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# India's Competitiveness in Digitally Delivered Services Trade: A Comparative Analysis with Global Peers

**Paliwal N[1*]**

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[1*] Neha Paliwal, Assistant Professor, Department of Economics, Mohanlal Sukhadia University, Udaipur, Rajasthan, India.

Digitalisation is transforming the world and has significantly changed the international trade landscape. The share of digitally delivered services (DDS) in trade has increased significantly over the last two decades. This paper aims to analyse India's comparative status in the DDS trade and its competitiveness in the international market. The competitiveness of India's DDS exports is assessed using various indices, such as Revealed Comparative Advantage, Revealed Symmetric Comparative Advantage, International Market Share, Market Share Growth, and Trade Competitiveness Index, and compared with the top 20 DDS exporters worldwide from 2005 to 2024. The paper highlights that India's market share in DDS exports is the fifth largest and has doubled over the past two decades. While India possesses strong competitiveness in this sector, it has experienced a decline in its standing over time. The USA, UK, Ireland, and Germany hold a larger market share, while countries like Luxembourg, Poland, Sweden, the Netherlands, and Spain are showcasing higher growth in their market share compared to India. They are the major competitors of India in DDS exports. India must diversify its export basket and actively seek global partnerships and alliances with other nations to enhance its competitiveness in the global DDS market.

**Keywords:** digitally delivered services (DDS), trade competitiveness, revealed comparative advantage (RCA), market share

**Corresponding Author**

Neha Paliwal, Assistant Professor, Department of Economics, Mohanlal Sukhadia University, Udaipur, Rajasthan, India.

Email: neha.paliwal03@gmail.com

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# 1. Introduction

Digitalisation is spreading its wings across the world, and 15 per cent of the world's GDP accounted for the digital economy in 2024 (International Data Center Authority, 2025). Digitalisation has also reformed the trade of services. The services enabled via electronic networks or technological infrastructure can be traded internationally and are considered under digitally delivered services trade (Ferencz, 2019). Digitally delivered services include: insurance and financial services, telecommunications, computers and information services, intellectual property changes, research and development services, as well as health and education personal services and cultural heritage and recreational services (UNCTAD and WTO). Digitalisation has not only encouraged the digital economy by digitalising services but by creating favourable circumstances for cross-border, suitable, and well-organised international trade; it has also enhanced the growth of trade of DDS and made it a new engine for future trade growth (Li and Wang, 2024). As the digitalisation of services trade has grown rapidly with the innovation of new technologies, the competition among nations regarding the trade of these services has also increased rapidly. The international competitiveness of DDS trade refers to the ability of a country to participate in the competition of DDS trade in the international market and continuously create value added in the production of digital services and increase wealth in the process of trade liberalisation (Feng and Zang, 2022). Every country wants to increase its competitiveness in the international market of DDS.

The advanced countries with high digital infrastructures have a higher share in DDS trade, and the emerging economies have also registered their strong presence in this trade. The developing nations showed a growth rate of 12 per cent in DDS exports in 2025, while developed nations registered only a 9 per cent growth rate (UNCTAD, 2025). It indicates that DDS exports of developing nations are growing faster and the gap between developing and developed nations is reducing. On the other hand, the gap between a few more successful exporters and others struggling to increase their market share has widened. India is also one of the successful exporters of DDS and holds the top position among all the emerging nations.

Based on the data of the World Trade Organisation (WTO), India stood at 5$^{th}$ in exporting the digitally delivered services (DDS) in the world in 2024 and is trying to excel in this sector. If a nation intends to lead in the digital economy, digital service trade plays an important role. Also, it is helpful in the growth of global trade (Sun, 2024). Since the DDS trade has potential for high economic development, India's performance and competitiveness in this trade should be analysed to have insights about India's comparative status, strengths, and challenges in the international market of DDS trade, which can help in providing suggestions for making India the leader in DDS trade in the world and getting economic benefit out of it. The present research paper perfectly caters for this need and contributes by analysing the performance and competitiveness of India's DDS exports compared to the top 20 exporters of the world.

