The Value of Cross-border Digital Transmissions to MSMEs in Indonesia: Implications for Participation in the WTO E-commerce Moratorium

By: Badri Narayanan Gopalakrishnan, C Karthikeyan, Ciplis Gema Qor'iah, Amit Sinha, Manasi Gupta and Jane Drake-Brockman.

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Executive Summary

This study analyzes how imported digital transmissions contribute to the growth of Indonesian MSMEs[1]. Its conclusions highlight the value of the WTO e-commerce moratorium to both small business and the economy as a whole in Indonesia.

Experiencing a significant structural shift over the last decade, Indonesian MSMEs are increasingly engaged in services. The services sector is rapidly being digitalized on a global basis, and the same holds true in Indonesia. This study highlights the benefits of the WTO e-commerce moratorium to Indonesian MSMEs and the Indonesian economy as a whole. Two-thirds of Indonesian MSME output is now in the services sector, which is also the sector which is digitalizing most rapidly. Total digital imports by Indonesian MSMEs have quadrupled over the period 2010-2021, led by digital imports by MSMEs in wholesale and retail services, followed by "other services".

While much more modest, and starting from a very low base, digital imports by manufacturing MSMEs, are actually growing fastest.. By the end of the decade, nevertheless, the overwhelming bulk of MSME digital imports were destined for the wholesale and retail sector.

Based on a comprehensive literature review, including of recent empirical work involving definitions of digital transmissions, we collected aggregate sector-level time series data for MSMEs using available sources such as ADB and Input-Output (I-O) tables coupled with data on imports of digital transmissions from OECD. This helped us pinpoint the contribution of digital imports in particular, including in individual sectors of the economy.

Econometric regression analysis was undertaken to assess the impact of imported digital transmissions on aggregate output (GDP), employment, productivity and numbers and size of Indonesian MSMEs over time.

Based on data from 2010-2021, the empirical results suggest that digital imports by MSMEs are positively correlated with all investigated aspects of MSME performance, both at aggregate and individual sectoral levels. The econometric panel data regressions suggest, at the aggregate level, that for every 1 per cent increase in imported digital inputs by MSMEs:

1. MSME GDP (production output) increases by 0.96 per cent

[1] The methodology employed is similar to a recent study conducted for India (Narayanan et al 2023).

2. MSME Employment increases by 0.42 per cent
3. Number of MSMEs increases by 0.54 per cent
4. Labor productivity (defined as MSME output (GDP) per employee) increases by 0.95 per cent
5. Employees per MSME (enterprise size measured by employment) increases by 0.13 per cent
6. GDP per MSME (enterprise size based on output) increases by 0.39 percent

The use of intermediate digital imports was associated with enhanced production output from MSMEs, higher labor productivity, and an increase in the number of people they employed. Increases in digital imports were also correlated with increases in MSME numbersand with firms attaining a more economically competitive/relatively bigger scale, as measured both by employees and output.

Our findings that digital imports promote job creation in MSMEs by boosting their production, employment and firm numbers and also increase productivity and scale effects suggest that at the aggregate level, there is no trade-off between the volume of digital imports and the total number of people employed in the MSME economy Our correlations at the individual sub-sector level suggest this finding holds true for many of the services sectors, especially for the high employing wholesale and retail sector.

Furthermore, an increase in productivity also implies a reduction in inefficiencies, including in terms of energy and other input use, providing a positive sustainability angle to the contribution of digital imports by MSMEs.

Background

In 1998, the members of the WTO agreed to impose a moratorium against custom duties on electronic transmissions and have agreed to its extension at every Ministerial Conference since that time. This continuing commitment to not impose customs duties on electronic transmissions has become a bedrock of the growth of the global digital economy and is a major force promoting the growth of SMEs including in developing countries. The moratorium has enabled a global business environment which continues to deliver a wealth of new opportunities for all players to leverage in a plethora of economically useful ways. At the last two WTO Ministerial Conferences, however, India, South Africa, Indonesia, as well as a few other developing country members, began to raise concerns about potential customs revenue losses resulting from the moratorium with the advent of 3-D printing and a desire to have the freedom to impose import substitution policies in the digital context.

In response the WTO E commerce work program has engaged in productive discussions on issues raised by these countries as well as a broader discussion of the costs and benefits of ending the moratorium among WTO members. These discussions led to extensive new economic analysis by the OECD, World Bank, IMF, and academic studies providing strong evidence that the moratorium promotes developing country GDP growth and that the costs of ending the moratorium far outweigh any benefits, which would be marginal at best particularly with respect to revenue generation. Historically-Indonesia has been supportive of extending the e-commerce moratorium on the basis that it will facilitate economic development.

More recently, though, Indonesia and some other WTO members have expressed skepticism about the benefits of the moratorium for SMEs. In a communication to the WTO in 2022, Indonesia noted "domestic retailers in developing countries hardly benefit from the free tax and duties scheme for the electronic transmission, given that the majority of business sectors in developing countries are Small and Medium-sized Enterprises (SMEs) who engage minimally in cross-border e-commerce."

Indonesia is a large and rapidly growing market with tremendous potential, and, correctly positioned, can continue to reap tremendous advantages from the moratorium for its domestic economy and its SMEs in particular. As the findings presented in this paper indicate, Indonesia's SMEs are in fact benefiting from the moratorium as they have become more actively engaged in the digital economy over the last decade and now depend on digital imports and digital tools to

grow and thrive. Our findings, moreover, show MSMEs in the retail services sector to be among those benefitting most from growth in digital imports.

Indonesian regulators have already been active in securing revenue in the digital space as a result of the 11 per cent value-added tax (VAT) on electronic transmissions that has been in place since 2020, along with a reporting requirement for digital transactions. The VAT is collected by the Directorate General of Taxes (Direktorat Jenderal Pajak or DJP in short), separate from the Customs office. According to a report in the Jakarta Post (Thomas, 2022), USD163 million in VAT revenue was collected from electronic transactions in the first half of 2022 alone. It is notable that the recent IMF Report on the moratorium concludes that a VAT is a far more effective revenue raising mechanism than imposing customs duties, generating 150 per cent more revenue than imposing customs duties, and avoiding the risk of harms to SMEs as well as the risk of potential retaliation.[2]

Despite its success in raising revenue through its existing VAT on electronic transmissions, Indonesia has taken a step towards imposing duties on electronic transmissions by establishing HTS codes for five categories of enterprise software. These items, which the Indonesian government describes as "digital goods", include the following under Heading 99.01: Operating System Software (9901.10.00), Application Software (9901.20.00), Multimedia (9901.30.00), Supporting or Driver Data (9901.40.00), and Other Software and Digital Product (9901.90.00). Currently Indonesia imposes a most favored nation (MFN) tariff of zero per cent in these five categories. While Indonesian customs authorities have not indicated how import duties would be imposed on digital software imports, they have indicated they intend to proceed with imposition of duties at some point in the near term[3].

Globally, there are concerns regarding Ministry of Finance Regulation No. 190/PMK.04/2022 ("PMK 190") and the imposition of new customs obligations on imports of intangible goods, including digital tools, knowledge, and content that is transmitted electronically. Even with a zero tariff, compliance costs associated with Reg 190 are considered to be onerous for MSMEs.

[2] IMF (2023, September). Fiscal Revenue Mobilization and Digitally Traded Products: Taxing at the Border or Behind It?. Document NOTE/2023/005. Authors - Tibor Hanappi, Adam Jakubik,and Michele Ruta

[3] Indonesian communication to WTO dated 09 December 2022. Indonesia's Perspective on Customs Duties on Electronic Transmissions, Document WT/GC/W/859.

Literature Review

Impact of tariffs on economic growth

Historical studies on Indonesia might shed some light on how imports have impacted Indonesia. Piazolo (1996) studies the impact of imports on economic growth in Indonesia over the years 1965-1992. A positive effect was found between imports and economic growth over the long run. Marwah and Tavakoli (2004) studied the impact of imports on economic growth in Indonesia over the years 1970-1998. The study used imports as a separate factor in the production function. The production elasticity of imports was determined to be 0.226 for Indonesia.

Import tariffs are a double-edged sword, protecting and aiding domestic growth on one hand but also depriving the economy of the productivity boost that would be achieved by reduced costs. Protectionism through an increase in import tariffs in Indonesia was found to have a negative impact on rural and urban poverty as well as on income inequality (Mahadevan et al., 2017). A reduction in tariffs on inputs into the manufacturing sector in Indonesia has been found to result in a more than proportional increase in productivity (Amiti and Konings, 2007).

Makiyama and Narayanan (2019) analyzed the impact of potential tariffs on digital transmissions in a number of different economies (India, Indonesia, South Africa, and China) should the WTO moratorium on electronic transmissions expire, using the CGE GTAP modelling framework. Services sectors generally considered to be part of the digitized economy and involving electronic transmissions include:

- Online retailing services (e.g., online intermediation)
- Internet publishing, web search portals, directories, and information services
- Motion picture and video industries and sound recordings (online portion only)
- Software and programming
- Data hosting, system services, and data transfers
- Advertising - NAICS 541800 can also be subject to tariffs.

The study mapped these sectors to GTAP sectors and shocks the model with the appropriate tariffs. The study finds that the overall GDP of Indonesia is expected to decrease with a loss in most other macroeconomic variables such as investment, employment, and welfare. This was found to be the case when there was unilateral or bilateral imposition of tariffs.

Impact of digitization on SMEs and MSMEs, including access to GVCs

The lowered barriers brought about by the moratorium have the potential to kindle economic growth and employment prospects at the micro and sectoral level. Small businesses, often the

backbone of economies, can now harness the global market by offering their products and services beyond their geographical confines. This not only diversifies revenue streams but also has the potential to generate new jobs.

The trade-related problems faced by SMEs may or may not be similar to larger enterprises. The WTO World Trade Report of 2016 shows that problems faced by SMEs pertaining to trade may differ across countries at different levels of development. In particular, SMEs in developed economies may enjoy some additional government incentives/subsidies as compared to those in developing countries. In general however, changes in tariffs have a larger impact on the trade flows of SMEs in merchandise sectors compared to large enterprises. Compared to large enterprises, SMEs in merchandise sectors also tend to have a relatively more significant presence in sectors that have higher tariffs. Problems in areas such as ICT security and data protection among others pose relatively more serious challenges to SMEs in all countries in participating in global valaue chains (GVCs). The OECD has also shown that typically reductions in barriers to services trade have a significantly greater impact on trade cost reductions for SMEs and MSMEs compared with larger enterprises.

