

The Impact of Cross-Border Digital Transmissions on the MSME Sector in India and the Benefits of the WTO E-Commerce Moratorium



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Contents

EXECUTIVE SUMMARY.....	2
BACKGROUND.....	4
1. IMPORTANCE OF DIGITALIZATION TO INDIAN ECONOMY.....	4
2. MSMEs IN INDIA – CHALLENGES, POLICY, AND DIGITALIZATION.....	5
3. IMPACT ASSESSMENT OF DIGITAL TRANSMISSIONS ON THE ECONOMY....	7
3.1 POSITIVE ECONOMIC IMPACT OF DIGITAL TRANSMISSIONS.	7
3.2 NEGATIVE IMPACT OF TARIFFICATION OF CROSS-BORDER TRANSMISSIONS ON IMPORTING COUNTRY’S ECONOMY.	9
3.3 DUTY ‘FREE’ CROSS-BORDER ELECTRONIC TRANSMISSIONS HELP RATHER THAN HURT AN IMPORTING COUNTRY’S ECONOMY.....	11
4. DATA SOURCES AND METHODOLOGY.....	12
4.1 DATA SOURCES.....	12
4.2 METHODOLOGY.....	13
5. RESULTS.....	15
5.1 DESCRIPTIVE STATISTICS OF THE VARIABLES IN THE STUDY.....	15
5.2 PANEL REGRESSION.....	17
5.3 STAKEHOLDER DISCUSSIONS.....	19

6. CONCLUSIONS.....	22
REFERENCES.....	23
APPENDIX.....	27
SECTORS IN BALANCED PANEL.....	27
SECTORS IN UNBALANCED PANEL.....	28
YEAR 2001-02.....	28
YEAR 2006-07.....	30
YEARS 2010-11 and 2015-16.	32
MISSING DATA EXTRAPOLATION METHODOLOGY FOR SECTORS.....	33
MSME OWNERS QUESTIONNAIRE.....	34
INDUSTRY ASSOCIATIONS QUESTIONNAIRE.....	34
GOVERNMENT OF INDIA QUESTIONNAIRE.....	34

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EXECUTIVE SUMMARY

The WTO moratorium on imposing custom duties on electronic transmissions has been in effect for more than two decades (since 1998) and has served as a cornerstone of global digital policy, promoting the growth of the digital economy. While India and other WTO members have agreed to extend the moratorium until the next WTO ministerial, New Delhi has raised a variety of concerns in the WTO about its impact on state revenue, the government's ability to impose import substitution policies, and its scope. Yet there is strong evidence that India has seen considerable economic benefits from the 'e-commerce moratorium' and resulting digital boom, particularly for its Micro, Small and Medium Enterprises (MSMEs) in terms of its imports as well as exports.

This study is intended to provide data on the value of the moratorium to MSMEs as the Indian government continues internal deliberations on the value of the moratorium and participates in WTO e-commerce working group discussions on the issue. The impact on MSMEs is of particular interest as this sector has accounted for roughly 30% of India's GDP in recent years.

On the export front, India's cross-border sales of digitally delivered services have shown impressive growth in recent years. An UNCTAD 2018 report indicated that India had exported \$89 billion in the year 2016-17 in this segment: computer services accounted for 63%, management and administration services were 14% and engineering and R&D services were 11%. As part of this trend, a growing number of smaller Indian firms are leveraging global e-commerce markets to sell creative and

cultural services such as Indian films, music and e-books to the Indian diaspora. UNCTAD concluded that ‘digital delivery’ is of particular value to these smaller companies in India.

The OECD found that India's share of global estimated digital trade exports grew by roughly 400% – from 1% in 1995 to nearly 4% in 2018. In contrast, OECD member states' shares of digital trade exports fell by over 10% in the same period. The rate of growth of India's digital trade exports eclipsed even that of China's, whose share grew by 235% from 2% in 1995 to 6.7% in 2018 (OECD 2023). On the import side, Indian MSMEs have also begun to integrate several types of digital services inputs, such as smartphone-based marketing and communications services, into their business operations. Typical goals include expanding market reach and deepening their connection with customers.

In evaluating the economic impact of these trends, our study concluded that cross-border digital transmissions are indeed of benefit to Indian MSMEs. Our findings are summarized below:

- Digitally-delivered imports have a positive and significant impact on Gross Value Added (GVA) of MSMEs in India in all of the model variants. For every 1% rise in digitally-delivered imports, we may expect 0.1-0.2% rise in the GVA of MSMEs.

Digitally-delivered imports have a positive and significant impact on productivity (defined as GVA per employee) in most of the model variants. For every 1% rise in digitally-delivered imports per employee, we may expect a 0.04-0.08% rise in the GVA per employee in the MSMEs.

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- Digital imports have a positive and significant impact on employment in most of the model variants. For every 1% rise in digital imports, we estimate a 0.4-0.8% rise in employment in the MSMEs.

Summary of Study Data Sources: The study is based on the most recent available MSME data for the years 2001-02, 2006-07, 2010-11 and 2015-16, including census data for the years 2001-02 and 2006-07 (Census 2001-02 captures values of some economic characteristics in 1999-00 and 2000-01), and National Sample Survey (NSS) data for the years 2010-11 and 2015-16.

It is also based on Inter-Country Input-Output (ICIO) data for digital imports. Telecommunication, IT and other information services encompass the possible digital imports. The study covers close to 50 sectors at NIC 2 level. All sectors are covered in census. NSS data covers only a subset.

It uses econometric techniques to determine relationships between economic characteristics of MSMEs – panel data regression for sectors that are present across all the years as well as for all sectors across all the years.

The study is also based on interviews of different stakeholders of MSMEs, namely MSME owners, government officials, think tanks, digital industry executives and industry association officials.

To summarize, the different stakeholders in the MSME ecosystem in India provided different insights on the role of digital products and services. Most of those interviewed believed that any tariffs or taxes on digital transmissions would be difficult to implement. Because MSMEs are quite dependent on such cross-border digital transmissions, the application of local tariffs or taxes could backfire, incurring

costs for the MSMEs. Industry association officials and MSME owners opined that this move could be negative for business. At the same time, some of the stakeholders felt that viable Indian alternatives for digital services based on international standards would be helpful and there is no need to raise tariffs on imports.

BACKGROUND

In its second Ministerial Conference in Geneva, the World Trade Organization (WTO) announced a moratorium on custom duties on electronic transmissions (WTO, 1998). In the ensuing two and a half decades, WTO members have continued to support the extension of the moratorium. During this period, digital transmissions have played a significant role in shaping novel opportunities for growth and business across the world. India has a unique standing in the world when it comes to trade in digital transmissions. On one hand, it has been voicing its view along with other developing countries in favor of imposing tariffs on digital transmissions. The argument presented is preservation of policy space for digital advancement, regulation of imports and generation of revenue through custom duties (The Hindu, 2022).

At the same time, India has experienced a digital boom at an impressive scale in the last decade that has ushered in corresponding economic benefits for the economy and people, bolstering its economy in the post-COVID period. India has also seen impressive growth in its IT exports in the recent years. Against that backdrop, this study attempts to understand the impact of digital transmissions on Micro, Small and Medium Enterprises (MSMEs) of the Indian economy. The research is based on a literature review, followed by a comprehensive data analytics exercise that includes panel data econometrics and a qualitative analysis comprising stakeholder discussions.

1. IMPORTANCE OF DIGITALIZATION TO INDIAN ECONOMY

Digitalization has played an important role in ensuring better financial transactions. India's adoption of digital technologies in this space has made it the country with the highest number of real-time payments transactions (Insider Intelligence, 2021). India is reported to have posted more than 48.6 billion such transactions in the year 2021, while China is a distant second with 18.5 billion transactions.

Digitalization is also expected to aid in sustainable development, which a developing country such as India should try to leverage for its benefit. Xu et al. (2022) have presented a number of studies on how digitalization impacts the environment, governance and sustainability. They conclude that digitalization is beneficial in most of these spheres if handled correctly. They recommend that policies for digitalization are a necessity both in institutional as well as governance sectors.

The proportion of businesses using computers has increased from 52.12 percent in 2004 to 76.93 percent in 2018 (UNCTAD Stats, 2023), though micro enterprises still lag behind in adopting digital technologies. Over 95 percent of large enterprises used a computer in most of the years for which data was captured, while fewer than 50 percent of micro enterprises used a computer in the same period. A similar trend can be observed for the proportion of businesses using the internet and the proportion of businesses with a web presence.

