

Optimizing carbon emission in supply chains



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Problem Statement

The e-commerce sector faces significant challenges related to rising competition, operational inefficiencies in supply chain management, high customer acquisition costs, and increasing demand for sustainability. As a result, businesses need a well-rounded, data-driven strategy to enhance profitability, ensure sustainable operations, and improve customer retention.

Current Issues

- Rising Competition: E-commerce platforms face aggressive competitors and pricing pressure.
- Supply Chain Disruptions: Increasing demand for same-day delivery, complex global supply chains.
- Sustainability: Increasing regulatory and consumer pressure to adopt eco-friendly practices.

Why E-commerce?

- **Rapid Growth:** E-commerce has experienced explosive growth, with increasing package deliveries and associated transportation emissions.
- **Last-Mile Delivery Challenges:** The final leg of the delivery process, often involving individual vehicles, contributes significantly to emissions.
- **Packaging and Waste:** E-commerce often leads to excessive packaging and waste generation.

Why E-commerce is a Priority Over Healthcare and Agriculture?

- **Scalability:** The large-scale operations and rapid growth of e-commerce offer significant potential for emissions reduction.
- **Consumer Influence:** E-commerce companies can directly influence consumer behavior and promote sustainable practices.
- **Data Availability:** The vast amount of data generated by e-commerce enables precise analysis and targeted interventions.
- **Centralized Operations:** Unlike healthcare and agriculture, e-commerce often involves centralized operations, making it easier to implement standardized sustainability measures.

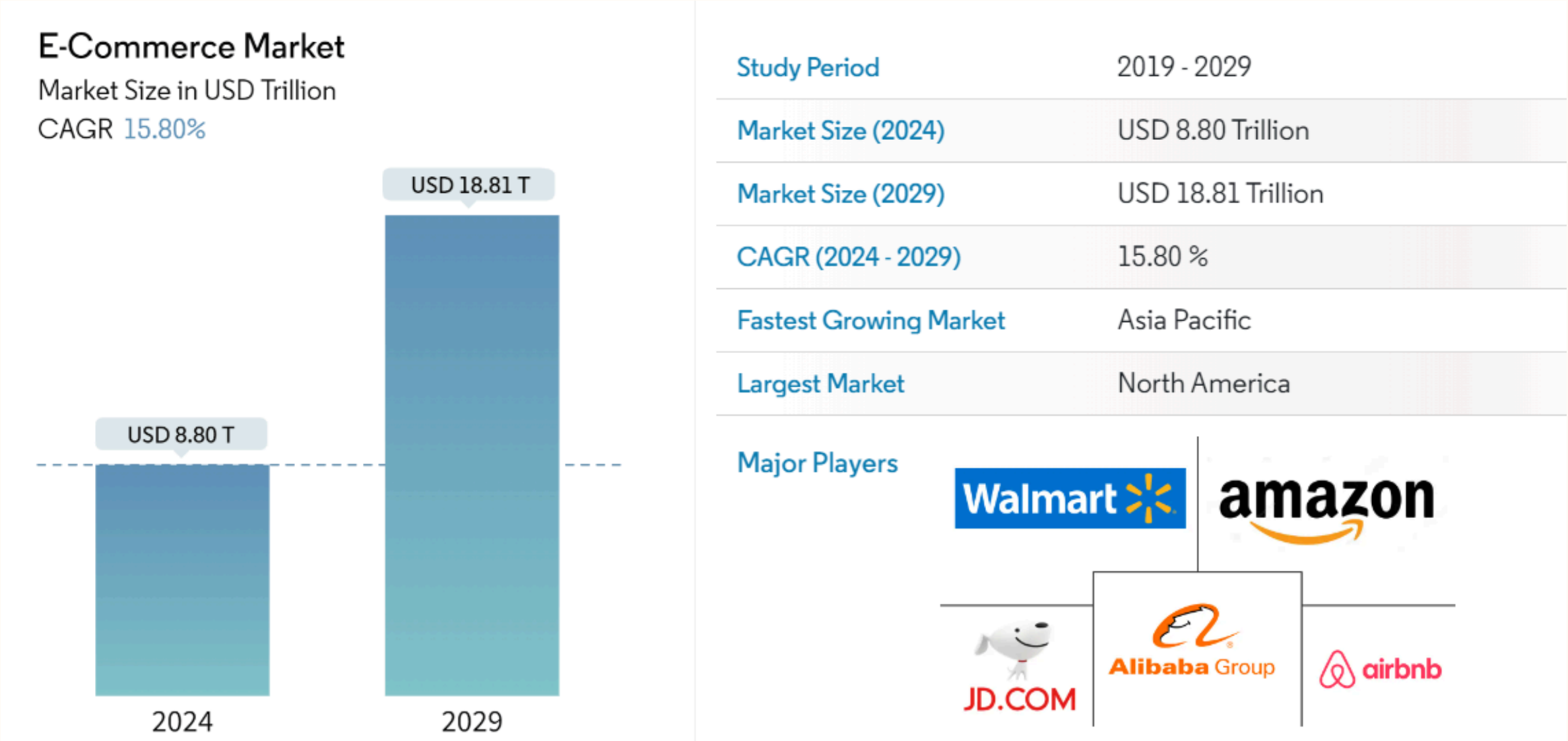
The Growing Environmental Impact of E-commerce Logistics