A report by ADB (2019) discusses the evolution of GVCs in Indonesia. This report compares the participation of Indonesia in GVCs through forward and backward linkages between 2000 and 2017. There has been a decrease in both forward and backward linkages with participation in the former being greater than the latter in both the years. Most of the imports into Indonesia were destined as intermediate inputs into domestic production including for export.

Participation of SMEs in GVCs is facilitated to a large extent, even more so than for large firms, by a presence on the web, with ICT infrastructure of the country also playing a significant role (Lanz et al., 2018). López González and Sorescu (2019) find in an OECD paper on trade facilitation for SMEs that advance rulings impact the export propensity of firms, implying that their foreign inputs play a significant role in the production process and engagement in GVCs. One can deduce that this finding on foreign inputs covers digital imports as well as physical imports.

It is worth noting that Miroudot (2019) observed that digital channels have significantly facilitated countries with specific industry strengths to effectively tap into foreign markets. Miradout's analysis of GVCs highlighted Korea's remarkable position as the third highest earner in global motion picture revenue, despite its relatively small population. This accomplishment, accounting for 6 per cent of worldwide revenue, stems from Korea's advanced film industry. Beyond

producing its own acclaimed movies, the country also offers specialized services across the entire film-making process to international productions.

In this GVC context, the imposition of import tariffs in digitized sectors could have unintended consequences, including in terms of affecting other associated digital services. As online delivery of services increases, levying duties on a digital product might necessarily impact other related bundled services. This is likely to be more visible in outsourced sectors dominated by SMEs.

A survey-based Indonesia Services Dialogue study (2021-2022) has shed light on the contribution of MSMEs specifically to the Indonesian economy and provided an understanding of the extent and level of dependence of MSMEs on digital goods and service suppliers and the positive impact of digital use on MSME business outcomes.

The primary challenges encountered by MSMEs in Indonesia are high operational costs, difficulties in driving revenue growth, and high barriers to expansion. To overcome supply chain issues during the COVID-19 pandemic, 44 per cent of MSMEs surveyed had joined online marketplace platforms or e-commerce channels. Going digital helped MSMEs earn income through a more extensive consumer base both nationally and globally, as well as achieve efficiency in operational costs and transaction processes. As many as 98 per cent of surveyed MSMEs have now adopted digital tools.

Digital adoption is more common, moreover, in core business processes such as software or application services and for marketing tools such as online platforms, social media and operating system and other supporting software, than in supporting role activities (such as human resources and finance). The dependency of MSMEs on digital goods and services suppliers was rated as 3.40, which is classified as a 'moderate dependency' level, meaning that MSME and digital goods and service suppliers have relatively equal bargaining power. The study concluded that using digital goods and services has helped Indonesian MSMEs in expanding and scaling up their business. MSMEs that use digital technology are also more likely to have higher participation in local communities and employ more local people.

The impact of this digital adoption is shown to be dramatic, with overall increases in the scale of business as measured by consumer base, revenue, profits, assets, workforce numbers and the number of product variations sold. On average, the consumer base increased per cent, employee numbers increased by 3 people per business unit, product variations increased to 4 and revenue and profits increased over 20 per cent.

Business revenue increased for 80 per cent of MSMEs surveyed, operational costs fell for 63 per cent and 85 per cent expanded their businesses. In the transportation and communication sectors, 88 per cent of MSMEs experienced revenue gains and all of them expanded their business. Seventy-seven per cent of MSMEs in forestry, agriculture and fisheries experienced cost reductions. The overall average monthly reduction in MSME logistics costs alone was 16 per cent, translating to an estimated monthly cut of USD413 in average costs per business unit for small businesses.

A big impact was also identified on propensity to export. Indonesian MSMEs making use of digital imports were shown to be 4.6 times more likely to export.

Narayanan et al. (2023) undertook a study focused on the impact of digital imports on MSMEs in India. Data from different sources such as the Indian NSSO sample survey and census of MSMEs were used in conjunction with ICIO data. Digital imports were found to have a positive influence on many different macroeconomic variables including Gross Value Added, Employment and Productivity of MSMEs when analyzed at economy-wide aggregate level.

Impact of the moratorium on government revenue and other economic variables

Despite substantial evidence on the value of digital imports to small business in developing countries, some have nonetheless continued to advocate for the imposition of tariffs. Banga (2019) argued that developing countries could generate about USD 4.5 billion in additional revenue via customs duties on electronic transmissions; estimated to be about 40 times more than developed countries could generate via customs duties on electronic transmissions (USD 103 million). Her estimates, however, have subsequently been somewhat discredited in the literature.

Banga also estimated that for developing countries, the revenue foregone from customs duties which would otherwise be imposed on physical imports of digitizable products is 30 times more than for developed countries. Banga estimated the potential tariff revenue loss associated with digitizable products at about USD 108 million for developed countries and USD 3.5 billion for developing countries.

In contrast to Banga's approach, Andrenelli and López González (2019) drew attention to the economic and developmental benefits arising from imports of electronic transmissions. They drew the following conclusions:

- The ability to digitize goods translates into substantial reductions in transportation costs, a factor that can account for up to 20-30 per cent of the total trade expenditure. Given that such costs disproportionately affect developing counties, the introduction of electronic transmissions has the potential to level the playing field in this regard.
- Any decline in tariff revenue due to the elimination of tariffs on goods amenable to digitization would be counterbalanced by enhancements in consumer well-being, ultimately yielding net welfare gains. Indeed, simulations of tariff reductions on digitizable goods indicate a rise of USD 940 million in consumer welfare, surpassing revenue loss costs by USD 73 million. Though more challenging to model, reductions in transportation costs are also expected to contribute to additional welfare gains.
- The utilization of foreign business services, increasingly deliverable through digital means, significantly bolsters export competitiveness. Access to such services is particularly vital for lower middle and lower-income economies.
- Concrete evidence at the firm level corroborates those digital technologies, like websites or digital delivery methods, empower businesses in developing countries, including SMEs, to become exporters. This, in turn, opens up novel growth opportunities. Potential duties imposed by other countries on electronic transmissions, encompassing content, could potentially impede the export capabilities of domestic SMEs.

The OECD analysis suggests that when WTO members deliberate on extending the moratorium, it is crucial that they take into account the broader advantages it offers, rather than focusing solely on revenue implications. While the implications of the moratorium for government revenue appear relatively minor, discontinuing it would result in more significant setbacks, such as compromised consumer welfare and diminished export competitiveness. The modelling results emphasized the sensitivity of outcomes to tariff application methods, underlining the complex nature of evaluating tariff policies with respect to digital trade.

Several additional factors warrant consideration when evaluating the significance of the moratorium:

- The first issue is the adverse impact of tariffs on consumers. Historical economic data demonstrates that the imposition of tariffs results in local import-oriented businesses passing on the increased costs to domestic consumers. In essence, local consumers bear the primary brunt of tariff implementation. Tariffs also tend to correlate with reduced output and productivity levels.

- Second, digital delivery generally involves enhanced affordability and accessibility. Notably, the expenses associated with transportation constitute a substantial portion, approximately 20-30 per cent, of merchandise trade costs in countries with less developed infrastructure. Adoption of digital delivery markedly mitigates these expenses, thus promoting consumer welfare.
- Third, the adoption of digital transactions serves as an effective deterrent against corruption. The transparency intrinsic to digital transactions renders them preferable from an enforcement perspective. Countries can accrue advantages by encouraging a transition toward digital platforms, where transactions are readily documented and accounted for.
- There also exists considerable technical ambiguity regarding governments' ability to establish equitable regulations for levying custom duties on electronic transmissions. Should the concept of imposing duties on "digitizable goods" be pursued, the identification of the source of cross-border data transfers, destined for transformation into tangible products in the receiving country, becomes imperative. This, however, is challenging due to the dynamic nature of data flows. During internet transmission, data is segmented into smaller packets, which traverse diverse routes and jurisdictions in transmission to the final destination. The reassembly of these packets into a coherent message takes place upon arrival. Designating a solitary country as the origin of these distinct data subsets, each traversing various jurisdictions prior to convergence, entails intricate and potentially arbitrary determinations.

Serafica et al. (2020) evaluated the impact of the moratorium for the Philippines. The moratorium was shown as resulting in 0.10 per cent and 0.65 per cent foregone customs revenues determined using different tariff rates. A negative impact can be witnessed on the whole economy on account of barriers to cross-border data flows, thus putting forward a strong case for continuation of the moratorium.

Andrenelli and López González (2023a, 2023b) address the issues around classification of electronic transmissions as goods or services, noting the ambiguity about products that can be delivered both electronically and embodied in physical format, such as films, video games, music, or software. The papers help clarify the application of the moratorium to content rather than just the 'carrier medium'.

The OECD authors also examine provisions in Regional Trade Agreements (RTAs) on "Non-Imposition of Customs Duties on Electronic Transmissions" (NICDET) clarifying that neither these provisions nor the Moratorium apply to internal non-discriminatory taxation nor cover regulation of electronic services delivery covered under GATS and in other separate provisions of

the RTAs. Over 100 countries at all levels of development have signed at least one NICDET provision in their trade agreements. This includes over 50 high-income countries, over 30 upper-middle-income countries, and more than 10 lower-middle-income countries.

A key aspect of this work is a review of the customs revenue implications of the moratorium, which argues against the fiscal policy case for abandoning the moratorium. The Andrenelli and López González analysis reveals that an average additional 0.68 per cent of total customs revenue or 0.1 per cent of total government revenue could be collected if the WTO moratorium is discontinued. However, this additional revenue could equally well be generated by a VAT or goods and services tax (GST). The macroeconomic effects of not renewing the moratorium include greater policy uncertainty, reductions in trade and higher tariffs, which can undermine domestic competitiveness and disproportionately impact low-income countries and small firms.