The main objectives of the present research paper are:

- To analyse the comparative status of India in the digitally delivered services trade in the international market.
- To measure the competitiveness of digitally delivered services of India in the world and compare it with the top exporters of these services in the international market.

# 2. Methodology

The present research is a secondary data-based study. The data on digitally delivered services (DDS) trade are collected from the World Trade Statistics database for 2005 to 2024. To compare the competitiveness of India's DDS trade, a sample of the top 20 countries having the highest share in the world's DDS exports was selected. The various indices were used to measure the competitiveness of selected countries. The description of those indices is as follows:

### 2.1 Revealed Comparative Advantage (RCA)

This index was introduced by Bela Balassa (Balassa, 1965) and is also known as Balassa Index. It measures the comparative advantage of a country in the export of a particular product. It is the ratio of the share of the product's export in total exports of the country to the share of its export in the world's total exports. Its formula is given below.

$$RCA_i^c = \frac{\frac{X_i^c}{\sum X_i^c}}{\frac{X_i^w}{\sum X_i^w}}$$

Here, x denotes the value of exports, subscript i denotes the product, superscript c denotes the country and superscript w denotes the world.

On the basis of the value of the RCA index, a country's competitiveness can be measured. Its value greater than 1 indicates a revealed comparative advantage for the country in the product's export. If its value lies between 1.25-2.5, then a strong comparative advantage; if greater than or equal to 2.5, a very strong comparative advantage; if the value lies between 0.8-1.25, a moderate comparative advantage; if in a range of 0.4-0.8, then a weak comparative advantage. If its value is less than 0.4 or even less than 0, it indicates that the country has a strong comparative disadvantage in the export of the product and lacks international competitiveness (Feng and Zhang, 2022).

### 2.2 Revealed Symmetric Comparative Advantage (RSCA) Index

There is an asymmetry in the RCA index because it ranges from 0 to infinity and is centred at 1, so it is difficult to compare its values for different countries. In order to remove this asymmetry, the Revealed Symmetric Comparative Advantage (RSCA) index was introduced. It is the transformation of the RCA index and centred it at zero. Its formula is as follows:

$$\text{RSCA} = \frac{RCA-1}{RCA+1}$$

The values for RSCA range from -1 to +1. Its value less than 0 shows the comparative disadvantage of a country in exporting a product, but its value greater than 0 shows a comparative advantage

### 2.3 International Market Share (IMS) Index

It indicates the share of a country's export of a product in the world's export of the same product. Its formula is given below.

$$IMS_i = \frac{X_i}{X_i^{world}}$$

Here, x denotes the value of export, and subscript i is used for product. A higher value of this index shows strong competitiveness of the country in exporting the product in the international market, whereas a lower value indicates weak competitiveness (Feng and Zhang, 2022).

### 2.4 International Market Share Growth (IMSG) Index

This index is the dynamic version of the IMS index because it measures how a country's share in world exports of a product is changing over time. Its formula is given below.

$$IMSG = \frac{IMS_t - IMS_{t-1}}{IMS_{t-1}} \qquad \text{where} \qquad IMS_t = \frac{X_t}{X_t^{world}}$$

If its value for a country's export of a product is positive, it means the competitiveness of a country in the international market is improving; if it is negative, then it indicates that the country is losing competitiveness, and its zero value shows the stable position of a country in the international market. Its interpretation becomes more meaningful when analysed with the IMS index, for example, if a country's IMS index value is high and its IMSG index value is negative, it means the country is a strong player of export of a product in the international market but losing its ground. In other words, the country has strong competitiveness, but that is declining.

### 2.5 Trade Balance Index/ Trade Competitiveness (TB/TC) Index

It measures the trade competitiveness or competitive advantage of a country in the trade of a product in the international market. It is the ratio of the difference in export and import value of a product to the total trade value (export + import) of a country in that product (Li and Wang, 2024).

