

COMPLETION REPORT

Estimating and comparing the tourism carbon footprint between Japan and Taiwan

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The tourism carbon-efficiency comparison of Taiwan and Japan

With the emerging of the global value chains (GVCs), imported products and services play a critical role in the quality and quantity of tourism services. What to import and how much to import thus concerns the trade-offs of maintaining economic prosperity, reducing domestic carbon emissions and improving tourism carbon efficiency at destinations. This study presents an environmentally extended input-output model to assess the distribution of tourism economic and environmental effects in the global segments. We propose that a country's carbon competitiveness rests on two perspectives, including 1) the share of GDP and carbon emissions that are obtained in GVCs, and 2) the carbon efficiency performance per dollar GDP at the destination economy. The first indicator, share of GDP and emissions in GVCs, measures the relative economic welfare a destination can secure and the percentage of the global carbon responsibility. The second indicator, on the hand, reflects the opportunity cost in delivering one dollar of tourism GDP, benchmarking the destination against others. Both measurements document collectively a comprehensive environmental responsibility as well as a country's efficiency in its tourism carbon emissions. These two measurements highlight three essential factors of competitiveness - the ability to convert sales to GDP, the ability to produce tourism services based on minimum energy consumption, and the ability to rely on international trade and services to improve the agglomerated domestic tourism carbon efficiency.

In the example of bilateral travel flow between Taiwan and Japan, there was around 1.3 million visitors travelling from Japan to Taiwan, generating a total of US\$ 2,286 million foreign receipts, of which, 29% was for local lodging expense, 22% for international airfare, 17% for shopping expenses, and 11% for dining in 2011. The 2,286 million spending has a total (direct + indirect) economic impact of 4,463 million in sales, and 2,238 million in value added. The tourism carbon footprint is estimated to be 1597 kilotons of CO₂ globally.

In contrast, around 1 million of Taiwan residents have made the visits to Japan, and their trip expenses were around 1,316 million. The largest share of Taiwanese trip expenses goes to international air fare (30%), followed by shopping (26%), lodging (19%) and dining (14%). This market incurred a direct spending of 1,316 million, generating a total effect of 2,851 million in sales and 1,300 million in value added across the global segments. Their tourism carbon footprint is estimated to be 866 kilotons globally.

In the context of bilateral travel flow between Taiwan and Japan, both regions secure 70% of the tourism GDP from the foreign receipts in the global value chains but Japan outsourced 70% of their carbon footprint to foreign production while Taiwan only outsourced about 40%. In addition, the tourism carbon intensity of Japan is

55% more efficient than the performance of Taiwan (0.27 kg CO₂/GDP vs. 0.60 kg CO₂/GDP). From these perspectives, Japan demonstrates the comparative advantages over Taiwan in terms of its ability to produce a clean and carbon efficient services in domestic tourism production lines as well as to collaborate with foreign suppliers for energy-intensive products and services.

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