Data Sources and Methodology

Aggregate sector-level time series data for Indonesian MSMEs was compiled drawing on available data from sources such as ADB and I-O tables coupled with data on imports of digital transmissions from OECD. The ADB SME monitor has MSME data for the years 2010, 2011 and 2012. Indonesia's economic census of 2016, though it captures the composition of some sectors of the economy, fails to capture all the sectors, hence some assumptions about the sectoral composition have been made beyond 2016. The sectors present in the ADB SME monitor are: 1) Agriculture, forestry, and fisheries, 2) Manufacturing, 3) Transportation and communication, 4) Construction, 5) Wholesale and retail trade, 6) Other services and 7) Others.

OECD's ICIO (OECD 2022) data is used to arrive at the digital imports for Indonesia. The classifications of IDN_J61 and IDN_J62_63, corresponding to Telecommunications and IT and Other information services, are taken as representatives for all digital products. The digital input into different sectors of Indonesia can be identified as input rows in the ICIO input output table that ends with _J61 or _J62_63 with columns being different sectors in Indonesia. Digital imports into Indonesia can be inferred to be any such row from a country other than Indonesia. The summation of a column will be the total digital imports into Indonesia. The total imports into different sectors are also calculated on similar lines. The exports of Indonesia can be inferred to be rows in the ICIO input output table starting with IDN_ with columns of other countries. The digital imports by MSMEs in each sector are assumed to be proportional to the digital imports to

the sector as a whole[4]. The methodology used is detailed in the appendix. The mapping between ICIO classification and sectors in the ADB SME monitor can be found in the appendix.

Following data collection, the econometric regression and correlation exercise was used to assess the impact of imported digital transmissions on the output, productivity, employment, and profits of MSMEs over time.

The Pearson correlation coefficient is used to measure linear correlation between a pair of variables. It is defined as:

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{n\sum x_i^2 - (\sum x_i)^2}\sqrt{n\sum y_i^2 - (\sum y_i)^2}}$$

Where *n* is sample size, x_i and y_i are individual sample points, $\bar{x}$ and $\bar{y}$ are individual means.

This study undertakes panel data regression to understand the relationship between different variables. Panel regression is an econometric technique that is widely used to understand cross-sectional changes over time. Panel data models can be either pooled, fixed, or random illustrating the assumptions behind each model (Constantin Colonescu, 2016).

The pooled model can be represented simply as

$$y_{it} = a_1 + a_2 x_{2it} + \cdots + a_k x_{kit} + e_{it}$$

Where *t* is the time period, *i* is the individual cross-sectional observation and a_k is the coefficient of the kth variable.

The fixed effects model can be represented as

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

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

The random effects model can be represented as

$$a_{1i} = \bar{a}_1 + u_i$$
$$y_{it} = \bar{a}_1 + a_2 x_{2it} + \cdots + a_k x_{kit} + \epsilon_{it}$$
$$\epsilon_{it} = u_i + e_{it}$$

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.

[4] Data for digital imports into MSMEs is not available. This is a proxy for the imports.

The macroeconomic models used in this study analyze the following relationships at a sector level as classified in the ADB SME monitor. The following econometric equations are estimated:

$$ln(GDP_{it}) = a_0 + a_1 * ln(Employment_{it}) + a_2 * ln(Number\ of\ Enterprises_{it}) + a_3 * ln(Digital\ Imports_{it}) + e_{it}$$

$$ln(Employment_{it}) = a_0 + a_1 * ln(Number\ of\ Enterprises_{it}) + a_2 * ln(Digital\ Imports_{it}) + e_{it}$$

$$ln(Number\ of\ Enterprises_{it}) = a_0 + a_2 * ln(Digital\ Imports_{it}) + e_{it}$$

MSME productivity and size in a sector is analyzed with the specification as in equations below:

$$ln(GDP\ per\ MSME_{it}) = a_0 + a_1 * ln(Employee\ per\ MSME_{it}) + a_2 * ln(Digital\ Imports\ per\ employee_{it}) + e_{it}$$

$$ln(Employee\ per\ MSME_{it}) = a_0 + a_1 * ln(GDP\ Per\ Employee_{it}) + a_2 * ln(Digital\ Imports\ per\ employee_{it}) + e_{it}$$

$$ln(GDP\ per\ Employee_{it}) = a_0 + a_1 * ln(Digital\ Imports\ per\ employee_{it}) + e_{it}$$

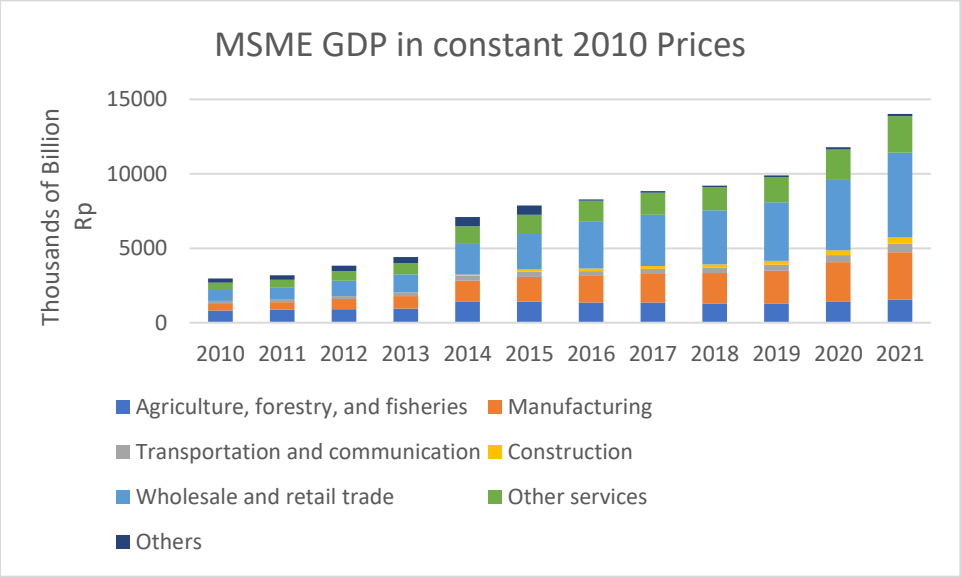
The study explores these relationships using different panel data regression models. F test and Hausman test are used to determine which among the models best describes the relationship. F test is used to determine the better among pooled and fixed effects models, while Hausman test is used to determine the better among fixed and random effects models (Constantin Colonescu, 2016). Models with significant coefficients are presented. R software has been used to run these models.

Results

Data analysis

The aggregated deflated value of the MSME contribution to Indonesian GDP increased over the decade to 2021. The MSME contribution to production is more in the services sectors than in the merchandise sectors. In 2010, MSME output was already more concentrated in the services sectors (56 per cent) and a decade later in 2021, as much as two thirds of MSME output was generated in the services sector. The most growth in relative terms has been in wholesale and retail services along with manufacturing and "other services".

Figure 1: MSME production output, by sector, 2010 to 2021



The contribution to GDP by MSMEs in the agricultural sector has plummeted from 28 per cent to 11 per cent over the decade from 2010 to 2021, as illustrated in figure 2. `The MSME contribution to GDP has meanwhile increased dramatically to 41 per cent in wholesale and retail services and also increased, but to a lesser extent, in the manufacturing sector. MSMEs in the services sector have increased their overall contribution to GDP during the decade, with the upward trend apparent not only in wholesale and retail but also construction and "other services".

Figure 2: Comparison of MSME contribution to GDP by sector, between 2010 and 2021

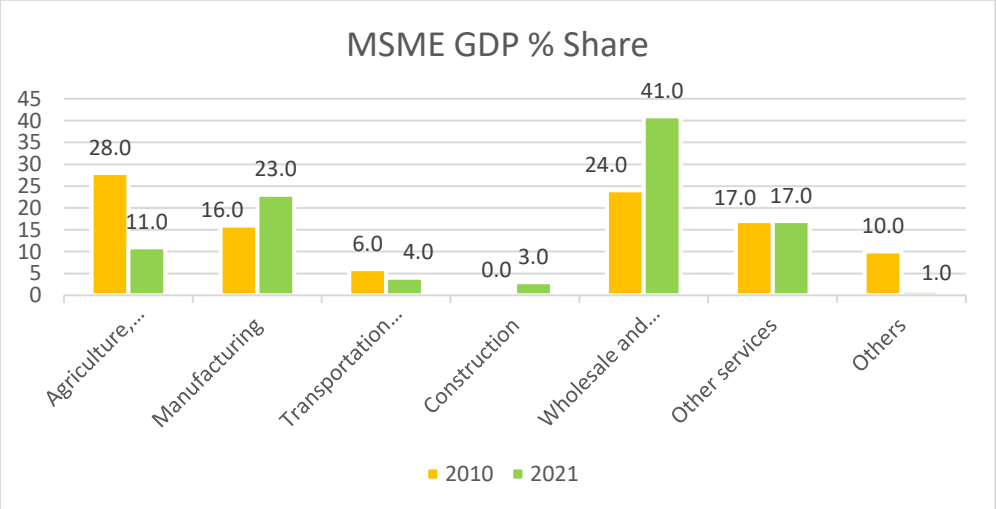
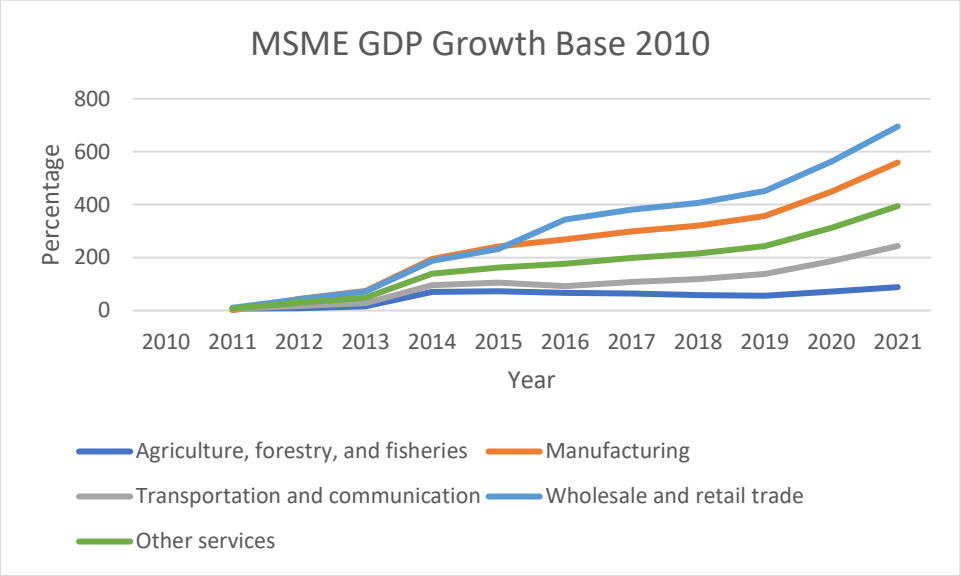