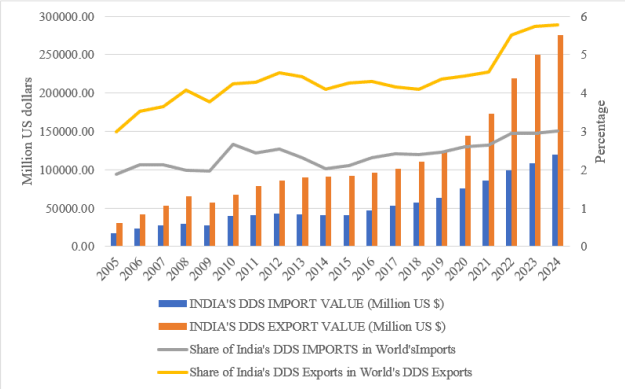
$$\text{TC} = \frac{X_i - M_i}{X_i + M_i}$$

Here, $X_i$ denotes the export value of the $i^{th}$ product, and $M_i$ denotes the import value of the $i^{th}$ product. The value of the TC index ranges from -1 to +1. Its value closer to -1 indicates that the trade competitiveness of the country is weak, and its value equal to -1 indicates that this product is imported in the country but not exported, which shows extremely weak or no competitiveness for the country. An index value closer to 1 indicates that the trade competitiveness of the country is strong, and a value equal to 1 indicates that the country only exports the product but does not import, which indicates extremely strong competitiveness of a country for trade of that product in the international market (Feng and Zhang, 2022).

# 3. Results and Discussions

### 3.1 Trends in India's Digital Trade

**Figure 1:** Volume and Share of India's DDS Exports and Imports from 2005 to 2024




**Source:** Based on WTO Data

Figure 1 depicts India's DDS exports' value increased drastically and showed exponential growth in the last two decades. It increased approximately ninefold from 30,609.84 million US dollars in 2005 to 2,75,743.16 million US dollars in 2024. It slightly slowed down in 2008 due to the global financial crisis, but regained pace. A sharp increase in India's DDS exports was observed after the recovery from the COVID-19 pandemic, and its share increased to 5.52 per cent in 2022 and 5.77 per cent in 2024, which was 4.11 per cent in 2018 (Figure 1).

India's DDS imports also followed the trend as in exports and regularly increased from 2005 to 2024, but consistently, a large gap between DDS exports and imports was observed, which became more significant in the post-pandemic period (Figure 1). In 2005, India's DDS imports were 17676.89 million US dollars, and the difference between exports and imports was 12932.95 million US dollars, which was 73 per cent of exports. Even though the imports increased 6.8 times in 2024 (119809.99 million US dollars), the difference between DDS imports and Exports increased to 130 per cent.

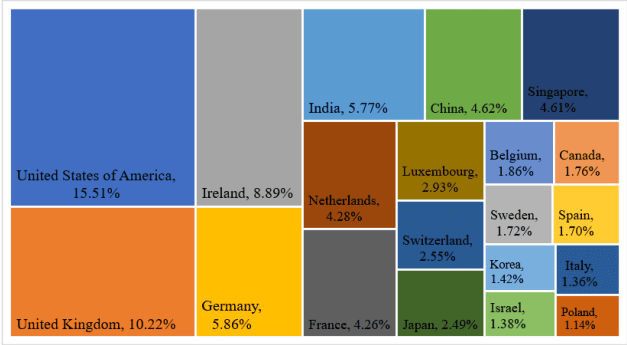
The increasing gap between India's DDS exports and imports is clearly visible through the lines showing India's share in the world's DDS exports and imports in Figure 1. India's share in DDS exports was 2.99 per cent in 2005, but this ratio was only 1.88 per cent for the imports, whereas the share of India's DDS exports increased to 5.77 per cent in 2024, but it remained 3.01 per cent for imports.

So, a large gap emerged over the years and became wider after the pandemic (Figure 2).

