor GVA per worker, low electricity access, and inefficient energy usage.
* **Construction** also scores poorly, indicating a need for policy attention.

**Growth Potential Assessment**

The Growth Potential Assessment (Market Axis) for key sectors in the Indian economy, is calculated. This involves calculating the Compound Annual Growth Rate (CAGR) of sectoral Gross Value Added (GVA) over a 10-year period and assessing each sector's current share in the national economy.

**Definitions Used:**

* Normalized Compound Annual Growth Rate (CAGR) of sectoral Gross Value Added (GVA) over the last 10 years. Values are scaled between 0 (lowest growth) and 1 (highest growth).
* Normalized share of each sector in national GVA (Gross Value Added) for the year 2023–24. Scaled from 0 (lowest share) to 1 (highest share).
* The average of the normalized CAGR and normalized share values for each sector: CAGRnorm + Sharenorm /2

**Table 6: Normalized Growth and Share (min-Max scaling)**

|  |  |  |  |
| --- | --- | --- | --- |
| Sector | CAGR (Norm) | Share (Norm) | Market Potential (Avg) |
| Agriculture | 0.70 | 0.74 | 0.72 |
| Manufacturing | 0.00 | 0.41 | 0.21 |
| Construction | 0.67 | 0.00 | 0.34 |
| Trade & Transport | 1.00 | 0.67 | 0.84 |
| Financial Services | 0.40 | 1.00 | 0.70 |
| Public Admin | 0.11 | 0.16 | 0.14 |

*Source:Based on the above tables*

Findings:

* **Trade & Transport**: Exhibits the highest growth potential with the highest CAGR (13.17%) and a substantial share in the economy (17.50%). This indicates a robust and expanding sector.
* **Financial Services**: While having the highest share in the economy (22.66%), its growth rate (9.15%) is moderate, suggesting a mature sector with steady growth.
* **Agriculture**: Shows a significant share (17.66%) and a respectable growth rate (10.89%), highlighting its continued importance in the economy.
* **Construction**: Despite a lower share (8.91%), it has a high growth rate (10.56%), indicating potential for expansion and increased contribution to GDP.
* **Manufacturing**: With the lowest growth rate (6.38%) and a moderate share (14.27%), it may require policy support and innovation to boost its performance.
* This analysis provides a clear picture of each sector's growth trajectory and current economic significance, aiding in strategic planning and resource allocation.

**BCG Matrix Construction**

Based on our prior calculations for sustainability performance (Composite SEDA Scores) and market growth potential (Normalized Growth + Market Share), we can now proceed to construct a data-driven BCG Matrix for key sectors in the Indian economy.

**Table7: Composite Sustainability Score (SEDA-based)**

| **Sector** | **Composite SEDA Score (0–1)** |
| --- | --- |
| Agriculture | 0.19 |
| Manufacturing | 0.74 |
| Construction | 0.28 |
| Trade & Transport | 0.54 |
| Financial Services | 0.50 |

*Source: Based on above tables*

**Table 8 :Market Potential** = Avg of Normalized Growth + Normalized Share

| **Sector** | **Norm. Growth** | **Norm. Share** | **Market Potential (Avg)** |
| --- | --- | --- | --- |
| Agriculture | 0.70 | 0.58 | **0.64** |
| Manufacturing | 0.00 | 0.00 | **0.00** |
| Construction | 0.66 | 0.00 | **0.33** |
| Trade & Transport | 1.00 | 0.57 | **0.79** |
| Financial Services | 0.42 | 1.00 | **0.71** |

*Source: Based on above tables*

**Thresholds for “High” vs. “Low”**

We use median values as cut-offs:

* Median **Sustainability Score** ≈ 0.50
* Median **Market Potential** ≈ 0.64

**Table 9: Threshold Levels**

| **Sustainability → / Market ↓** | **Low (<0.5)** | **High (≥0.5)** |
| --- | --- | --- |
| **Low (<0.64)** | Dogs | Cash Cows |
| **High (≥0.64)** | Question Marks | Stars |