- **Rapid Growth:** The number of delivery vehicles is projected to increase significantly by 2030, driven by the expansion of e-commerce.
- **Increased Emissions:** The rise in delivery vehicles will lead to a substantial increase in CO2 emissions.
- **Longer Commute Times:** Last-mile deliveries contribute to longer commute times for urban residents.

Conclusion:

The e-commerce sector's growing environmental impact necessitates urgent action. By focusing on sustainability initiatives within e-commerce, we can mitigate the negative effects on our cities and contribute to a more sustainable future. The scalability, consumer influence, and data availability within this sector make it a prime target for environmental improvements.

E-Commerce Market Overview

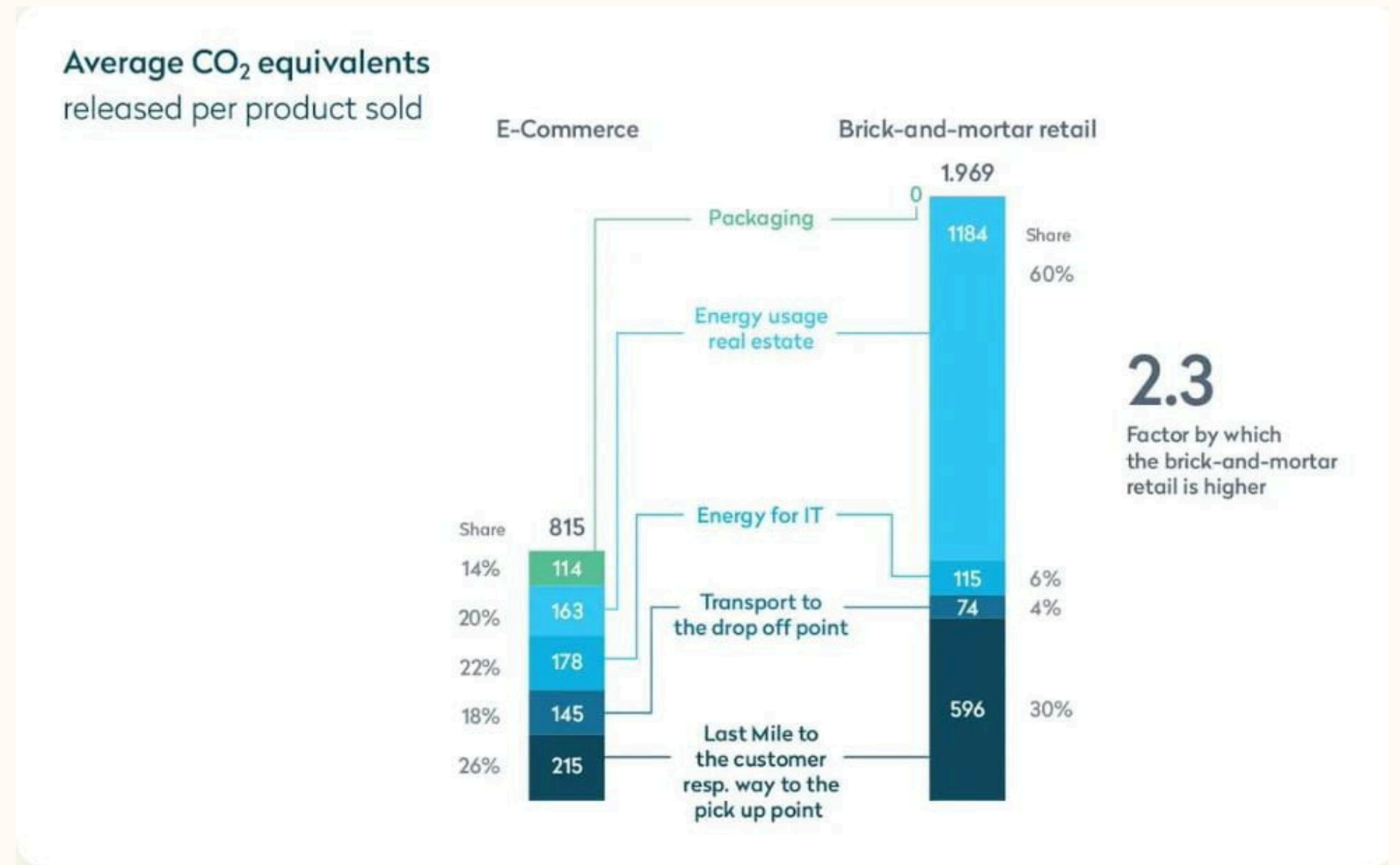


The E-Commerce Market size is estimated at USD 8.80 trillion in 2024, and is expected to reach USD 18.81 trillion by 2029, growing at a CAGR of 15.80% during the forecast period (2024-2029).

Analysis of Supply Chain

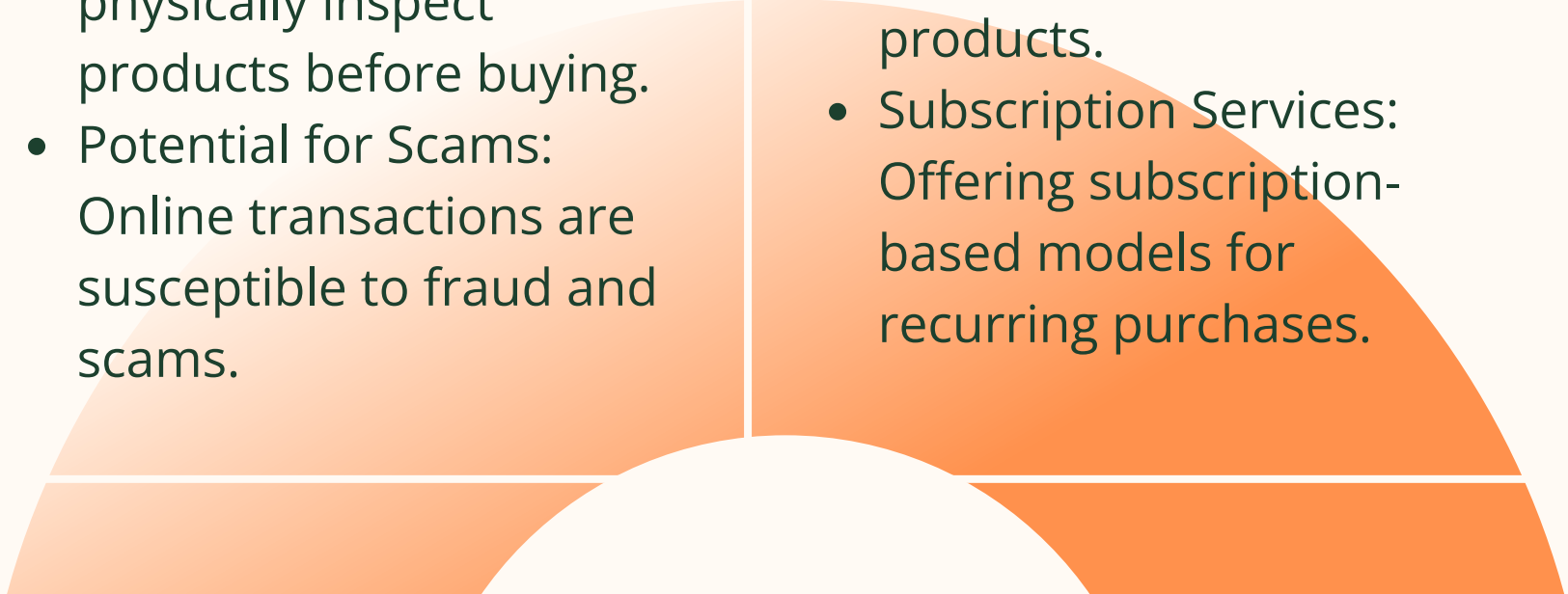
E-commerce, now over 18% of global retail sales, heavily relies on transportation and logistics—the largest GHG emitter in the U.S. at 29%.

“(**Visible** Carbon Footprints) One year of packaging on a global scale is estimated to equal one billion trees or 5000 packages per second.”