### 3.2 Competitiveness of India's Digitally Delivered Services Trade

There are many advanced countries having a large share of the world DDS trade, and India is a strong competitor. Though India is an emerging economy, it is the fifth-largest exporter and eighth-largest importer of DDS in the world. The top 20 countries, as per their share in the world's DDS exports and imports, are shown in Figures 2 and 3, respectively.

**Figure 2:** Top 20 Digitally Delivered Services Exporter Countries of the World (2024)

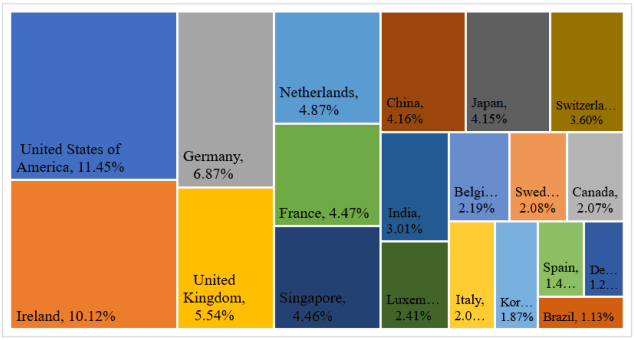



**Source:** Based on WTO Data

As far as the DDS exports are concerned, India held 5.77 per cent of the world's DDS exports in 2024 and stood just behind the United States of America (USA), the United Kingdom (UK), Ireland and Germany, but it was ahead of not only China but many advanced countries including Singapore, Netherland, France, Japan, Republic of Korea, Israel and others (Figure 2). There was not much difference between the shares of Germany and India, which indicates that India can soon improve its rank and become a stronger competitor for other top exporters.

Whereas India's share in DDS imports was just 3.01 per cent in 2024, and it was behind the world's ten top importers of DDS. These top ten countries include the USA, UK, Ireland and Germany, which are also the top four exporters. This analysis reveals that India is doing well in the DDS trade and has a trade surplus.

**Figure 3:** Top 20 Digitally Delivered Services Importer Countries of the World (2024)




**Source:** Based on WTO Data

For the analysis of comparative analysis of competitiveness of India in DDS Trade, firstly all competitiveness indices such as Revealed Comparative Advantage (RCA) Index and Revealed Symmetric Comparative Advantage (RSCA) Index International Market Share (IMS) Index, International Market Share Growth (IMSG) Index and Trade Balance or Trade Competitive (TB/TC) Index were computed for India over the years and secondly, these indices' values for India were compared with values computed for all other top 19 countries for the year 2005 and 2024.

Table 4 presents values of all 6 indices used to measure the competitiveness of India's DDS Trade in every five years since 2005.

**Table 4:** Competitiveness Indices Values for India's Digitally Delivered Services (DDS) Trade Over the Years since 2005

| Name of Index | 2005 | 2010 | 2015 | 2020 | 2024 | Interpretation |
|---|---|---|---|---|---|---|
| RCA | 1.52 | 1.43 | 1.37 | 1.15 | 1.35 | (1.25 to 2.5) Clear Comparative Advantage in all |
| RSCA | 0.21 | 0.18 | 0.16 | 0.07 | 0.15 | (>0) Comparative Advantage |
| IMS | 0.03 | 0.04 | 0.04 | 0.04 | 0.06 | Market share has doubled. |
| IMSG | .177* | 0.123 | 0.041 | 0.022 | 0.004 | The rate of increase in Market share has declined. |
| TB/TC | 0.27 | 0.26 | 0.38 | 0.31 | 0.39 | Weak (0-0.3) to Stronger (0.3-0.6) Competitive advantage |

**Source:** Computed based on WTO data

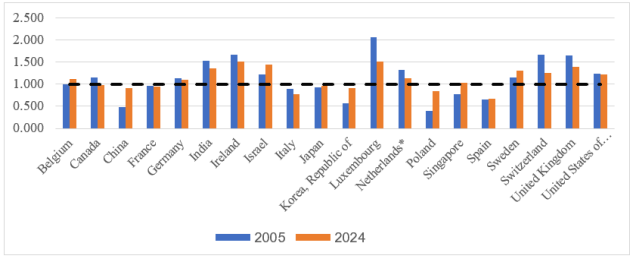
*This value shows the MSGI of 2006, since data are collected from 2005.