Digitalization offers myriad opportunities. A McKinsey Global Institute report by Kaka et al. (2019) listed some of these opportunities for India. India is one of the largest and fastest growing digital consumer market. In September 2018, India had 560 million internet subscribers, second only to China. The report estimated that by

2023, the number of internet subscribers would range between 750 and 800 million, with the number of smartphones estimated at 650 to 700 million. The study estimated that the productivity improvement unlocked by the digital economy would create 60 to 65 million jobs by 2025, with many requiring digital skills.

Industrial revolution 4.0 has already brought major changes to business in developing as well as developed countries. Aly (2022) undertook an analysis that determined digital transformation has had a positive impact on employment, labor productivity and economic development in developing countries. The study also found that women seem to gain more than men. Policymakers in India should take note in order to assess how much support is to be given to encourage digital transformation. Large enterprises as well as MSMEs will undergo considerable changes due to the advent of industry 4.0.

Kathuria et al. (2019) in their study evaluated the economic implications of cross-border data flows. The study found that an increase in internet bandwidth can be said to lead to an increase in total volume of goods traded by India. Among its recommendations were to develop the digital ecosystem of India as a whole instead of forcing data localization that would result in higher costs. This will ensure that businesses will find it more cost effective and efficient to operate in India.

2. MSMEs IN INDIA – CHALLENGES, POLICY, AND DIGITALIZATION

The significance of the MSME sector for the Indian economy has been steadily rising. The share of MSME Gross Value Added (GVA) in the country's GDP in recent years has been close to 30%. The share of the MSME manufacturing in all India

manufacturing gross value output is even higher; it was 36.9% during the year 2019-20. In 2020-21, the share of exports of specified MSME-related products to all India exports was 49.5%. Further, this sector is estimated to have employed a workforce of 111 million (PIB, n.d.). Behind these impressive numbers are the characteristic challenges faced by the MSME firms as well as the policy support provided by the Indian Government.

Several studies have pointed out the factors stifling the growth of MSME firms in India: limited access to credit, lack of a skilled workforce, regulatory compliance, poor infrastructure, increasing competition, poor use of technology and lack of market linkages.

Das and Das (2012) argued that the issues faced by MSMEs such as “...limited knowledge, non-availability of suitable technology, ineffective marketing strategy, inability to identify new markets, constraints on modernization & expansions, [and] absence of highly skilled labour” can be resolved with the use of information technology (IT). The study, which collected data by means of personal inquiry and semi-structured questionnaire, explored factors influencing adoption of IT by Indian MSMEs. Responses of a total of 36 ‘successful MSMEs’ (defined as those that had surpluses and profits to invest in IT) were analyzed. Correlation and regression analyses were conducted; empirical results suggested that greater need for information, higher level of competition, higher age and larger size of the enterprise, as well as higher government support and incentives, play a positive role in IT adoption among MSME firms.

Mukherjee (2018) analyzed the challenges faced by the Indian coir industry as a result of globalization. The methodology employed was case study analysis. The author

attributed the weak performance of Indian coir exports over the last decade (2011 to 2017) to problems including inadequate credit, lack of access to raw materials at competitive cost, insufficient knowledge of updated technology, a deficit of skilled personnel and poorly developed infrastructure. The corrective course suggested by the study was to gain competitive advantage over rival neighboring countries like China, Indonesia, the Philippines and Thailand with the use of latest technology and with adequate market promotion to acquire new trade partners. A convergence of technologies like social media, mobility, analytics, and cloud computing (SMAC) was proposed as a key business enabler for the MSME firms. The author suggested use of both domestic and international technology transfer through mechanisms such as technology licensing, technology sale, technology transfer through capital management, etc.

Khatri (2019) did a detailed exploratory analysis of the issues and challenges faced by this sector in India. One challenge was access to funds for operational and expansion needs. Relevant factors in the ability to access financing included non-availability of collateral with small firm owners, the cumbersome process to access available government aids, low levels of financial literacy among firm owners, limited access to capital sources such as equity and higher rates of interest on funds from informal money lenders.

The next set of challenges mentioned was in the technological domain. The study pointed out inadequate access to advanced machinery and technology, lack of familiarity with lean manufacturing, and poorly developed information and communication technology (ICT) skills. Human resource challenges included the inability to attract skilled personnel and complex labor laws that rendered compliance

difficult. In addition, sales and marketing challenges included insufficiently developed logistical infrastructure, intense competition, limited access to foreign markets, and lack of information about target customers, ISO certification & IP-related issues.

At the operational level, MSME entrepreneurs also contend with socio-cultural issues, supply chain inefficiencies, sub-optimal infrastructure, and complex regulations. At the level of exports, other difficulties include lack of familiarity with target market, high tariffs on the raw materials imported by MSME units, lack of foreign language skills, and the high cost and uncertainty related to dispute settlement mechanisms.

It is well acknowledged that research and development (R&D) is the backbone for the growth of industries. Innovation is required to prosper in an era of global competition; for that, constant industry-level R&D is required. However, owing to low scale of operation and small budgets, MSME firms have limited ability to invest in R&D. To understand the level of R&D in this sector, Majeed et al. (2021) conducted an empirical analysis, culling data from the Annual Survey of Industries from 2016 through 2018. The study found there was “...no correlation and symmetry between the level of industrialization across states, average output and the R&D process.” Given the lack of satisfactory level of R&D among Indian MSME firms, the study recommended changes in industrial policy to boost growth and development of industry-specific R&D.

There is tremendous potential for exports from MSMEs in India, which already constitute 30% of India's GDP. Chakravarthy et al. (2023) found that Indian MSMEs have relatively higher potential for exports in textiles and clothing; food products, vegetables and other agricultural products; and machinery and electrical equipment sectors. In terms of markets, the analysis revealed that Indian MSMEs have a broad

scope in the UAE, China, Bangladesh, and the USA. Many of these sectors and target markets could be well served by e-commerce, digital platforms and cross-border digital transmissions.

In this backdrop, the Government of India has come up with several initiatives and schemes. Some of the more prominent ones include the following:

- Make in India launched in 2014[\[1\]](#)
- Digital India initiative launched in 2015[\[2\]](#)
- Dedicated online portal for MSME loans and introduction of "59-minute loan" scheme launched in 2018: PSB loans in 59 minutes[\[3\]](#), further revamped as a credit guarantee scheme reducing the cost of credit by 1% in addition to greater infusion of funds into the corpus, in February 2023.
- Atmanirbhar Bharat Abhiyaan in 2020, which included the special economic and comprehensive package of INR 20 lakh crores to fight the COVID pandemic in India[\[4\]](#)
- Unified Skill India Digital Platform to enable demand-based formal skilling, linking with employers including the MSMEs and facilitating access to entrepreneurship schemes in Budget 2023-24
- Special Credit Linked Capital Subsidy Scheme launched in November 2021

It is important to note that digitalization and the flow of cross-border transmissions has clearly helped smaller firms. The flow of information over the internet has enhanced MSMEs' ability to reach new customers through e-commerce retailers, to understand their customers better, and to retain existing customers through social media and email interactions. Improved access to technology has helped MSMEs bridge the knowledge and information gap that exists with bigger companies.

Further, the Government of India's "Digital India" initiative can leverage digital technology to help address the challenge MSMEs face in attracting skilled workers. This initiative helps by "...providing software interventions, evolving internal efficiencies and cost reduction by automating procedures, imparting digital literacy and capacity enhancement for information access, processing, collaboration and dissemination." 4

The question for India, therefore, is not "if" but "how" and "by how much" its growth engine – the MSME sector – can take advantage of the potential benefits of cross-border digital transmissions. The importance of this question has been validated at the global level by the 2019 WTO Joint Statement: "We recognize and will take into account the unique opportunities and challenges faced by Members, including developing countries and LDCs, as well as by micro, small medium-sized enterprises, in relation to electronic commerce." (WTO, 2019).

The WTO has not clearly defined what is encapsulated in the term "digital (or electronic) transmissions". Hence, it is still open to interpretation. Electronic transmissions are basically the transmission of electronic content via digital networks (OECD, 2019). Electronic or e-commerce is the business interpretation of these transmissions. The other closely related term is digital trade. For this terminology,

though, there is a growing consensus that it includes digitally enabled transactions of trade in goods and services that can be digitally or physically delivered (OECD, n.d.).