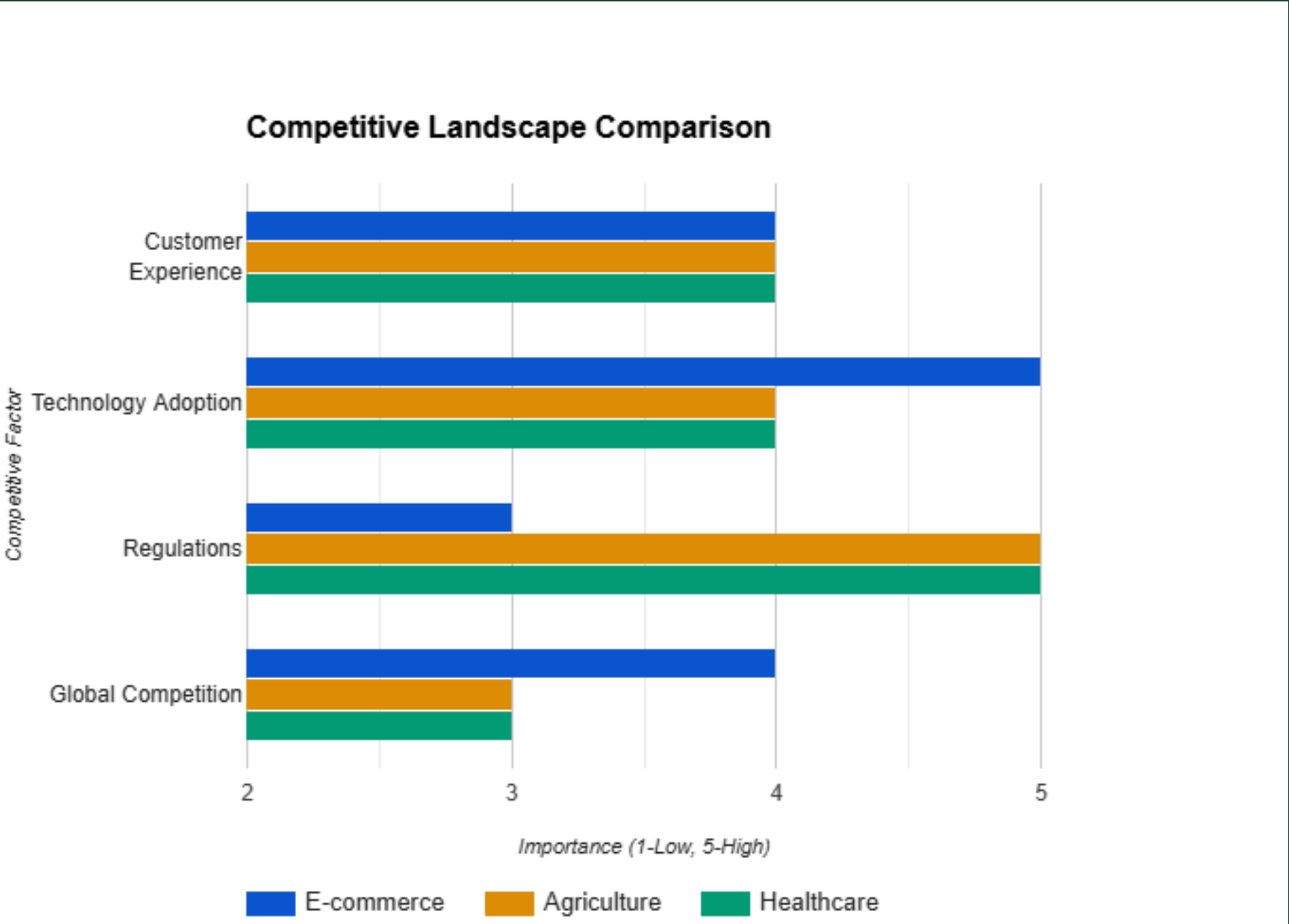
SWOT

S (Strengths)	W (Weaknesses)	O (Opportunities)	T (Threats)
<ul style="list-style-type: none">• 24/7 Availability: Customers can shop anytime, anywhere.• Product Variety: E-commerce platforms offer a vast selection of products.• Price Comparison: Consumers can easily compare prices across different sellers.	<ul style="list-style-type: none">• Return Difficulties: Returning items can be inconvenient, especially for international purchases.• Lack of Physical Touch: Customers cannot physically inspect products before buying.• Potential for Scams: Online transactions are susceptible to fraud and scams.	<ul style="list-style-type: none">• Omnichannel Integration: Combining online and offline channels to create a seamless shopping experience.• Voice Commerce: Using voice assistants to place orders and search for products.• Subscription Services: Offering subscription-based models for recurring purchases.	<ul style="list-style-type: none">• Economic Uncertainty: Economic downturns can reduce consumer spending.• Intense Competition: The e-commerce market is highly competitive, with new players constantly emerging.• Data Privacy Concerns: Increasing concerns about data privacy and security can impact consumer trust.