### 3.2.1 DDS Trade Competitiveness based on the RCA Index

In Table 4, the RCA index values show the ratio of India's DDS exports' share in its total exports to the world's DDS export share in the world's total exports, so its values above one clearly reveal the comparative advantage of India in the world. Since the values of RCA for all the years presented in Table 4 lie between 1.25 and 2.5, it can be interpreted that India had a strong comparative advantage since 2005, but this value has declined over the years, so India needs to pay attention to improve its share of DDS exports in its total exports compared to the world share for the same.

RCA index values of the top 20 DDS exporter countries in 2024 are presented in Figure 4. This figure depicts that in 2005 India's RCA index value was the fifth highest after Luxembourg, the United Kingdom, Switzerland and Ireland. Though the value has declined, it was still the fourth highest after Luxembourg, Ireland, Israel and the United Kingdom. If India could have improved or maintained its relative share of DDS exports in the world's DDS exports, then it would have a higher position than others. It is also worth noting that India had a higher comparative advantage in DDS exports compared to the USA, Switzerland, Germany and others. The dotted line shows the threshold for the values of RCA. RCA greater than one shows a comparative advantage and less than one shows a comparative disadvantage, so eight countries- China, France, Japan, Italy, Korea, Poland and Spain- have revealed a comparative disadvantage in DDS exports.

**Figure 4:** Revealed Comparative Advantage (RCA) Index for Top 20 DDS Exporters of the World



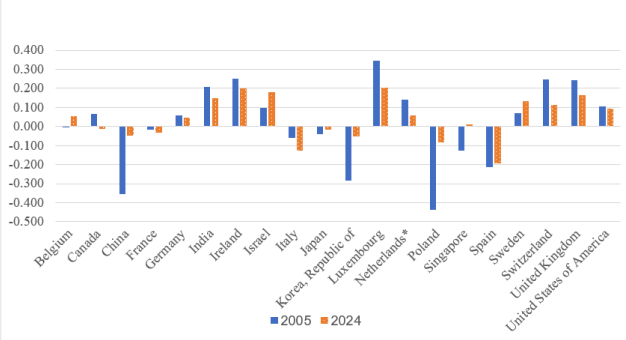

**Source:** Based on computed values from WTO data

### 3.2.2 DDS Trade Competitiveness based on the RSCA Index

The Revealed Symmetric Comparative Advantage (RSCA) Index address the problem of asymmetry in RCA, and its values lie between -1 and +1. RSCA index values for India's DDS export for all years presented in Table 4 were greater than zero, so it can be concluded that India had a clear comparative advantage over the years since 2005.

Figure 5 presents the RSCA values for DDS exports of all top 20 countries of the world in the year 2024 and shows that eight countries (almost one third of the 20 countries), including China, Japan, France, and Korea (similar as explained in section 5.1), have revealed symmetric comparative disadvantage in DDS exports. Countries ranking in competitiveness according to RSCA are the same as their ranking in RCA.

**Figure 5:** Revealed Symmetric Comparative Advantage (RSCA) Index for Top 20 DDS Exporters of the World




**Source:** Based on computed values from WTO data

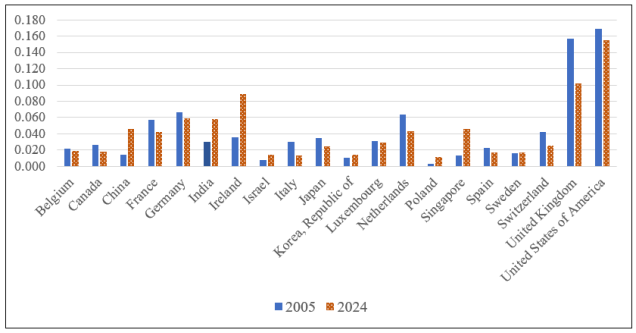
### 3.2.3 DDS Trade Competitiveness based on the International Market Share (IMS) Index

The IMS index presents the competitiveness of any country by revealing the share of its exports in the world's exports of the commodity. A higher value of this index indicates a higher share of industry in the international market and stronger competitiveness.