3. IMPACT ASSESSMENT OF DIGITAL TRANSMISSIONS ON THE ECONOMY

The past few years have seen major shifts in the global economy, aided by digital technology. The following is a review of literature on the impact assessment of digital transmissions on the economy. The entire body of literature is unanimous on their positive economic impact. The unique circumstances of COVID have further underscored the economic value of digitalization.

3.1 POSITIVE ECONOMIC IMPACT OF DIGITAL TRANSMISSIONS

The Digital Desh Drive 7 Dak report (2019) by Indian platform NowFloats pointed out that many micro and small enterprises of Himachal Pradesh state of India, which were lagging behind their counterparts, have begun to use digital methods to gain access to new markets.

Artisans creating handicrafts, such as the Chamba Chappal, Himachal Miniature Paintings and Chamba Rumaal, have started to use social media platforms for marketing and digital transaction platforms to gain access to urban markets. According to the report, digital tools could allow for a potential growth increase of 15 to 20 times in transactions. The use of digital transactions allows artisans to eliminate middlemen, which in turn increases their profit margin.

The report also notes the vital role played by the Indian Post Office Network in filling the gap in rural areas where internet and digital banking is not yet accessible. The postal network delivers artisans' work to customers and does the important job of connecting "Bharat to India". It is notable that in 2019, Tata Consultancy Services, an important Indian IT services provider, partnered with the Department of Posts to introduce an integrated ERP solution as a step to make it one of the world's largest e-postal networks.

Digital Desh Report 9.0 (2020), by the same Indian platform NowFloats, pointed out that while the internet was making inroads in "Bharat", COVID made digital adoption an overnight necessity. Micro and small businesses across India have adopted digitalization not only to save money, or to enhance safety in a period of COVID restrictions, but also to gain an edge over competitors and create new opportunities in the industry. Retail businesses are using digital tools on both the supply and demand side: They order materials online, for example, while reaching customers through WhatsApp, Instagram, and Facebook. Others maintain traditional methods of managing supply-demand chains but have started using digital payments.

The detailed report presented a sector-wise analysis:

- In healthcare, app-based medical consultation has become prevalent, with some doctors providing consultation over WhatsApp voice and video call and accepting online payments. Online pharmacies have begun to gain popularity by providing discounts and offering home delivery. Business owners list their business on 'Google My Business.' They also use platforms like Shopify and Faire that allow producers to sell to retailers at wholesale rates and discounts.

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- COVID also changed behaviors in the Indian hospitality sector. While 80% of businesses saw their lack of knowledge and experience in digitization as a hurdle, up to 80% felt optimistic and willing to invest in a platform or app that will smooth their business operations. The use of UPI Payments, Ola/Uber or Zomato/Swiggy for delivery, as well as social media and word-of-mouth marketing, helped keep many small restaurants sustain operations amid COVID-related disruptions. While physical kitchens and restaurants closed, home deliveries increased as 50% of players reported an increase in sales.
 - In comparison, industries that failed to embrace digitization have suffered. For example, microservice providers such as repairmen saw a 60% drop in sales due to COVID, hurt by their limited ability to use digital tools.

The study found that 52% of the time, small businesses used social platforms like WhatsApp, Facebook and Instagram for promotions. Sixty-seven percent of firms used apps to increase customer engagement while 33% sought help from apps with supply side and inventory management. The report suggested that Bharat MSMEs need a ‘super-app’ that requires low time and resource investment, is low cost, and packs in multiple features.

Similar sentiment on the positive impact of digital transmissions was reflected in the WTO Joint Statement by Ministers of Australia, Japan, and Singapore in 2021. The need to update the WTO rulebook in the area of electronic commerce was acknowledged in the light of the significant role played by digitalization during and beyond COVID. The statement recognized that the “digital economy offers enormous opportunities for developing Members and least-developed country (LDC) Members,

including by lowering the costs for businesses, particularly MSMEs, to access and participate in global markets.”

Among the areas of agreement for participating WTO members are “online consumer protection; electronic signatures and authentication; unsolicited commercial electronic messages; open government data; electronic contracts; transparency; paperless trading; and open internet access.” (WTO, 2021).

Further, in May 2022, on the occasion of the 12th Ministerial Conference (MC 12) of the WTO, 89 associations issued a global industry statement in support of renewal of the WTO moratorium on duties on electronic transmission (WTO, 2022a). The statement pointed out that cross-border flow of knowledge, information, and research and access to digital tools and market opportunities have helped economies and individuals. Constant flows of data have helped manufacturing supply chains and service industries remain resilient. The statement also pointed out that MSMEs that have been using digital tools and technologies to support ongoing operations during COVID need to maintain this access.

Eliminating the moratorium would result in digital fragmentation that would reduce opportunities for MSMEs in developing countries in particular. As the OECD has noted, the relatively small opportunity cost in foregone duty revenue associated with the moratorium is far less than the global economic losses that would ensue if the duty ban is lifted.

On similar lines, a joint Indonesian study conducted by the online wholesale platform GudangAda and the Center of Economic and Law Studies (Celios), as reported in an online article by Afifa (2023), has noted that up to 60% of Indonesian small and

medium enterprises (SMEs) have seen the benefits of digitization in terms of locating suppliers and reaching new customers. The study was based on a literature review.

3.2 NEGATIVE IMPACT OF TARIFFICATION OF CROSS-BORDER TRANSMISSIONS ON IMPORTING COUNTRY'S ECONOMY

One crucial aspect of digital transformation is the use of digital technology and services to facilitate transactions, payments, and data exchange between countries. In India, the use of cross-border digital transmission has unlocked numerous growth opportunities for MSMEs. By embracing digital technology, Indian MSMEs can conduct their business operations more efficiently and at lower costs, leading to a significant boost in profitability and customer base expansion. Setting up online storefronts, making payments, and focusing on core business operations has also become simpler to do. The use of blockchain technology and artificial intelligence has been especially beneficial for MSMEs in different sectors.

Blockchain technology offers secure storage and transfer of sensitive data, while artificial intelligence can automate customer care and provide insights into user behaviour. These capabilities streamline MSME operations, enhance efficiency, and help firms better understand their customers.

Cross-border digital transmission has also made it easier for Indian MSMEs to access funding, which is often a significant challenge for smaller enterprises. Digital technology has enabled MSMEs to transfer funds across borders efficiently, providing them with the money required to establish and expand their operations. Therefore, the adoption of cross-border digital transmission has played an important role in the growth and innovation of Indian MSMEs in the global economy. By creating

connections between MSMEs and potential consumers and suppliers in other countries, reducing costs associated with foreign transactions, and enabling faster and easier access to funding, digital technology and services have created significant opportunities for MSMEs to expand their reach and profitability. The use of cross-border digital transmission represents a significant step forward for MSMEs looking to succeed in the global economy (Steffen et al., 2015).

Given these findings, it is logical to assume that tariffication of digital transmissions might have an adverse economic impact. The studies listed below have used empirical as well as qualitative analysis to arrive at similar conclusions.

Makiyama and Gopalakrishnan (2019) averred that imposition of tariffs on digital goods and services would translate to higher prices and lowered consumption in the importing country, resulting in lower GDP growth and shrinking tax revenues – findings that underscore the value of extending the moratorium on duties on electronic transmissions. Their deductions were made based on the Computable General Equilibrium (CGE) exercise they conducted using the GTAP model for examining the impact of the imposition of tariffs on electronic transmissions for India, Indonesia, South Africa and China (as a representative case for developing countries). This study went beyond the focus on cross-border tariff losses in reports from UNCTAD in 2017 and 2019; the research by Makiyama and Gopalakrishnan demonstrated that the resulting loss in GDP as well domestic tax revenues for all the countries in question was several times higher than the revenues that accrue from the imposition of import duties.

The study also questioned certain assumptions of the above reports, such as that “all physical media or paper-based products would be digitized in future”. They pointed

out that 'lost tariffs' were overstated, since the price of digitally delivered products has fallen over time. Over the specific aspect of difficulty in capturing taxes due to adoption of 3D printing, the authors pointed out that the thermoplastic ink of a 3D printer and other source materials would still remain subject to sales tax and their increased use will continue to generate revenues. Further, the costs of enforcement and compliance of tariffs were not accounted for by the UNCTAD reports that will lower estimations of increase in revenues due to imposition of tariffs.