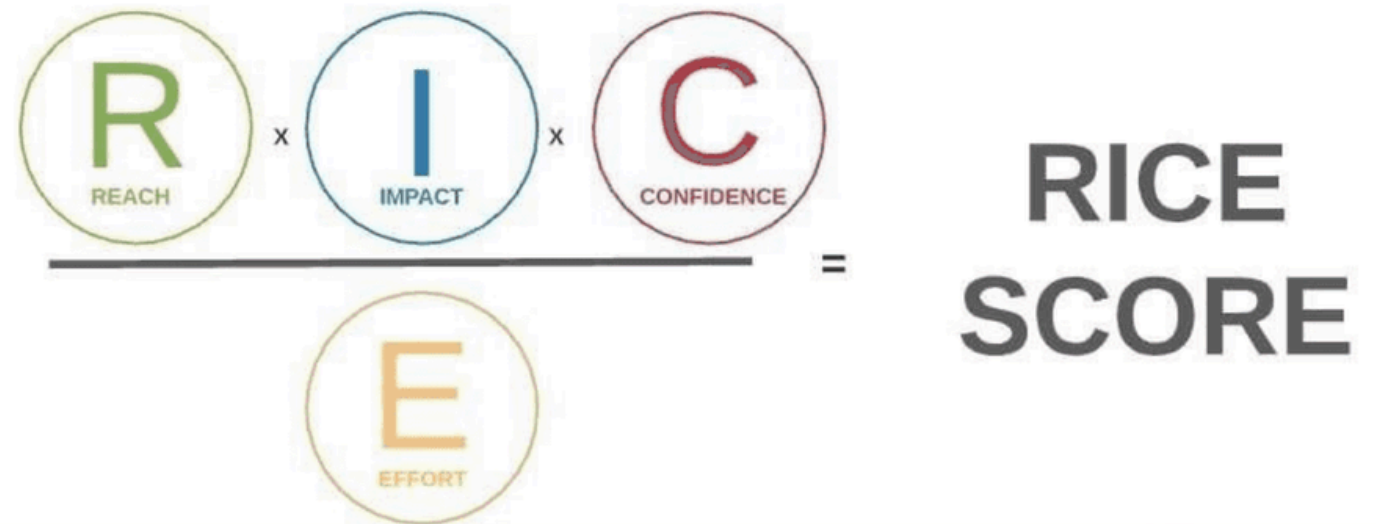
Competitor Analysis

Sector	Carbon Footprint	Sustainable Practices
E-commerce	High	Electric vehicles, eco-friendly packaging, optimized logistics
Agriculture	High	Precision farming, organic fertilizers, renewable energy
Healthcare	Moderate to High	Energy-efficient buildings, telemedicine, waste management



Competitors: E-Commerce, Healthcare, Agriculture
Key Differentiators: Strong focus on sustainability and green logistics.

RICE Scoring for Prioritization



Project	Reach (1-10)	Impact (I)	Confidence (C)	Effort (E)	RICE Score
AI-Driven Personalization	9	5	4	4	45
Green Logistics	7	4	3	5	17
Real-Time Inventory Logistics	8	6	4	3	64
Predictive Analytics for Demand Forecasting	8	7	3	4	42

De-Carbonisation of E-Commerce

Effective decarbonisation strategies for reducing the carbon footprint of e-commerce businesses :-

1. Using sustainable Packaging

2. Monitoring scope 3 emissions(Scope 3 emissions can account for up to 80% of a company's emissions, thus mapping out these indirect emissions created by other businesses and functions within the supply chain is vital)

3. Carbon-neutral delivery services are an essential component of a sustainable e-commerce strategy(Major CCUS hubs are emerging across the globe, providing alternatives for industries struggling to reduce carbon emissions)

For example, the UK expects to capture and store up to 10 million tonnes of CO₂ by 2030 via projects such as those at the Humber industrial cluster in the North of England

Adoption Techniques & Implementation Strategies

1.Digitalisation and delivery services optimisation(Carbon-neutral delivery services are an essential component of a sustainable e-commerce strategy)

2.Adopt green logistics and reduce fulfillment costs.

3.Energy-Efficient Web Hosting: Data centers consume massive amounts of electricity. By choosing a green web host, you can ensure your site is powered by renewable energy sources.

4.Promote Slow Shipping: While next-day deliveries may be convenient, they aren't exactly eco-friendly

References

- Net-Zero Challenge: The Supply Chain Opportunity ([World Economic Forum](#)).
- <https://www.statista.com/topics/8200/sustainability-in-e-commerce/#topicOverview>
- <https://plana.earth/academy/how-to-decarbonise-e-commerce-business>