The IMS index values for India's DDS exports had doubled in 2024 (6 per cent) from 3 per cent in 2005 (Table 4).

Two countries having the highest value of IMS for DDS exports were the USA and UK in 2005 and in 2024, but IMS declined for both of them and even for other developed countries like Germany, France, the Netherlands, Italy etc. whereas IMS for India and China increased drastically from 2005 to 2024 and India stood at fifth after for developed countries in the international market (Figure 6). It shows the strong competitiveness of India's DDS exports in the world.

**Figure 6:** International Market Share (IMS) Index of Top 20 DDS Exporters of the World

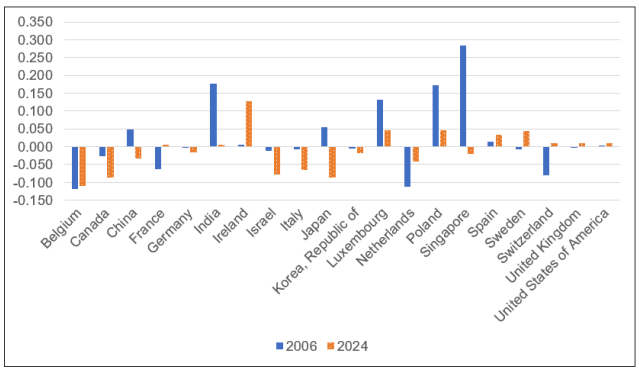



**Source:** Based on computed values from WTO data

### 3.2.4 DDS Trade Competitiveness based on the International Market Share Growth (IMSG) Index

Having the highest market share alone cannot measure the competitiveness of any country until the growth of its market share is also analysed. IMSG Index measures the growth of market share of exports over the previous year. As presented in Table 4, the IMSG Index value of India's DDS exports declined over the years. It was .177 in 2006 and reduced to .004 in 2024. Figure 7 depicts that 10 countries (fifty per cent) out of the top 20 countries are facing a negative growth rate of DDS exports in 2024. Among the countries having a positive growth rate of DDS exports, only five countries have a higher growth rate in 2024 compared to 2005, and the growth rate of Ireland is very impressive. Even the USA and UK have improved their growth rate in 2024 compared to 2006. The drastic decline in the growth rate of DDS exports of India is posing a challenge for India to retain its present market share in the international market for DDS exports.

**Figure 7:** International Market Share Growth (IMSG) Index of Top 20 DDS Exporters of the World




**Source:** Based on computed values from WTO data

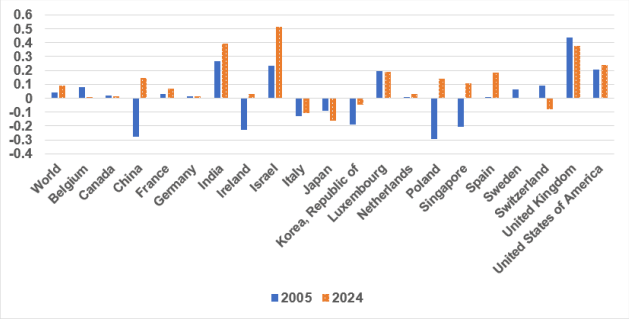
### 3.2.5 DDS Trade Competitiveness based on Trade Competitiveness or Trade Balance (TC/TB) Index

Trade competitiveness or Trade Balance Index shows the ratio of the trade balance of a country in a specific commodity or service over the total trade value of that specific commodity or service. This index basically measures the competitiveness of trade in a specific item by measuring the gap between its exports and imports. Its value lies between -1 and +1.