Figure 3 maps the trends in growth rates and shows that wholesale and retail services have grown faster than other sub-sectors in the MSME economy.. The contribution of MSMEs in

manufacturing and other services is also accelerating. over . The contribution to growth from MSMEs in agriculture has flattened out

Figure 3: Trends in MSME contribution to GDP, major sectors, 2011-2021



Over the last decade, the number of MSMEs in the services sector has also grown more rapidly than is the case in the goods sector., figure 4 shows that by the end of the decade, slightly over half of MSMEs are located in the goods sectors (agriculture and manufacturing) and slightly under half are in services. figure 5 shows there are still more MSMEs in Indonesia's agricultural sector than in any other individual sector, but wholesale and retail MSMEs now come a very close second. Of the remaining services sectors, "other services" take the top position, followed by transport and communications, and construction.

Figure 4: Number of MSMEs by sector, 2010 to 2021

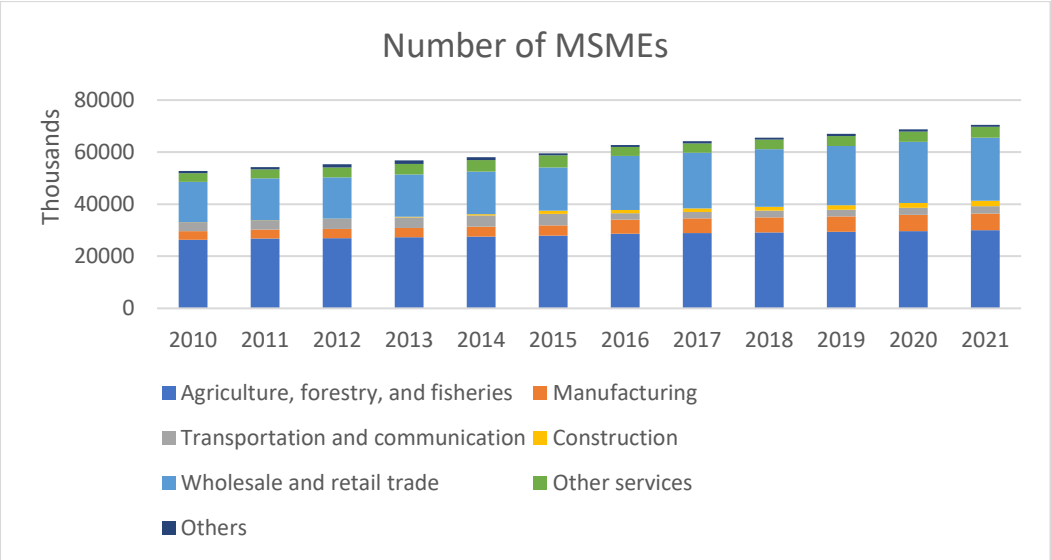
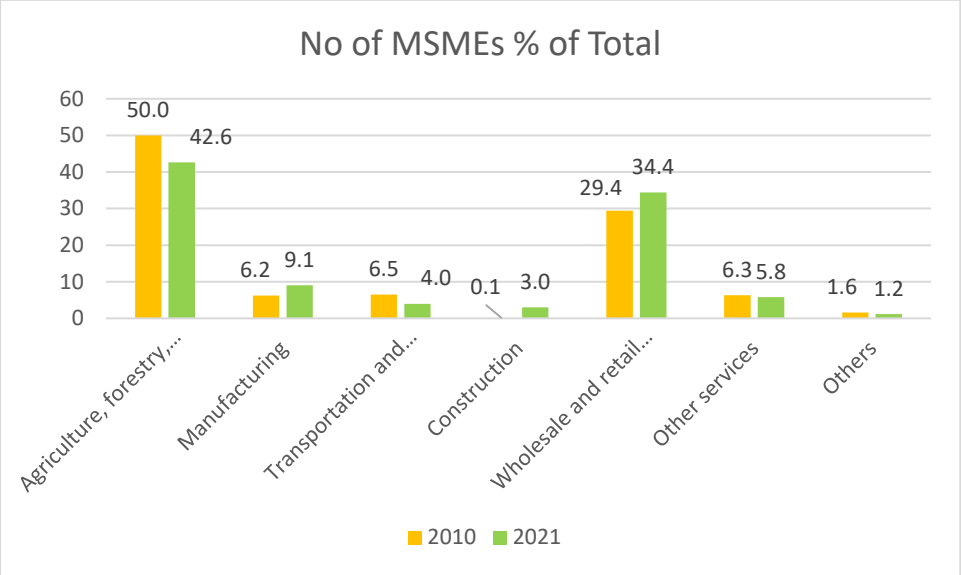


Figure 5 further illustrates the decline in the number of MSMEs in the agricultural sector over the last decade, and the steady increase in MSME numbers in wholesale and retail as well as manufacturing.

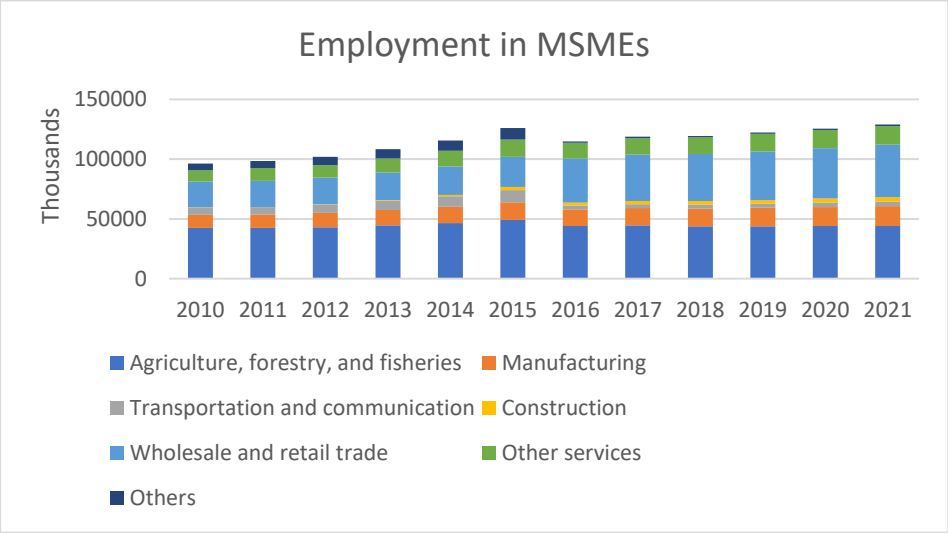
Figure 5: Distribution of MSMEs, by percentage share across sectors2010 and 2021



As shown in figure 6, MSMEs in the agricultural sector traditionally provide a solid underpinning bedrock of employment but by the end of the decade, there had been no net increase in numbers employed, unlike for example wholesale and retail services where employment now matches that in agriculture. MSME employment in manufacturing experienced some growth so the goods sectors together managed to hold their own until by the end of the decade they account for just under half of MSME employment, with services accounting now for just over half.

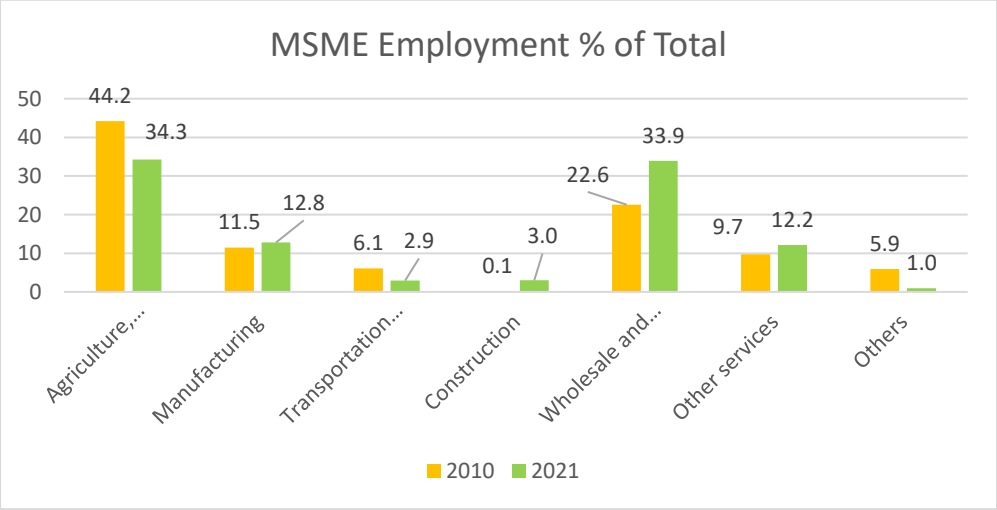
Looking across the goods and services sectors, agriculture and wholesale and retail services together account for close to two-thirds of total MSME employment,. MSMEs in construction services and transportation and communication services employ far fewer people than the other sectors. While there has been some slow upward trend in construction, MSME employment in transport and communication has dropped significantly since 2015. "Other services" have seen significant growth.

Figure 6: MSME employment trends, by sector, 2010-2021



As shown in figure 7, the MSME employment share in agriculture dropped 10 percentage points over the last decade; the MSME employment share has meanwhile increased more than 10 percentage points in wholesale and retail, 4 percentage points in other services, 2 percentage points in construction and 1 percentage point in manufacturing.