Another significant point raised by the study was that digital transactions result in increased transparency and traceability, thereby bringing the 'grey economy' into the ambit of taxation. This, in turn, leads to positive impact on tax revenues for domestic economy.

Another study by the Indonesia Services Dialogue Council released in October 2019 indicated that the imposition of tariffs on intangible digital products (IDG) would have a negative, short-term impact on the Indonesian economy, especially on its MSMEs and tech startups. Indonesia is a net importer of IT services and IDGs. Further, the Indonesian Government launched 'Go Digital' campaign in 2017 specifically for growth of MSMEs and startups; in this backdrop, any increase in tariffs would increase import bills and impede the intended growth of these MSMEs and startups.

The study included a CGE testing featuring different scenarios of duty rate and considering the potential for retaliation from trade partners. It concluded that Indonesian GDP, household income, and employment would all be negatively

impacted in the short run if the moratorium were lifted. It also determined that the associated economic losses would outweigh economic gains from new tariff revenues.

Andrenelli and González (2019) conducted an economy-wide empirical cost-benefit analysis on the impact of the global moratorium on electronic transmissions for the Organisation for Economic Co-operation and Development. Their study focused on three areas: custom revenue predictions on imposition of tariffs; stability of tariffs as source of revenue; and overall impact of tariffs on export competitiveness and consumer welfare.

To arrive at a reliable estimate for potential foregone custom revenue, they argued against using ‘bound rates’ and ‘statutory rates’ of tariffs – raising questions about the credibility of high estimates for foregone revenue that have appeared in some studies.[\[5\]](#),[\[6\]](#),[\[7\]](#) Andrenelli and González demonstrated that even at the highest end, the estimates for developing countries constituted a relatively small proportion of government revenue (0.23%). They further reviewed the available empirical literature to show that developing countries showing the highest potential foregone revenue due to the moratorium are actually those least dependent on custom duties as a source of overall government revenue. These findings refute the claim of a significant adverse impact of moratorium on custom revenues for developing countries.

Next, they questioned the assumption that all digitizable goods will be digitized, pointing out that the sale of e-books has plateaued in the United States. They also noted the “...growing complementarities between electronic transmissions and other goods”; for example, lower cost of online streaming can boost demand for smart TVs. Responding to speculation about the potential impact on fiscal revenues of new technologies such as 3D printing, the authors suggested that overall cross-border

trade would likely remain unaffected. These arguments were made to dispel doubts on the adverse impact of free electronic transmissions on overall trade.

Moving on to the impact of tariffication on consumer welfare, the authors quoted various studies to support their claim that most of the price rise is actually absorbed by consumers, with domestic output and productivity also adversely impacted.

As a preferable alternative to tariffs, the authors proposed value-added tax (VAT) as a broad-based and reliable source of government revenue. They also pointed out that digitalization has reduced trading. Using the WITS-SMART partial equilibrium simulation model with 49 categories of digitizable goods (from another study), this study demonstrated an increased 'consumer welfare' (referring to individual benefits derived from consumption), resulting in an overall net welfare increase for all countries (specifically, USD 73 million for developing countries).

Other economic studies reinforce this perspective. For example, on a broader examination of the impact of digital services restrictiveness on trade costs, the OECD estimated that, if data transfer restrictions are removed, the average trade costs reduction for OECD countries is -13%. However, the benefits for India (at -28% reduction in trade costs) are more than double than the OECD figure. Although the authors of this study did not examine the impact of customs duties on electronic transmissions, one could surmise the opposite impact, i.e., adding customs duties on electronic transmissions (new data transfer restrictions with a direct impact on trade operations) would increase trade costs for India and other economies. (OECD, Services Trade Restrictiveness Index, 2023).

In addition, digitalization can help add domestic value to exports and enable more firms to become exporters.

3.3 DUTY 'FREE' CROSS-BORDER ELECTRONIC TRANSMISSIONS HELP RATHER THAN HURT AN IMPORTING COUNTRY'S ECONOMY

There is very limited literature pointing out the harmful effects of a regime based on unrestricted, untaxed cross-border digital transmissions.

Indonesia, in its communication to the WTO dated December 2022, pinpointed the negative impact of the moratorium on local SMEs. Domestic retailers in developing countries hardly benefit from the free-tax and duties scheme for electronic transmissions, since many businesses in developing countries are SMEs that engage in minimal cross-border e-commerce. According to Indonesia, most of the tariff loss to developing and least developed countries in the period 2017 to 2020 was related to items such as movies and music; therefore, the communication claimed that the moratorium is granting duty-free access to developed countries to enter developing and least developed countries' markets. This would result in a negative impact on the local economy. The communication drew on national tariff and tax data and trade growth rate assumptions.

Further, it listed certain benefits of the imposition of custom duties. According to Indonesia, these included better recording of trade statistics, a more level playing field for brick-and-mortar stores vis-à-vis e-commerce stores, help for local SMEs as they compete with global e-retailers, a better assessment of digital goods risk, and the creation of policy space for regulation. The report also mentioned the provision of a

simplified customs declaration by importers of digital goods as a means to facilitate duty implementation (WTO, 2022b).

As stated earlier, India is uniquely placed in terms of trade of digital transmissions. In 2016-17, India became the first country to publish results on its ICT-enabled export of services based on UNCTAD's pilot survey. The figure stood at \$89 billion, out of which 63% were computer services, 14% was management and administration services, and 11% was engineering and R&D services. The report stated that 'digital delivery' is particularly important for 'small enterprises.' Half of these exports were destined to the United States (UNCTAD, 2018).

As e-commerce has boomed in India, more and more Indian e-commerce companies have targeted global markets, particularly those with a large Indian diaspora, especially for sales of Indian music, books and handicrafts. In 2017-18, ICT-enabled services contributed more than 60% of India's services exports (UN, 2020). In the last three financial years, Indian IT exports have grown from \$150 billion in 2019-20 to \$178 billion in 2021-22. This has been aided in part by Government assistance through the Software Technology Parks of India (STP) program and an export-oriented scheme for development and export of computer software, including professional services, using communication links or physical media (Economic Times, 2022). Considering the above figures, it becomes evident that a duty-free regime for digital transmissions is beneficial for India.

4. DATA SOURCES AND METHODOLOGY

4.1 DATA SOURCES

This study uses data from many different sources. They include 1) MSME data of India 2) OECD's Inter-Country Input-Output (ICIO) tables and 3) Enterprise survey of the World Bank.

The study uses data on Employment, Output, Input, Gross Value Added, and Digital imports for MSMEs. The GDP deflator is used to baseline all monetary values to the year 2011. MSME data for the years 1999-00, 2000-01, 2001-02, 2006-07, 2010-11 and 2015-16 has been used in this study. This has been obtained from different sources. All variables have been aggregated to the NIC 2 level. NIC 1998 and NIC 2004 used in 2001-02 and 2006-07 Censuses, respectively, have been mapped to NIC 2008 to ensure comparability across years. The base year for MSME data has been taken as 2006-07 as this year had all necessary macroeconomic data pertaining to MSMEs. A list of the different industry classifications that are covered by the study is presented in the Appendix.

MSME census (MSME,2023) data of India conducted in the years 2001-02 and 2006-07 has been used. The raw data from the Census for the years 2001-02 has been used to obtain data for the years 1999-00 and 2000-01. Missing values such as Input and Employment have been extrapolated using data from the year 2006-07.

NSS 67th round (MoSPI, 2023a) conducted from 2010-2011 as well as NSS 73rd round (MoSPI,2023b) conducted from 2015-16 detail the estimated MSMEs in India in different sectors. These surveys are on Unincorporated Non-Agricultural Enterprises excluding Construction in India. The Gross value added by each sector that was part of the survey is obtained. These surveys have also obtained employment numbers in each of these sectors.