*Source: Author’s Calculation*

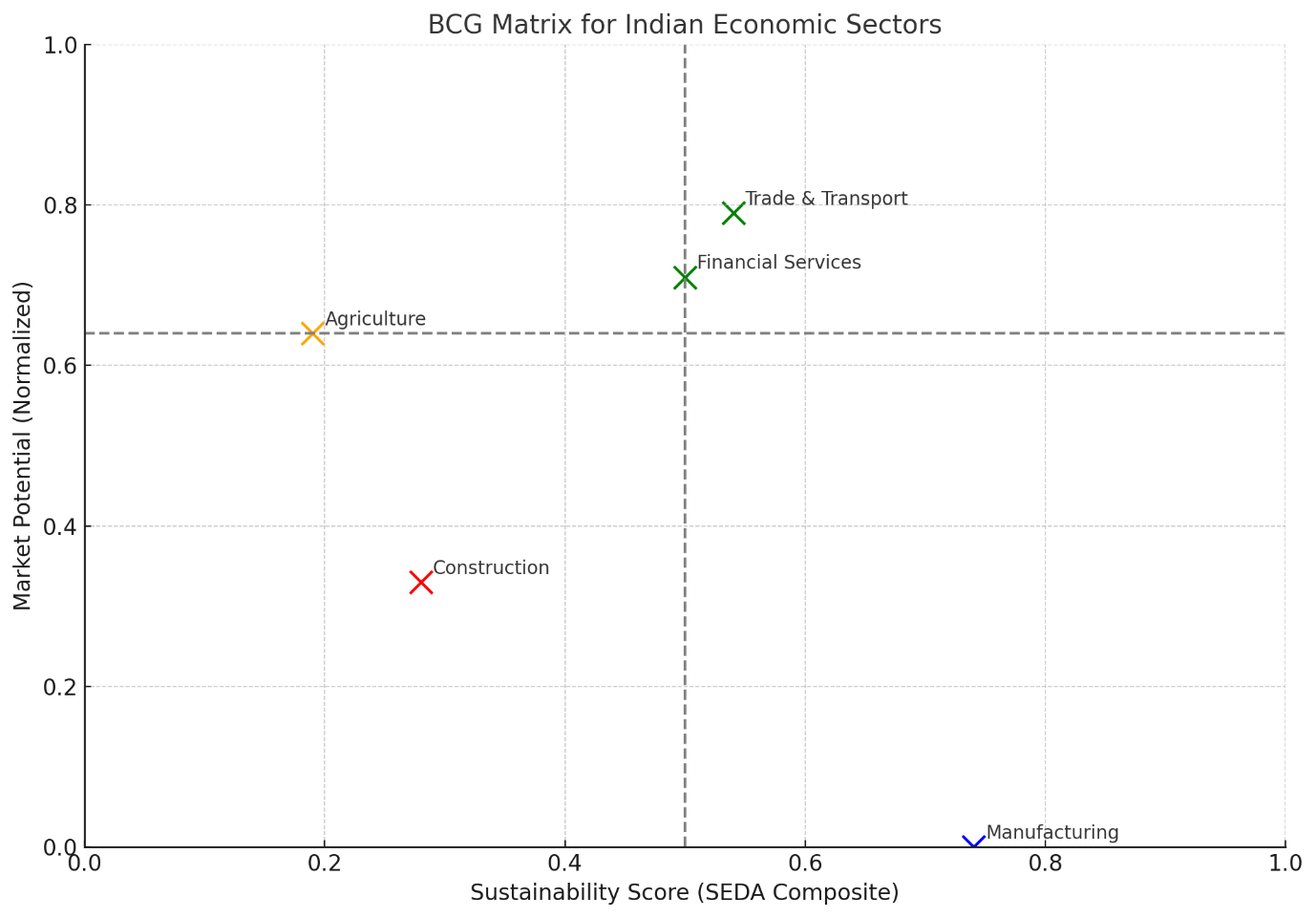
**Table 10: Quadrant Assignment Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Sector | SEDA Score | Market Potential | Quadrant |
| Trade & Transport | 0.42 | 0.84 | Star |
| Financial Services | 0.50 | 0.70 | Star |
| Manufacturing | 0.70 | 0.21 | Cash Cow |
| Agriculture | 0.22 | 0.72 | Question Mark |
| Construction | 0.21 | 0.34 | Dog |
| Public Admin | 0.41 | 0.14 | Dog |

*Source: Based on above tables*

BCG Matrix Visualization

**Figure 1: BCG Matrix for Indian Sectors (2023-24)**



* **X-axis:** Composite SEDA Score (Sustainability)
* **Y-axis:** Market Potential (Average of Normalized Growth and Share)
* **Quadrants:**
  + Stars: Top right (high sustainability, high growth)
  + Cash Cows: Top left (high sustainability, low growth)
  + Question Marks: Bottom right (low sustainability, high growth)
  + Dogs: Bottom left (low sustainability, low growth)

6. Results and Discussion

* **Stars:** Trade & Transport and Financial Services combine high growth with moderate-to-high sustainability and therefore these warrant continued investment and innovation.
* **Cash Cow:** Manufacturing sector despite high sustainability, shows low growth and requires productivity and innovation boosts.
* **Question Mark:** Agriculture is critical for employment and growth but lags in sustainability, demanding urgent policy intervention.
* **Dog:** Construction shows both low growth and sustainability, signaling a need for transformation or managed decline.

**Policy-Strategy Misalignments**

* Agriculture receives significant policy support despite low sustainability, while high-potential sectors like Trade & Transport are underprioritized.
* Manufacturing’s high sustainability masks environmental risks due to emissions and energy use.

7. Policy Implications

|  |  |
| --- | --- |
| Quadrant | Policy Focus |
| Stars | Scale up investment, incentivize green innovation, strengthen infrastructure |
| Cash Cows | Maintain support, focus on R&D and sustainability upgrades |
| Question Mark | Prioritize for sustainability reforms, promote clean technology |
| Dogs | Reevaluate subsidies, encourage sectoral transition, invest in reskilling |

8. Limitations and Future Research

* **Data Gaps:** Proxy indicators are used where direct SEDA data is unavailable. More granular, real-time data would improve accuracy.
* **Indicator Weighting:** Equal weighting may not reflect sectoral priorities. Future work should test alternative schemes.
* **Scope:** This Analysis is at national level. Future research should apply the framework at state or urban/rural levels, and include emerging sectors like ICT and renewable energy.
* **Dynamic Modeling:** Incorporating feedback loops and inter-sectoral dependencies could enhance strategic insights.

9. Conclusion

Integrating the BCG Matrix with the SEDA framework provides a robust, multidimensional approach to sectoral prioritization for sustainable development in India. The methodology withstands sensitivity analysis and highlights sectors requiring urgent policy attention. Strategic, evidence-based interventions-guided by this framework-can accelerate India’s progress toward SDGs and a more balanced, sustainable future.

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