Figure 7: Comparison of MSME employment shares, by sector, between 2010 and 2021



Taken together, figures 1-7 suggest a broad positive correlation between digital imports by MSMEs and their performance in terms of GDP, enterprise numbers and employment..

Meanwhile, figures 8 and 9 show the upward trend in MSME digital imports, broken down into different sectors, over the last 10 years. There has been dramatic total growth over the decade (quadrupling from Rp 10,000 billion to Rp 40,000 billion) with the largest increases in wholesale and retail services followed by "other services". Growing fastest, from a relatively low base in

2010, digital imports by manufacturing MSMEs grew more than 6 fold to about Rp 2,612billion in 2021 while those into wholesale and retail grew nearly 5 fold to about Rp 26,281billion in 2021. Digital imports by agricultural MSMEs declined over the period. By the end of the decade, the overwhelming bulk of MSME digital imports were destined for the wholesale and retail sector.

Summarizing across figures 1-8, a structural transformation has taken place over the decade, with MSMEs , shifting steadily towards the services sector..

Figure 8: MSME cross-border digital imports, by sector, 2010-2021

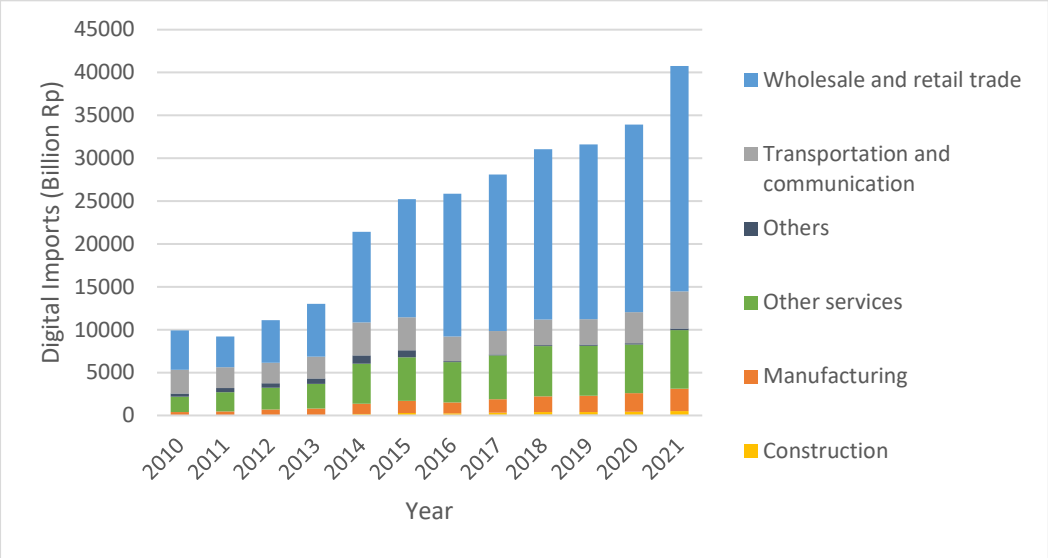
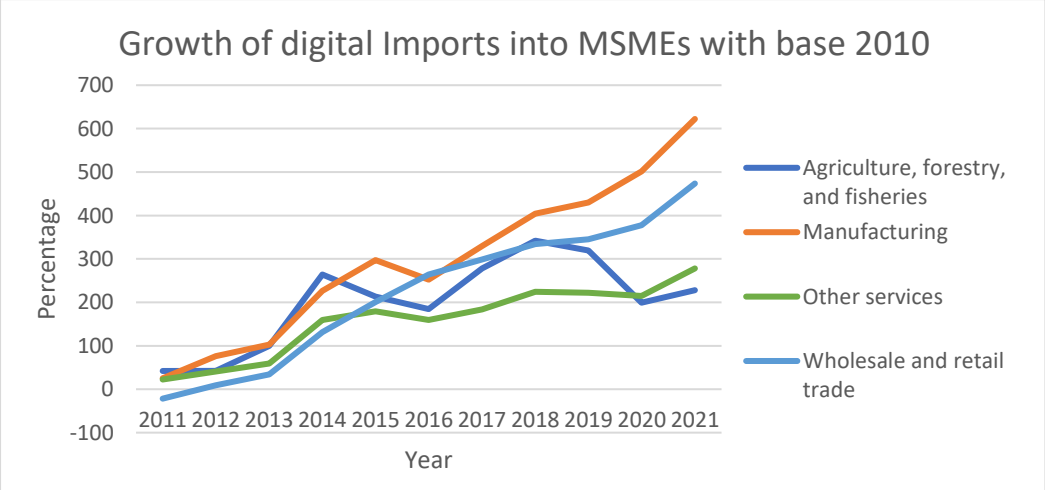


Figure 9 charts the growth of digital imports into different sectors to 2021, keeping 2010 as the base year. The rate of growth rate of digital imports into manufacturing is more than that of wholesale and retail but the absolute value of imports into the latter is far higher. (figure 8).The growth of digital imports into the MSME agriculture sector has been minimal.

Figure 9: Trends in MSME digital imports, by sector, with base 2010



The tertiary sector, comprising of wholesale and retail, transport and communication as well as "other services," can be said to be the driver of GDP growth over the years as can be inferred from figure 10. Compared with the primary and secondary sectors taken together, the tertiary sector has grown to the point where it has only slightly fewer MSMEs, they employ slightly more peoplepeople, imports more digital content and generate 85 per cent more output.and

Figure 10: Comparative analysis of MSMEs in the goods and services sectors.

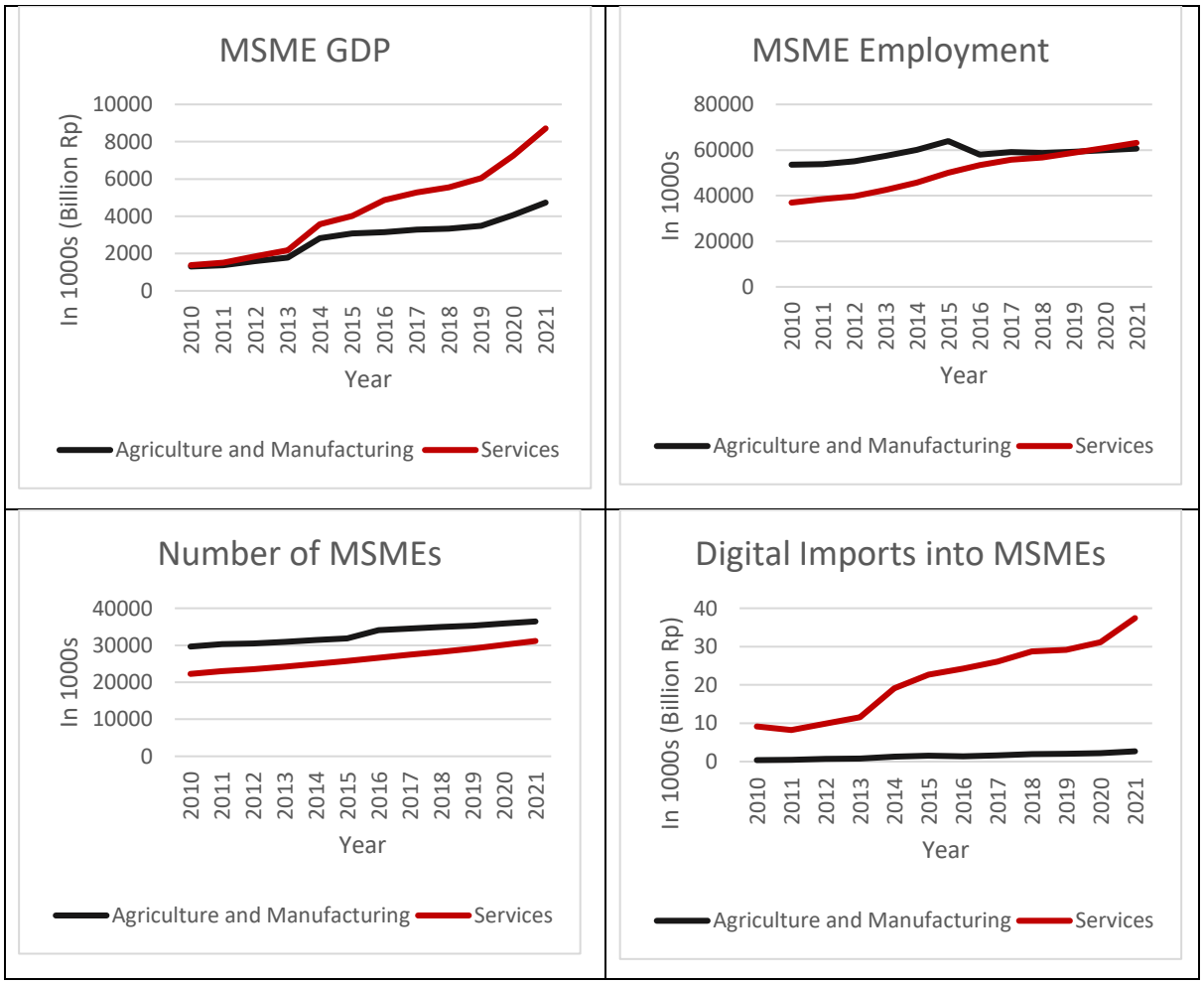


Figure 11 below suggests that MSME GDP and their digital imports tend to trend in the same direction in the manufacturing and services sector. The same holds for MSME employment and number of enterprises, with few exceptions, as illustrated in figures ~~8~~ 12 and ~~9~~ 13. This reinforces our broader finding above that digital imports have a positive correlation with MSME performance as measured in different ways, including at sectoral levels, not just at a macro level.

Digital imports by MSMEs appear to have had a lesser impact on MSME output in the agricultural sector than in other sectors of the economy, at least during the later years of the study. Agricultural

MSMEs have the lowest digital import-to-output ratio, while MSMEs in the transport and communications sector have the highest imported digital intensity in their output.