OECD's ICIO data (OECD,2021) is used to arrive at the digital imports for India. The classifications of IND_61 and IND_62T62, corresponding to Telecommunication and IT and Other information services, respectively, are taken as representative sectors for all digital products. The digital input into different sectors of India can be identified as input rows in the table that end with _61 or _62T63 with columns being different sectors in India. Digital imports into India can be inferred to be any such row from a country other than India. The summation of a column will be the total digital imports into India. The total imports into different sectors are also calculated on similar lines. The exports of India can be inferred to be rows starting with IND_ with columns of sectors of other countries. The summation of the row is the total exports of India.

$$\text{GVA of a sector} = \text{Output of the sector} - \text{Intermediate Inputs of the sector} \quad (1)$$

Where

$$\text{Output of sector} = \text{Intermediate Outputs}$$

$$+ \text{Household Final Consumption Expenditure (HFCE)}$$

$$+ \text{Final consumption expenditure of non-profit institutions serving households (NPISH)}$$

$$+ \text{Final consumption expenditure of general government (GGFC)}$$

$$+ \text{Gross Fixed Capital Formation (GFCF)}$$

$$+ \text{Changes in inventories (INVNT)}$$

$$+ \text{Direct purchases abroad by residents (imports) (DPABR)}$$

$$+ \text{Exports} \quad (2)$$

$$\text{Input of sector} = \text{Intermediate Inputs} + \text{Imports} \quad (3)$$

The digital imports into different MSME sectors are treated the same as the proportional total digital imports into different sectors of India.

Enterprise Survey conducted by the World Bank (World Bank, 2023) is used as a reference to understand different questions that can be posed to different stakeholders of MSMEs. A questionnaire formulated for the purpose of this study is presented in the Appendix.

4.2 METHODOLOGY

Panel data analysis is a technique that is used often to understand the impact of a technological change on productivity. Few studies are mentioned here in order to illustrate the context of use. Datta and Agarwal (2004) used a dynamic panel method to estimate the relationship between telecommunications infrastructure and economic growth using data for 22 countries. The fixed effects model was found to fit the data well. Dahl et al. (2011) study the impact of ICT on productivity in Europe using panel data methods. They undertook a multi-country sectoral panel data analysis. They extended the models proposed by Sritoh (2002).

The data that is extracted from different sources is used to arrive at two panels of data. The balanced panel consists of sectors that are present in each of the years. The unbalanced panel consists of the total data that covers all years and all sectors for which data is extracted.

This study undertakes panel data regression to understand the relationship between different variables. The regressions are performed for balanced as well as unbalanced panel. Panel data regression can be said to be a marriage of regression and time series

analysis. Panel regression is an econometric technique that is widely used to understand cross-sectional changes over time. Panel data models can be pooled, fixed, or random illustrating the assumptions behind each model (Colonescu, 2016).

The pooled model can be represented simply as

$$y_{it} = a_1 + a_2x_{2it} + \dots + a_kx_{kit} + e_{it}$$

Where t is the time period, i is the individual cross-sectional observation and a_k is the coefficient of the k^{th} variable.

The fixed effects model can be represented as

$$y_{it} = a_{1i} + a_{2i}x_{2it} + \dots + a_{ki}x_{kit} + e_{it}$$

Where t is the time period, i is the individual cross-sectional observation, and a_{ik} is the coefficient of the k^{th} variable in the i^{th} cross section.

The random effects model can be represented as

$$\begin{aligned} a_{1i} &= \bar{a}_1 + u_i \\ y_{it} &= \bar{a}_1 + a_2x_{2it} + \dots + a_kx_{kit} + \epsilon_{it} \\ \epsilon_{it} &= u_i + e_{it} \end{aligned}$$

Where t is the time period, i is the individual cross-sectional observation, \bar{a}_1 is population average and u_i is individual cross section--specific error term.

Panel data analysis of the data is undertaken in this study. R software has been used to run these models. Analysis of balanced as well as unbalanced panels is undertaken in the study.

All panel regression models are in log linear form. The gross value-added determination is done in natural logarithms as one expects a non-linear relationship along the lines of the Cobb-Douglas production function. The Cobb-Douglas production function has been empirically observed in different settings. It has been used to model agricultural production (Vasyl'yeva et al., 2022) and beef production (Kibona et al., 2022) among others. Digital imports can be said to be representative of technological change. Digital imports can also be taken to be representative of inputs.

Productivity in a particular sector can be illustrated with the ratio of Value Addition per Employee or Output per Employee (Venkataramaiah and Burange, 2003). Grund and Westergaard-Nielsen (2008) used value addition per employee as a measure of productivity in a firm. This study uses both variables along with digital imports per employee in order to determine the role of digital imports for a sector.

The relationship between employment, output, input, and digital imports is an extension of the employment elasticity of economic growth. This elasticity represents a percentage change in employment as a result of a percentage change in economic growth (Kapsos, 2006). A country is said to have positive economic growth when the gross value added by different sectors has increased over two years. Narayanan (2003) used a dynamic panel data model to analyze how employment is determined by lags of

capital, output and wages. The gross value added of a sector is the difference between the output produced by a sector and the input that goes into it.

The macroeconomic models used in this study analyse the following relationships at a NIC 2 level industry classification.

$$\ln(GVA_{it}) = a_0 + a_1 * \ln(Employment_{it}) + a_2 * \ln(Input_{it}) + a_3 * \ln(Digital Imports_{it}) + e_{it}$$

The productivity in a sector is analysed with the specification as in eqn.

$$\ln(GVA \text{ per Employee}_{it}) = a_0 + a_1 * \ln(Output \text{ per employee}_{it}) + a_2 * \ln(Digital Imports \text{ per employee}_{it}) + e_{it}$$

The employment in different sectors is analysed with the specification as in eqn.

The study explores these relationships using different panel data regression models. F test and Hausman test are used to determine which among the models best describes the relationship. F test is used to determine the better among pooled and fixed effects models, while Hausman test is used to determine the better among fixed and random effects models (Colonescu, 2016). Different models, irrespective of the significance of the coefficient of digital imports are presented.

A qualitative inquiry, through a stakeholder discussion, of the use of digital media is undertaken with different stakeholders of MSMEs. The survey questions are presented in the Appendix. These survey questions are indicative of the direction of inquiry and not all are tabulated completely. The inquiry is documented in the form of notes.

5. RESULTS

5.1 DESCRIPTIVE STATISTICS OF THE VARIABLES IN THE STUDY

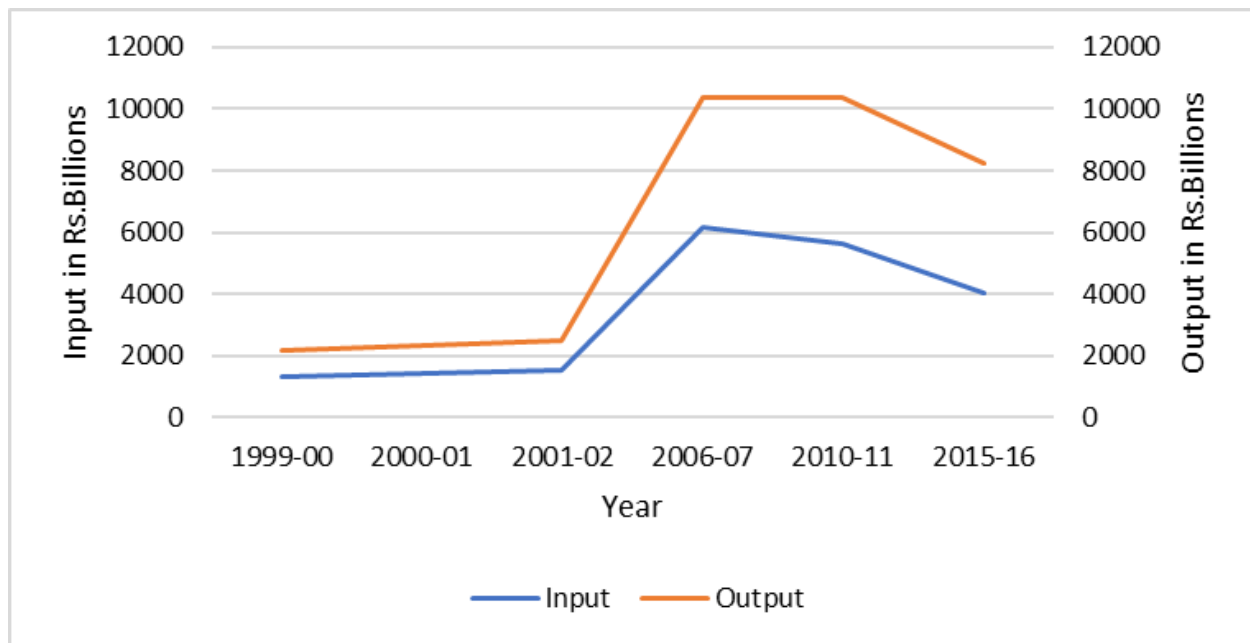
The tables below summarize the data for balanced as well as unbalanced panels. Table1 summarizes the economic characteristic of the balanced panel. There is a consistent pattern of increase in all of the economic characteristics when we compare 1999-2000 with 2015-16.