TC/TB Index value for India's DDS trade improved from 0.27 in 2005 to 0.39 in 2024. It indicates that India's exports of DDS increased more than its imports, and India has moved from weak competitiveness to a strong competitiveness status in DDS trade.

Figure 4 also depicts the same fact. India, along with Israel and the UK, achieved strong trade competitiveness in DDS trade in 2024. These are the only three countries among the top 20 countries which had strong trade competitiveness in 2024, and the UK is the only country which had strong trade competitiveness in 2005 also.

**Figure 8:** Trade Competitiveness or Trade Balance (TC/TB) Index of Top 20 DDS Exporters of the World




**Source:** Based on computed values from WTO data

## 4. Conclusion and Suggestions

The rapid digital transformation of the Indian economy has enabled the country to almost double its share in global digitally delivered services (DDS) exports over the last two decades, while the share of imports increased by only around 50 per cent during the same period. This widening gap between DDS exports and imports reflects a growing trade surplus in India's DDS sector and suggests that the country's trade competitiveness, as measured by trade balance, has strengthened significantly over the years.

However, other indicators of trade competitiveness present a more nuanced picture. Although India continues to enjoy a strong revealed comparative advantage (RCA) in DDS exports, this advantage has gradually declined over time. Despite the decline, India's RCA index remained the fifth highest globally, after Luxembourg, the United Kingdom, Switzerland, and Ireland, underscoring its continued prominence in the sector.

India's global market share in DDS exports is also the fifth largest and has consistently expanded since 2005. India's growth in DDS exports has outpaced the global average growth rate as well as that of leading exporters such as the United States, the United Kingdom, and Germany. Although its growth rate has declined over time. At the same time, several countries are emerging as strong future competitors due to their rapidly rising market shares. Economies such as Ireland, Luxembourg, Poland, Sweden, and Spain have recorded high positive growth rates in DDS exports and possess the potential to become major global exporters in the coming years. Alongside these emerging players (except Ireland, which already has the third largest share in the DDS market), established digital service leaders such as the United States, the United Kingdom, Germany, the Netherlands, Singapore, and China are expected to remain strong competitors to India in the global DDS market.

India's DDS trade remains heavily dependent on the United States as its principal trading partner, while trade linkages with other advanced and emerging economies such as South Korea, Ireland, Germany, Japan, China, and Brazil remain relatively limited.

India's digital services trade basket is narrow and highly concentrated. Around 35 per cent of India's digital services exports consist of computer services, indicating excessive dependence on a single segment of the DDS trade.

India needs to strengthen its trade relations with both advanced and emerging economies, such as South Korea, Ireland, Germany, Japan, China, and Brazil, to expand its presence in digitally delivered services (DDS) trade. At the same time, India should incorporate comprehensive and mandatory provisions related to DDS trade in its future Free Trade Agreements (FTAs) to secure greater market access and enhance regulatory cooperation in the digital economy.

Furthermore, relying predominantly on computer services and other business services may not be sufficient to sustain long-term growth in the DDS trade. India must diversify its DDS export basket by promoting exports of financial services, insurance and pension services, and personal, cultural, and recreational services. Such diversification would reduce sectoral dependence and improve India's resilience and competitiveness in the evolving global digital economy.

India's progress can be significantly strengthened by focusing on two of the four strategic pillars identified in one of the working papers of NITI Aayog (Narayanan et al., 2025), namely 'Economic Competitiveness' and 'Global Partnerships and Alliances' and a stronger emphasis on these pillars would help India enhance its global digital trade competitiveness and successfully achieve its long-term developmental objectives.

**Competing Interests**

Authors have declared that no competing interests exist.

**Disclaimer**

The author hereby declares that Grammarly (an AI-powered writing assistant) and ChatGPT were used only to assist in grammar check and language refinement.

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