Figure 11: Trends in MSME GDP and MSME digital imports, by sector, 2010-2021 (left vertical axis – MSME GDP, right horizontal axis – MSME digital imports, billion Rp)

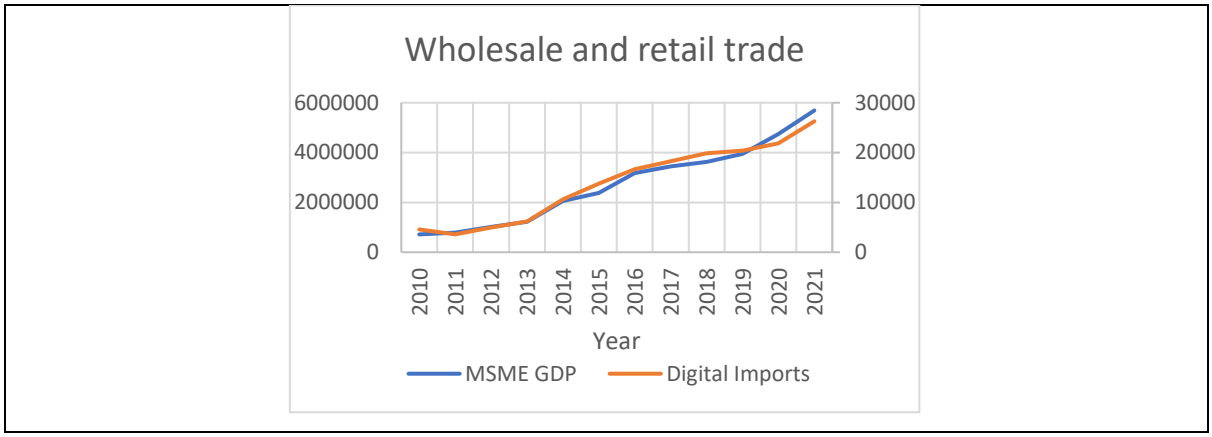
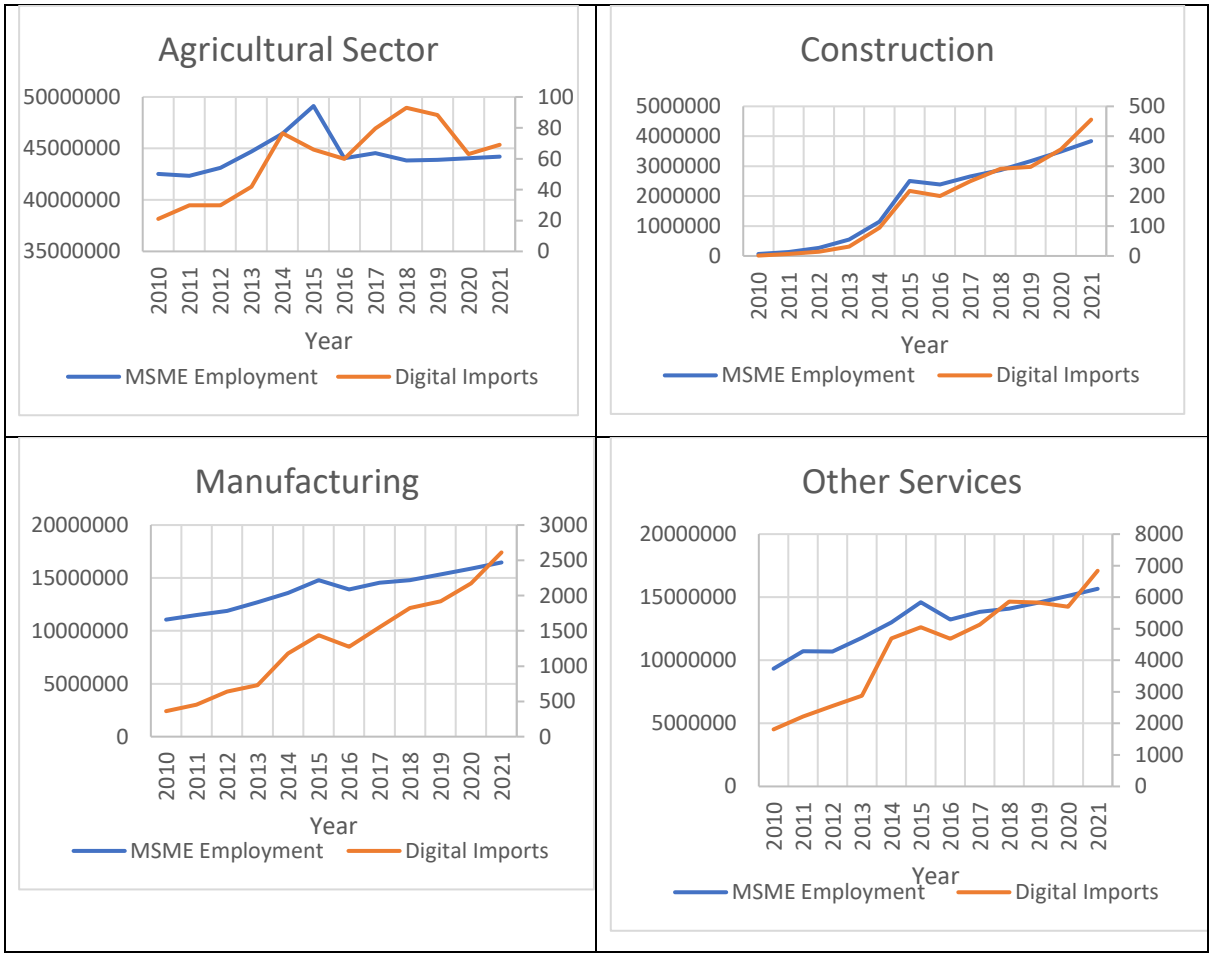


Figure 12 compares the trends in digital imports and MSME employment.. In construction, digital imports appear to have a role in sustaining MSME employment growth. This is evident also for manufacturing and, perhaps to a lesser extent, in wholesale and retail as well as other services. MSME employment trends in agriculture as well as in transport and communications suggest there may be productivity gains for MSMEs in these sectors due to the adoption of digital services.

Figure 12: Trends in MSME digital imports and MSME employment, by sector, 2010-2021 (left vertical axis – employment, right vertical axis – digital imports, billion Rp)