Table 1: Summary of Balanced Panel

Year	Employment	Output (Rs. Billions, base 2011)	Input (Rs. Billions, base 2011)	GVA (Rs. Billions, base 2011)	Digital Imports (Rs. Billions, base 2011)
1999-00	3,744,130	2200	1332	868	0.24
2000-01	4,125,585	2351	1426	925	0.22
2001-02	4,488,370	2489	1514	975	0.21
2006-07	28,122,536	10373	6169	4205	0.89
2010-11	72,355,947	10360	5633	4728	1.52
2015-16	48,742,898	8222	4021	4201	1.66

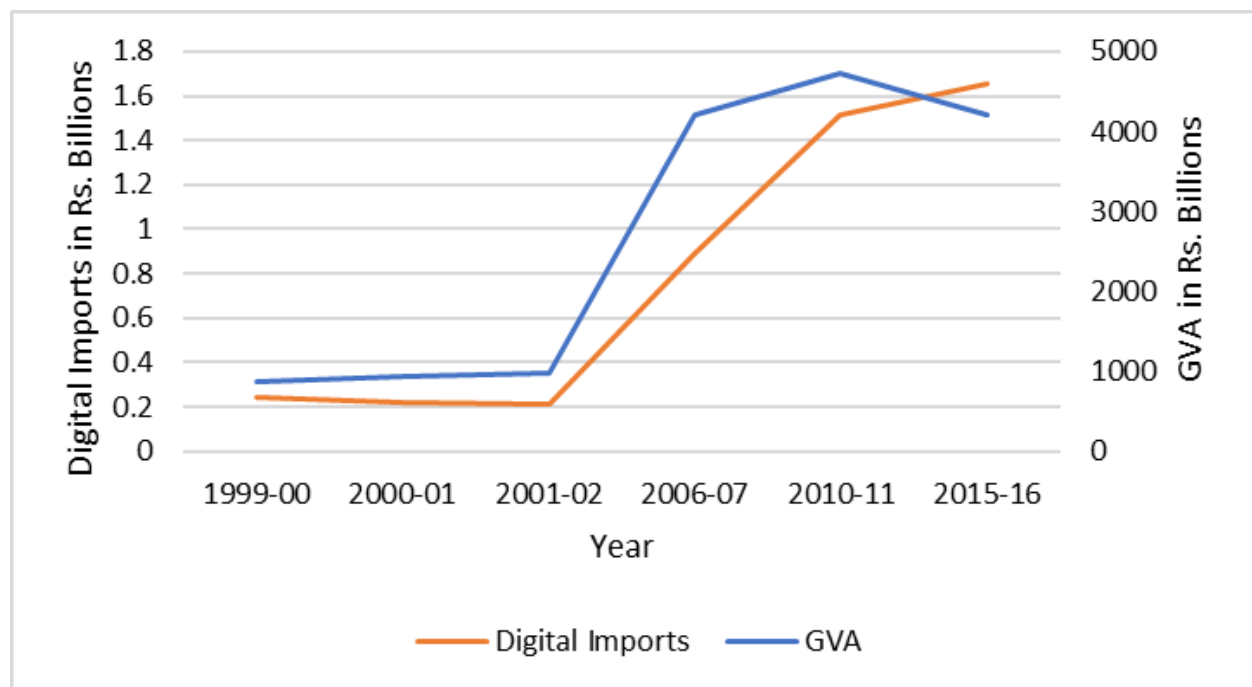
The plot of output and input for the years of the study is shown in the figures. There is a decrease in output and input in the years 2010-11 and 2015-16 as compared to 2006-07. (Figure 1) Nevertheless, the GVA has consistently increased over the years.

Figure 1: Input and Output in the Balanced Panel over Time



The comparison of GVA with Digital Imports is shown in Figure 2. Digital Imports have been increasing over the different years of the study while GVA shows a slight decrease in 2015-16 as compared to 2010-11 (Figure 2). Nevertheless, we may observe a broad positive correlation between the digital imports and GVA of MSMEs, which may be noted as a first tentative evidence for our hypothesis that digital imports may help the MSMEs.

Figure 2: GVA and Digital Imports in the Balanced Panel over the Years



The summary statistics for unbalanced panel are presented in Table 2. The aggregate values, other than employment and GVA, in 2010-11 and 2015-16 are less than the values in 2006-07. Employment has been increasing over the years. Gross value added in 2015-16 is the maximum among all the years of the study while output was the maximum in the year 2006-07.

Table 2: Summary of Unbalanced Panel

Year	Employment	Output (Rs. Billions, base 2011)	Input (Rs. Billions, base 2011)	GVA (Rs. Billions, base 2011)	Digital Imports (Rs. Billions, base 2011)
1999-00	4,756,182	2978	1828	1150	0.23
2000-01	5,283,023	3209	1974	1235	0.22
2001-02	5,692,487	3339	2055	1284	0.22
2006-07	45,401,605	15093	8679	6413	4.92
2010-11	80,557,379	11265	6103	5162	1.7
2015-16	80,783,424	12159	5235	6924	1.86

5.2 PANEL REGRESSION

Pooled, Fixed, and Random effects regressions are estimated for each of the model specifications. These are done in order to analyse the different characteristics of the variables under different assumptions. All the regression variables are in natural logarithms. Panel regressions are estimated both for balanced and unbalanced panel. The best regression model is determined based on F test and Hausman Test. The results of different panel regression models are presented in the following tables.

Digital Imports are significant at 5% level, at the minimum, in all the models of Table 3. The coefficients of the variable represent elasticity of GVA with respect to that variable. The positive value of the coefficient of digital imports, both in balanced and unbalanced panel, indicates that an increase leads to an increase in GVA. The coefficient of Input is also positive and significant in balanced as well as unbalanced panel; thus, one can conclude that if inputs increase GVA also increases. Input has a larger impact on GVA than digital imports. Thus, a 1 percent increase in digital imports leads to a 0.11 to 0.22 percent increase in GVA according to different models in balanced as well as unbalanced panel. There is no clear inference that can be made about employment and the intercept term as different models have given different results. An adjusted R square value of more than 0.95 for all the models indicates a good fit.

Table 3: GVA Based on Other Variables

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.655	1.054.	NA	0.783	1.183**	NA
Employment	0.265***	0.075*	0.042	0.262***	0.038	0.026
Input	0.516***	0.749***	0.829***	0.513***	0.801***	0.848***
Digital Imports	0.195**	0.159**	0.119*	0.218***	0.151***	0.118**
Adj R Square	0.987	0.994	0.995	0.984	0.995	0.995

Model	Pooled	Random	Fixed (Within)	Pooled	Random	Fixed (Within)
Panel Data Type	Balanced	Balanced	Balanced	Unbalanced	Unbalanced	Unbalanced
Best Model	No	No	Yes	No	No	Yes

*** Significant at 0.1% level, ** Significant at 1% level, * Significant at 5% level, . Significant at 10% level

Digital imports per employee are positively and significantly related to GVA per employee in majority of the models, as can be inferred from Table 4. A 1 percent increase in digital imports per employee can increase the GVA per employee by about 0.04 to 0.08 percent in unbalanced panel while a similar conclusion cannot be made for all models. Output per employee is also positively and significantly related to GVA per employee. The intercept is negative in all relevant models. An adjusted R square value of more than 0.90 for all the models indicates a good fit.

Table 4: GVA Per Employee Based on Other Variables

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.606*	-0.615**	NA	-0.357*	-0.407*	NA
Output per employee	0.787** *	0.912***	0.934***	0.815***	0.926***	0.939***
Digital Imports per employee	0.073**	0.039.	0.032	0.082***	0.047**	0.038*
Adj R Square	0.921	0.968	0.972	0.920	0.979	0.977
Model	Pooled	Random	Fixed (Within)	Pooled	Random	Fixed (Within)
Panel Data Type	Balanced	Balanced	Balanced	Unbalanced	Unbalanced	Unbalanced
Best Model	No	No	Yes	No	No	Yes

*** Significant at 0.1% level, ** Significant at 1% level, * Significant at 5% level, . Significant at 10% level

Digital imports have a positive and significant impact on employment in the majority of the models. The coefficient of digital imports shows considerable variation across

models. The best model seems to indicate a positive impact but some models show statistically insignificant coefficient for digital imports. Output and input are insignificant in determining employment in the best model while they are significant in the other models. The output has a positive effect on employment while input has a negative impact where they are significant. The intercept term is positive and significant where relevant indicating that there may be some additional variables that impact the relationship. These inferences can be made from Table 5. An adjusted R square value of more than 0.90 for all the models indicates a good fit.