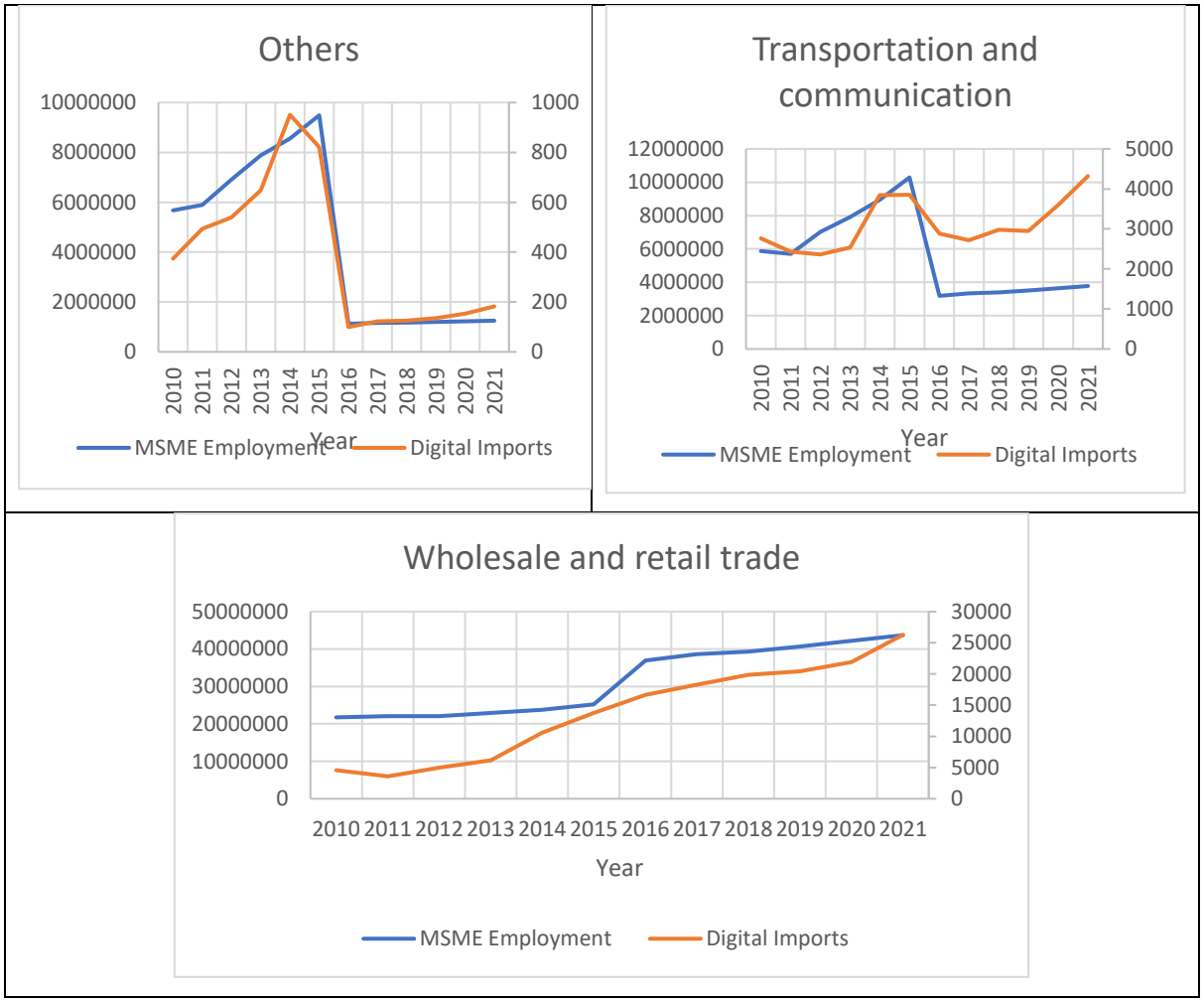
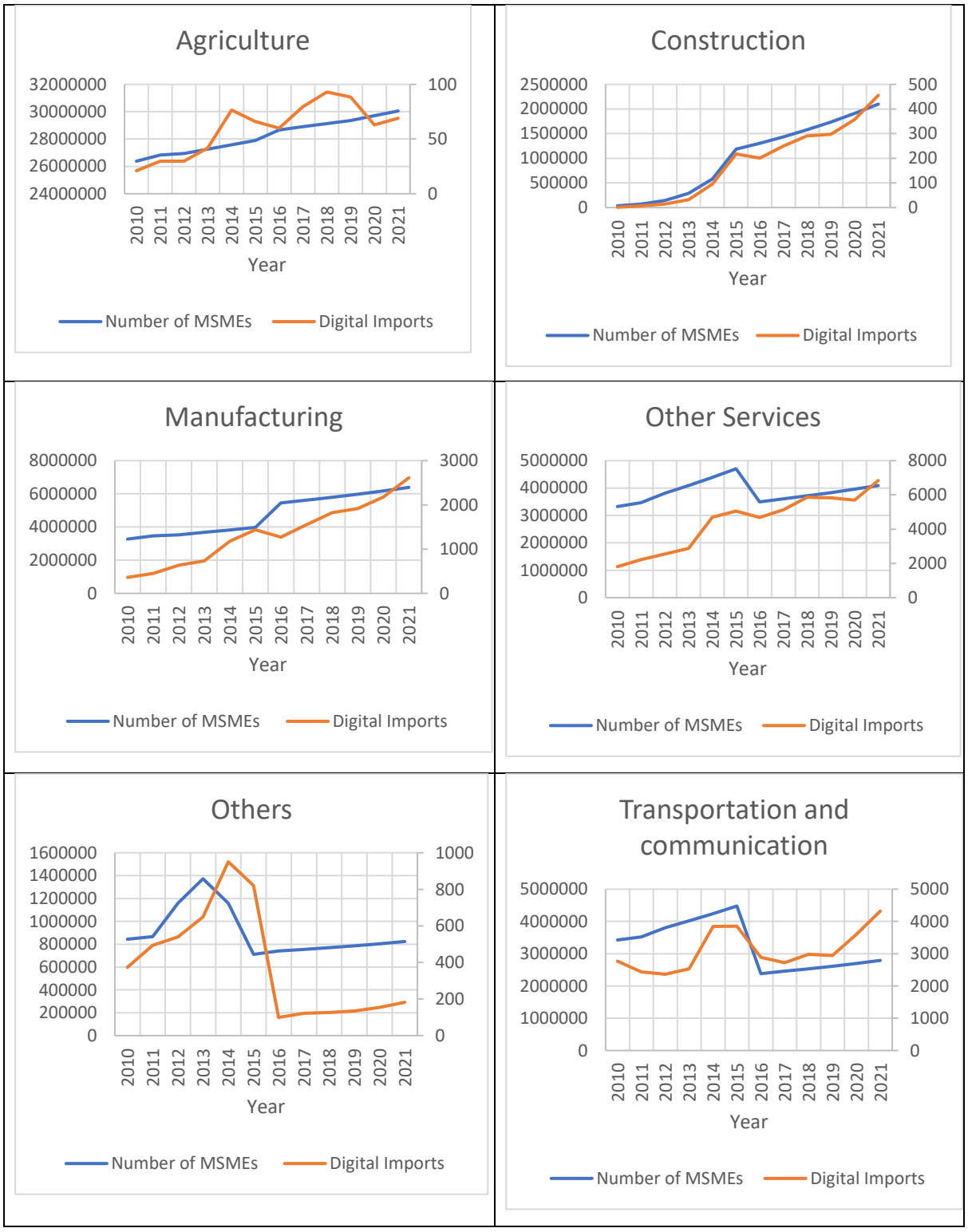
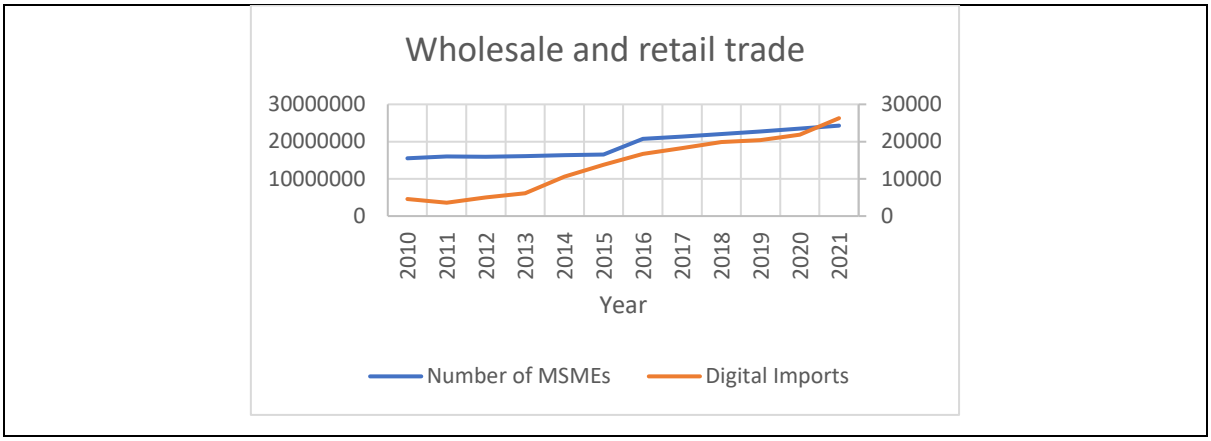


Figure 13 plots the trend increase in the number of MSMEs in comparison with digital imports. There are some indications, in the most recent period at the outset of the 2020's, that digital imports might be leading continuing growth in MSME numbers in most services sectors and in manufacturing. This trend is not obvious in agriculture nor in transportation and communication.

Figure 13: Trends in MSME digital Imports and MSME numbers, by sector, 2010-2021 (left vertical axis – employment, right vertical axis – digital imports, billion Rp)





Correlation Matrix: Analysis

At the whole-of-economy level, MSME digital imports are positively correlated with all the variables tested. The positive correlation is strongest for MSME GDP, followed by MSME employment, with a smaller positive correlation with the number of MSMEs, indicating some consolidation effects of digitalization on MSMEs. Among the derived variables (labor productivity and firm size), we observe strong positive correlations with respect to labor productivity and weaker positive correlations with the size of the enterprise as measured both by GDP and by employment. Employment in MSMEs is negatively correlated with labor productivity. This reinforces the observation that there is a size consolidation effect that happens with digital imports usage by MSMEs.

Table 1: Correlation matrix between different variables

	MSME GDP	MSME Employment	No. of MSMEs	Labor Productivity	GDP/ MSME	Employee/MSME	Dig Imports by MSMEs
MSME GDP	1						
MSME Employment	0.6277	1					
No. of MSMEs	0.521	0.9748	1				
Labor Productivity	0.4416	-0.24742	-0.330	1			
GDP/MSME	0.2689	-0.2297	-0.393	0.626	1		
Employee/ MSME	-0.058	-0.199	-0.3278	0.0404	0.769	1	

Dig Imports by MSMEs	0.794	0.356	0.253	0.3399	0.222	0.0043	1

Panel Data Regressions

Our econometric regressions suggest that for every 1% increase in digital imported inputs by MSMEs:

1. MSME GDP increases by 0.96%
2. MSME employment increases by 0.42%
3. Number of MSMEs increases by 0.54%
4. Labor productivity as defined by MSME GDP per employee increases by 0.95%
5. Employees per MSME (size measured by employment) increases by 0.13%
6. GDP per enterprise (size measured by GDP) increases by 0.39%

In other words, the digital imports used by the MSMEs may boost production, employment and even the number of enterprises, while also boosting labor productivity as well as firm size as measured both by employment and by production. These are significant findings, because policy makers working on MSMEs often struggle to strike a balance between productivity, firm size and job creation, whereas we find a synergy between these variables in the context of digital imports. Digital imports may create jobs in MSMEs, by boosting their output and number, while also increasing productivity and scale effects, thereby eliminating such a trade-off.

Table 2: Panel regressions determining MSME GDP, employment, no. of enterprises

	MSME GDP		**MSME Employment**		**MSME Number of Enterprises**	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept					11.61	< 2.2e-16 ***
MSME Employment	-0.11	0.1362				
Number of MSMEs	0.10	0.2259	0.46	0.0002***		
Digital Imports	0.96	<2e-16 ***	0.42	2.027e-07 ***	0.54	< 2.2e-16 ***
Adj. R Square	0.94		0.80		0.73	
Best Model	Fixed Effects		Fixed Effects		Random Effects	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The panel data regression results presented in Table 2 capture the aggregate variables. The best fit regression model is different in different regressions. MSME employment is found to be

determined by number of MSMEs as well as digital imports. Number of enterprises is found to be determined by digital imports while the positive intercept term points to some other variables that can have an impact.

Table 3: Panel regressions determining labor productivity and size variables

	MSME GDP per Employee (labor productivity)		**Employee per MSME (size based on employment)**		**GDP per MSME (size based on GDP)**	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept					-6.27	0.0001 ***
Employee per MSME					3.07	3.589e-09 ***
MSME GDP Per Employee			-0.01	0.788362		
Digital Imports per employee	0.95	< 2.2e-16 ***	0.13	0.000765 ***	0.39	4.044e-06 ***
Adj. R Square	0.79		0.27		0.59	
Best Model	Fixed Effects		Fixed Effects		Random Effects	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 3 captures the regression results on the derived variables pertaining to productivity and size. The fit, as determined by the Adjusted R square, is reasonable for most of the models. Digital imports per employee have a significant positive effect on the number of employees in a MSME. GDP per MSME is determined to a significant extent by the number of employees as well as digital imports per employee with both having a positive effect.

Conclusion

Digital trade is an important determining factor in the performance of MSMEs in Indonesia. Against the backdrop of rapid global market expansion for a wide variety of digital services, Indonesia's small businesses have begun to integrate imported digital services, including e-commerce platforms and social media applications, into their business models. These digital imports have had a significant positive impact on the performance of Indonesia's MSMEs. The positive impact can be seen in terms of MSME output as well as MSME size and productivity variables, indicating that there are consolidation-related efficiency improvements being facilitated by scaling of MSMEs through digital imports. Policy formulation will need to take note of these econometric findings. These findings suggest that any measures to curtail digital imports would be expected to have significant negative impact on Indonesia's MSMEs.

Another message emerges from our empirical findings about wholesale and retail services MSMEs which are the biggest importers of digital inputs to production and are making the fastest growing contribution to MSME output and simultaneously overtaking agriculture in terms of MSME employment. This tends to suggest that the imposition of customs duties on digital imports could have a disproportionate impact on MSMEs in wholesale and retail compared with MSMEs in agriculture.

Some Policy Implications

Our quantitative findings, along with the multiplicity of economic factors identified in our review of the relevant empirical literature, collectively underscore the importance for policy makers, in any review of the moratorium, of drawing on the local and global evidence base. Hasty decision-making to abandon the moratorium and impose customs duties on electronic transmissions is highly likely to have counterproductive macro and micro-level economic impacts, including in Indonesia.

The influence of online services, including those originating off-shore and transmitted cross-border, extends to enhancing the competitiveness of local businesses. Across the globe, prosperous enterprises, regardless of size, rely on a mix of digital tools such as digital marketing, payment systems, IT services, accounting software, sales monitoring, inventory management, communication platforms, and data storage solutions. These tools collectively empower businesses to concentrate on their core activities. Consequently, any strategy aimed at digitally substituting imports could potentially hinder rather than foster the expansion of businesses in developing countries. Small businesses are especially dependent on seamless flows of electronic transmissions, both domestically and internationally, to bolster their competitiveness.

Policy makers also need to consider a number of other, non-economic benefits likely to flow from ongoing efforts to facilitate rather than hamper the digitalization of international trade.

It is clear that the moratorium has incentivised innovation and acted to facilitate a transition from tangible goods to digital alternatives. This shift to digital trade, exemplified by the ability to download or stream items like books, CDs, DVDs, and newspapers online, holds the potential to reduce environmentally taxing physical transportation, delivering significant reductions in fuel consumption and energy usage. Resulting declines in greenhouse gas emissions and waste production align with sustainability goals.

The moratorium also appears to play a pivotal role in advancing social and equity objectives by fostering broader accessibility and affordability of digital goods and services, particularly benefiting consumers and producers in developing countries as well as MSMEs and remote or other disadvantaged communities.

More generally, the moratorium's influence contributes to the democratization of access to an array of digital products and services. This inclusivity is of particular significance for populations in developing countries and for MSMEs, which might otherwise face hurdles in participating fully in the digital economy due to financial limitations. The moratorium's contribution to affordable cross-border finance cannot be underestimated. E-payments and digitally delivered banking and insurance solutions, for example, allow individuals and businesses to access financial services that might have been previously out of reach. By facilitating more accessible trade, the moratorium empowers remote and disadvantaged groups with the ability to engage in a broader range of economic, educational, health, entertainment, and financial opportunities.

The educational and informational advantages of the moratorium are similarly considerable. Students and learners across the world can access diverse learning resources, enabling them to expand their knowledge horizons beyond what is locally available. Improved access to health information and services could have a far-reaching positive impact on public health outcomes. The entertainment and cultural spheres also benefit from the moratorium, as it facilitates the distribution of diverse creative content across borders. This enables cultural exchange and broadens the reach of artistic endeavours.

Digital imports are a means of technology transfer that more often than not, result in gains along multiple different economic parameters for MSMEs in Indonesia. They boost MSME output, employment, productivity and size, thereby benefitting MSMEs and the overall economy both in the short and long term. While growth in output and employment are important in the short term, enhancements in productivity and size will also shift up the supply curves of MSMEs in the future.

References

ADB (October 2019). The Evolution of Indonesia's Participation in Global Value Chains. ADB and Islamic Development Bank. ADB Reports. http://dx.doi.org/10.22617/SPR190493-2

Amiti, Mary, and Jozef Konings. 2007. "Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia." *American Economic Review*, 97 (5): 1611-1638

Andrenelli, A. and J. López González (2019-11-13). "Electronic transmissions and international trade - shedding new light on the moratorium debate," OECD Trade Policy Papers, No. 233, OECD Publishing, Paris. http://dx.doi.org/10.1787/57b50a4b-en

Andrenelli, A. and J. Lopez Gonzalez (2023a), "Understanding the potential scope, definition and impact of the WTO e-commerce Moratorium", OECD Trade Policy Papers, No. 275, OECD Publishing, Paris.

Andrenelli, A. and J. López González (2023b). The potential implications of the e-commerce moratorium, OECD Scoping Paper, TAD/TC/WP(2023)1, Paris

Banga, R. (2019). Growing trade in electronic transmissions: Implications for the South. UNCTAD Research Paper, 29, UNCTAD/SER.RP/2019/1/Rev.1

Constantin Colonescu (2016). Principles of Econometrics with R, https://bookdown.org/ccolonescu/RPoE4/

Indonesia Services Dialogue (2021-2022). Digital Adoption and Dependency on Digital Goods and Services in MSME: A Survey of MSME in Java and Bali.

Lanz, Rainer; Lundquist, Kathryn; Mansio, Grégoire; Maurer, Andreas; Teh, Robert (2018). E-commerce and developing country-SME participation in global value chains, WTO Staff Working Paper, No. ERSD-2018-13, WTO, Geneva, https://doi.org/10.30875/ec5f0f21-en

López González, J. and S. Sorescu (2019-09-11). Helping SMEs internationalise through trade facilitation, OECD Trade Policy Papers, No. 229, OECD Publishing, Paris. http://dx.doi.org/10.1787/2050e6b0-en

Mahadevan, R., Nugroho, A., & Amir, H. (2017). Do inward looking trade policies affect poverty and income inequality? Evidence from Indonesia's recent wave of rising protectionism. Economic Modelling, 62, 23-34.

Makiyama, H. L., & Narayanan, B. (2019). Economic Losses from Ending the WTO Moratorium on Electronic Transmissions. European Centre for International Political Economy.

Marwah, K., & Tavakoli, A. (2004). The effect of foreign capital and imports on economic growth: Further evidence from four Asian countries (1970–1998). Journal of Asian Economics, 15(2), 399-413.

Miroudot, S. (2019). Korea's Comparative Advantage in the Global Motion Picture Industry. Kritika Kultura, 32, 54-078.

Narayanan, B., Karthikeyan, C., Pandey, P., Thukaram, S., Mathur, S., Bahri, V., Tiwari, M. and Rizvi, K. (2023). The Impact of Cross-Border Digital Transmissions on the MSME Sector in India and the Benefits of the WTO E-Commerce Moratorium. Institute for Governance, Policies & Politics-New Delhi

OECD (2023)"Key Issues in Digital Trade", OECD Global Forum on Trade 2023 "Making digital trade work for all", OECD Publishing, Paris, Oct 2023.

OECD (2022), OECD Inter-Country Input-Output Database, http://oe.cd/icio

Piazolo, M. (1996). Determinants of Indonesian economic growth, 1965-1992. Seoul Journal of Economics, 9(4), 269-298.

Serafica, Ramonette B.; Quimba, Francis Mark A.; Cuenca, Janet S. (2020). Costs and benefits of new disciplines on electronic commerce, PIDS Discussion Paper Series, No. 2020-46, Philippine Institute for Development Studies (PIDS), Quezon City

Thomas, Vincent F. (2022). 'Digital tax' pours $167m into state coffers in first half. The Jakarta Post. https://www.thejakartapost.com/business/2022/07/28/digital-tax-pours-167m-into-state-coffers-in-first-half.html

WTO (1998). The WTO Declaration on moratorium on custom duties on electronic transmissions. https://www.wto.org/english/tratop_e/ecom_e/mindec1_e.htm

WTO (2016). Levelling the trading field for SMEs. World Trade Report 2016. https://www.wto.org/english/res_e/publications_e/wtr16_e.htm

Appendix

Mapping between ICIO input output table and ADB SME sectors

ADB SME Monitor Sectors	ICIO Input Output Table
Agriculture, forestry, and fisheries	IDN_A01_02, IDN_A03
Manufacturing	IDN_B05_06, IDN_B07_08, IDN_B09, IDN_C10T12, IDN_C13T15, IDN_C16, IDN_C17_18, IDN_C19, IDN_C20, IDN_C21, IDN_C22, IDN_C23, IDN_C24, IDN_C25, IDN_C26, IDN_C27, IDN_C28, IDN_C29, IDN_C30, IDN_C31T33
Transportation and communication	IDN_H49, IDN_H50, IDN_H51, IDN_H52, IDN_H53, IDN_J58T60, IDN_J61, IDN_J62_63
Construction	IDN_F
Wholesale and retail trade***	IDN_G
Other services	IDN_I, IDN_K, IDN_L, IDN_M, IDN_N, IDN_O, IDN_P, IDN_Q, IDN_R, IDN_S, IDN_T
Others	IDN_D, IDN_E

MSME Digital Imports into a sector/MSME GDP in the sector = Total Digital Imports into the sector/Total GDP of the sector)

In other words, we assume that the ratio of total digital services imports to total output in any given sector applies also in the MSME subset of the sector. We follow the approach developed by Narayanan et al 2023 for a similar study on India. This is the best possible proxy for digital services imports by MSMEs, given the lack of any alternative dataset harmonized over time.

About the Authors

Dr. Badri Narayanan Gopalakrishnan is a Non-Resident Senior Fellow, NCAER, New Delhi, India.

Dr. C. Karthikeyan is a Research Fellow at Infisum Modeling Pvt Ltd, India.

Dr. Ciplis Gema Qor'iah is an Assistant Professor at University of Jember, Indonesia.

Amit Sinha is a Research Assistant at Infisum Modeling Pvt Ltd, India and is currently pursuing higher studies at Indian Institute of Foreign Trade, New Delhi.

Manasi Gupta is a Research Assistant at Infisum Modeling Pvt Ltd, India and is currently pursuing higher studies at Indian Institute of Foreign Trade, New Delhi.

Jane Drake-Brockman is a Visiting Fellow at the Institute for International Trade, The University of Adelaide and Director, Australian Services Roundtable.