Table 5: Employment Based on Other Variables

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	3.753***	6.859***	NA	3.365***	6.058***	NA
Output	1.728***	1.256***	1.050	1.411***	0.910*	0.852
Input	-0.836**	-0.687*	-0.951	-0.455*	-0.231	-0.765
Digital Imports	0.046	0.352**	0.792***	-0.046	0.220.	0.794***
Adj R Square	0.938	0.940	0.943	0.934	0.930	0.930
Model	Pooled	Random	Fixed (Within)	Pooled	Random	Fixed (Within)

Panel Data Type	Balanced	Balanced	Balanced	Unbalanced	Unbalanced	Unbalanced
Best Model	No	No	Yes	No	No	Yes

*** Significant at 0.1% level, ** Significant at 1% level, * Significant at 5% level, . Significant at 10% level

5.3 STAKEHOLDER DISCUSSIONS

The discussions with different stakeholders with the aid of a questionnaire is summarized below. The notes of general discussion on digital transmissions that was undertaken with the officials in each of the categories is given below.

Government of India – A government official addressed the difficulty of implementing imposition of tariffs on digital transmissions. The official’s opinion was that the cost and effort needed for enforcement and compliance with the requirements might outweigh any associated gains. A unilateral imposition of tariffs on digital imports might backfire, both in terms of domestic costs and in India’s digital exports to other countries, which could face retaliation in response to a unilateral move.

Industry association officials – A couple of leading industry association officials expressed the opinion that the use of advanced and sophisticated digital products or digital transmissions is currently very limited in MSMEs. The officials did acknowledge that the use of digital technologies should benefit MSMEs. One of the officials, however, stated that MSMEs view such digital technologies as an investment

for the long term, a time horizon for which many MSMEs do not plan for. Nevertheless, the use of day-to-day services for chats, transactions and social media has greatly improved the way they run their businesses.

Another leading industry association official opined that businesses would not be negatively affected as a result of tariff measures on digital transmissions. The official mulled over the difficulties arising as a result of imposition of tariffs or taxes on digital transmissions, including in terms of its implementation. The official felt that indigenous products that are of international standard can be substituted for digital imports, only when it makes economic and financial sense to all stakeholders.

An MSME think tank official similarly noted that digital technologies are useful for MSMEs in spite of potential risks such as data privacy issues. A bigger problem is the inertia and general hesitancy of MSMEs to adopt new technologies. With widespread adoption, the market will find solutions for the risk-related problems, and therefore, the official suggested it is premature to worry about such risks in India, unlike in developed countries, like the USA.

The pull effect of innovation as described by Schumpeter is important to India. New developments like ChatGPT-4 and Figma could further increase productivity of MSMEs. The official felt that entrepreneurial development institutes should focus on educating MSMEs about related opportunities and said such training and support services are currently insufficient.

The official also said India should reduce dependence on foreign technology, but that it should be done by helping develop domestic capabilities, not by obstructing or imposing tariffs on imports. Technology and innovation should not be stopped on the

pretext of leveling the playing field for brick-and-mortar stores vis-à-vis e-commerce, for example. The focus should, instead, be on educating and motivating domestic entrepreneurs for enhancing their adoption of available technologies, and thereafter, on developing Indian alternatives and progressively reducing dependence on the foreign technologies, using market forces and not protectionism. Micro and Small Multinational Corporations (MMNCs) are significant players globally, and India also needs to promote them as the EU does, for example. India needs an outward orientation program, similar to ‘Our Africa’ Program, to develop such MMNCs. The Institute for Small Enterprises Development (ISED) has done such studies in this area, advocating an overhaul of current entrepreneurship education and training.

To summarize, the common view of all the officials in this category was that MSMEs stand to benefit from greater adoption of digital technology; they do not want tariffication of foreign digital services in a manner that will hamper business.

MSME Owners – The tabulated details of the interviews conducted with MSME owners is presented in Table 6. A resort business in Uttarakhand is a front runner on the usage of digital technologies while a retail grocery store in Thiruvananthapuram has reported almost no use. An MSME owner of a retail supermarket in Thiruvananthapuram has stated a reduction in usage of digital tools for business post COVID. A similar statement was made by a resort owner in Uttarakhand; however, a vehicle services business in Uttarakhand reported an increase in use of digital tools.

Digital industry executives opined that their services – both domestic and imported – can help develop platforms for the MSMEs to scale up their sales not only within the country but also globally. The benefits of such digitally-delivered imports include the enhanced capability for MSMEs to reach a global marketplace, enhanced business

development, convenience in logistics and transportation, and the ability to fine-tune operational strategies based on insights from data analytics. In other words, digital platforms can make the lives of MSME owners easier by allowing them to focus on developing their products and services, while the platforms provide help with other aspects of business.

Many inferences can be made from Table 6. All MSMEs had access to the internet through phone as well as computer, with all of them using emails for business purposes. WhatsApp was used for business purposes by most of the MSMEs. The majority of the MSMEs have exposure to some softwares. MSMEs seem to be more open to receiving payments than to making them through UPIs. All interviewees agreed on one thing - business would be affected if these apps were taxed. They acknowledged that digitalization helped them during COVID, but provided different responses when asked if their usage of digital tools has increased, decreased or remained the same post-COVID.

Table 6: Tabulated Results of Questions to MSME Owners

	MSME 1	MSME 2	MSME 3	MSME 4	MSME 5
Location	Thiruvananthapuram	Uttarakhand	Thiruvananthapuram	Thiruvananthapuram	Uttarakhand
Service/Product provided by the MSME?	Retail Grocery	Vehicle services	Retail supermarket	Hardware	Resort business
Do you have an internet-enabled phone?	Yes	Yes	Yes	Yes	Yes
Do you have an internet-enabled computer?	Yes	Yes	Yes	Yes	Yes
Do you use emails for business purposes?	Yes, Gmail	Yes	Official email	Yes, Gmail	Yes
On a scale of 0-5, how much would you rate your use of Facebook for business purposes?	0	4	2	0	2
On a scale of 0-5, how much would you rate your use of Instagram for business purposes?	0	2	0	0	5
On a scale of 0-5, how much would you rate your use of WhatsApp for business purposes?	1	4	3	4	3
On a scale of 0-5, how much would you rate your use of Google Meet for interacting with your suppliers and/or customers?	0	0	0	0	4
On a scale of 0-5, how much would you rate your use of Google Ads for interacting with your suppliers and/or customers?	0	1	3	0	5
Do you use any app for keeping records and inventory management?	MARG	DMS and Tally	Local Billing Software	Soware Software	No
Out of 100, how many transactions for making payments do you do through UPIs including Google Pay?	0, MOSTLY CHEQUES	10		Very less	75
Out of 100, how many transactions for receiving payments do you do through UPIs including Google Pay?	25	50	20	50	50
If the above apps are taxed, do you think it will affect your business adversely?	Yes	Yes	Yes	Yes, but minimally	Yes
On a scale of 1-5, how much did digitalization help you during COVID?		5	4	3	5
Post COVID, has your usage of digital tools for business reduced/remained constant/increased?	Same	Increased	Reduced	Same	Yes

6. CONCLUSIONS

The question of how to facilitate digital trade is increasingly relevant for the success of India's MSME sector. The backdrop is a dramatic expansion in internet access nationwide, with the number of internet subscribers in India estimated to reach up to 800 million by 2023. Meanwhile, India's digitally delivered services exports have posted strong growth, reaching close to \$90 billion. In recent years, India's ICT-enabled services have accounted for more than 60% of all services exports (UN, 2020). At the same time, India's small businesses have begun to integrate imported digital services into their business models, including e-commerce platforms, social media and digital payment applications.

The primary finding of this study is that the use of such digitally-delivered imports is positively and significantly related to value addition, productivity and employment for MSMEs in India. Use of these services is associated with measurable gains in production output, employment and productivity for Indian small businesses. The research has relevant implications for policy: in short, measures that would render it more difficult to obtain digital services from abroad would have a negative impact on India's MSME sector.

The study's conclusions can be viewed through different lenses. The quantification of the impact of digital imports of MSMEs has been undertaken using econometric techniques. A qualitative inquiry about what different stakeholders in MSMEs think about digital transmissions has also been undertaken through interviews.

The interview of different stakeholders sheds light on what different stakeholders think of digital transmissions. The participants of the interview were more or less unanimous in their view that digital technologies are useful to all. Tariffication may have a limited impact at this stage given only a moderate usage of digital tools by SMEs and availability of indigenous alternatives. Indian digital service providers have risen to the challenge posed by their foreign counterparts and this is expected to continue given the Government's impetus and healthy domestic demand. Training and education on adoption of digital tools can further benefit the MSMEs. Small business representatives also stated that it would be good to have indigenous technological capabilities, though not at the cost of increases in prices.

A more comprehensive study could be performed in the future, when there is more updated primary data on MSMEs, to extend the questions asked here to a much larger primary survey. Nevertheless, our findings are robust to many different model specifications and alternative assumptions of data construction.

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APPENDIX

SECTORS IN BALANCED PANEL

NIC 2008 Code	Description
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
22	Manufacture of rubber and plastics products
23	Manufacture of other non-metallic mineral products

24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
45	Wholesale and retail trade and repair of motor vehicles and motorcycles
46	Wholesale trade, except of motor vehicles and motorcycles
49	Land transport and transport via pipelines
52	Warehousing and support activities for transportation
68	Real estate activities
85	Education

SECTORS IN UNBALANCED PANEL

YEAR 2001-02

NIC 1998 Code	Description
10	Mining of coal and lignite; extraction of peat
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying
12	Mining of uranium and thorium ores
13	Mining of metal ores
14	Other mining and quarrying
15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of wearing apparel; dressing and dyeing of fur
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plating materials

21	Manufacture of paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Manufacture of chemicals and chemical products
25	Manufacture of rubber and plastic products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of fabricated metal products, except machinery and equipments
29	Manufacture of machinery and equipment n.e.c.
30	Manufacture of office, accounting and computing machinery
31	Manufacture of electrical machinery and apparatus n.e.c.
32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision and optical instruments, watches and clocks

34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
36	Manufacture of furniture; manufacturing n.e.c.
37	Recycling
40	Electricity, gas, steam and hot water supply
41	Collection, purification and distribution of water
45	Construction
50	Sale , maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
55	Hotels and restaurants
60	Land transport; transport via pipelines
61	Water transport

62	Air transport
63	Supporting and auxiliary transport activities; activities of travel agencies
64	Post and telecommunications
70	Real estate activities
71	Renting of machinery and equipment without operator and of personal and household goods
72	Computer and related activities
73	Research and development
74	Other business activities
75	Public administration and defence; compulsory social security
80	Education
85	Health and social work
90	Sewage and refuse disposal, sanitation and similar activities
91	Activities of membership organisations n.e.c.
92	Recreational, cultural and sporting activities

93	Other service activities
99	Extra territorial organizations and bodies

YEAR 2006-07

NIC 2004 Code	Description
1	Agriculture, hunting and related service activities
2	Forestry, logging and related service activities
5	Fishing, aquaculture and service activities incidental to fishing
13	Mining of metal ores
14	Other mining and quarrying
15	Manufacture of food products and beverages
16	Manufacture of tobacco products
17	Manufacture of textiles
18	Manufacture of wearing apparel; dressing and dyeing of fur

19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21	Manufacture of paper and paper products
22	Publishing, printing and reproduction of recorded media
23	Manufacture of coke, refined petroleum products and nuclear fuel
24	Manufacture of chemicals and chemical products
25	Manufacture of rubber and plastics products
26	Manufacture of other non-metallic mineral products
27	Manufacture of basic metals
28	Manufacture of fabricated metal products, except machinery and equipment
29	Manufacture of machinery and equipment n.e.c.
30	Manufacture of office, accounting and computing machinery
31	Manufacture of electrical machinery and apparatus n.e.c.

32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision and optical instruments, watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
36	Manufacture of furniture; manufacturing n.e.c.
37	Recycling
40	Electricity, gas, steam and hot water supply
41	Collection, purification and distribution of water
45	Construction
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods

55	Hotels and restaurants
60	Land transport; transport via pipelines
63	Supporting and auxiliary transport activities; activities of travel agencies
64	Post and telecommunications
70	Real estate activities
71	Renting of machinery and equipment without operator and of personal and household goods
72	Computer and related activities
73	Research and development
74	Other business activities
80	Education
85	Health and social work
92	Recreational, cultural and sporting activities
93	Other service activities

YEARS 2010-11 and 2015-16

NIC 2008 Code	Description
1	Crop and animal production, hunting and related service activities
10	Manufacture of food products
11	Manufacture of beverages
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products

21	Manufacture of pharmaceuticals, medicinal chemical and botanical products
22	Manufacture of rubber and plastics products
23	Manufacture of other non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing
33	Repair and installation of machinery and equipment
45	Wholesale and retail trade and repair of motor vehicles and motorcycles

46	Wholesale trade, except of motor vehicles and motorcycles
47*	Retail trade, except of motor vehicles and motorcycles
49	Land transport and transport via pipelines
50	Water transport
52	Warehousing and support activities for transportation
55	Accommodation
56	Food and beverage service activities
64	Financial service activities, except insurance and pension funding
68	Real estate activities
85	Education
86	Human health activities
58-63	Information and communication
69-75	Professional, scientific and technical activities
77-82	Administrative and support service activities

* Not sampled in 2010-11

MISSING DATA EXTRAPOLATION METHODOLOGY FOR SECTORS

MSME OWNERS QUESTIONNAIRE

1. Service/Product provided by the MSME?
2. Do you have an internet-enabled phone?
3. Do you have an internet-enabled computer?
4. Do you use **emails** for business purposes?
5. What apps do you use for business promotion, getting new customers, and marketing?
6. On a scale of 0-5, how much would you rate your use of **Facebook** for business purposes?
7. On a scale of 0-5, how much would you rate your use of **Instagram** for business purposes?
8. On a scale of 0-5, how much would you rate your use of **WhatsApp** for business purposes?
9. On a scale of 0-5, how much would you rate your use of **Google Meet** for interacting with your suppliers and/or customers?
10. On a scale of 0-5, how much would you rate your use of **Google Ads** for interacting with your suppliers and/or customers?
11. Are there any other Apps that you use for business? CA
12. Do you use any App for keeping records and inventory management? If yes, which is that App? (**Zoho/Vyapar/Tranzact**)
13. Out of 100, how many transactions for **making payments** do you do through **Google Pay**?
14. Out of 100, how many transactions for **receiving payments** do you do through **Google Pay**?
15. If the above Apps are taxed, do you think it will affect your business adversely?
16. On a scale of 1-5, how much did digitalization help you during COVID?

17. Post COVID, has your usage of digital tools for business reduced/ remained constant/increased?

INDUSTRY ASSOCIATIONS QUESTIONNAIRE

1. Why do you think your industry will or will not benefit from imposition of tariffs on digital transmission?
2. What compliance and enforcement issues do you foresee?
3. Can you suggest better ways than tariffication of making digital transmissions more transparent?
4. How many companies are under your Association?
5. How many companies are expected to join in the future?
6. What are you estimation of growth in dollar terms?
7. What is the ideal level of tariff in your perspective?

GOVERNMENT OF INDIA QUESTIONNAIRE

1. Indian firms have shown grit and quick learning to compete with foreign companies in terms of digitalization. Why is tariff imposition required in the first place?
2. Digitization helped in keeping many small businesses afloat during COVID and beyond. Do you think our economy is resilient enough for such a move?
3. When India MSMEs are raring to go global, would tariffication be a counter move?

-
4. India is an exporter and importer of digital transmissions. How much net revenue gain from tariff impositions is expected?
 5. Studies have shown that such tariffs can adversely affect domestic consumption and tax revenues. What is your view on these findings and arguments?
 6. Which sectors stand to gain from tariffication?
 7. How do we decide which industries are fit for imposition of tariffs on electronic transmissions? Is one criterion also the possibility of counter tariff by main trading partners?
 8. Once industries are identified, how do we quantify electronic transmissions?
 - One way or two-way transmission taxed?
 9. What are the possible tariff rate slabs?
 10. Are there plans to tax use of social media for business purposes?
 11. What is your expected growth on the tariffs?
 12. How many industries are expected to stay in India or leave due to tariffs?

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