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## **Investing in ASEAN's Digital Economy: Risks and Opportunities**

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# Investing in ASEAN's Digital Economy: Risks and Opportunities \*

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## Abstract

This paper examines the landscape and growth of ASEAN's digital economy through the lens of venture investments in digital industries. We find that ASEAN countries attract a higher share of investments into digital economy related industries compared to the rest of the world. The region has also witnessed an increase in investment integration with non-Asian economies, although Asian countries maintain a stronger preference for investing in ASEAN. Zooming into heterogeneities across industries, we find that investments are increasingly flowing towards data-reliant services and digital financial services. The paper further discusses policy challenges to continuing the region's digital economy growth, particularly on restrictive data policies. Our findings suggest a negative correlation between the restrictiveness of these policies and investment attractiveness. As most ASEAN countries exhibit a higher than average restrictiveness in both overall digital policies and data policies, easing and aligning data transfer requirements across different member states could enhance the region's investment climate.

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# 1. Introduction

Southeast Asia, composed of the 10 Association of Southeast Asian Nations (ASEAN) member states, is set to reap rapid growth in the digital economy. It is projected that the size of ASEAN's digital economy will increase to 600 billion US dollars by 2030, which is nearly a tripling of its current value of 218 billion USD in 2023 (Google, Temasek, and Bain & Company 2023). Additionally, the compound annual growth rate (CAGR) in the digital economy is expected to be approximately twice as high as the predicted CAGR for nominal gross domestic product (GDP) throughout the remainder of the decade, despite a slight slowing of digital economy growth predicted for post-2025: While the expected CAGR for ASEAN's digital economy in 2023-2025 ranges between 13% (Singapore) and 20% (Vietnam, Philippines), this range reduces to between 8% (Singapore) and 18% (Philippines) in the latter half of the decade, which nevertheless remains significantly above the expected nominal GDP CAGR lying between 5% (Thailand) and 10% (Indonesia, Vietnam). The Google, Temasek, and Bain e-Conomy report (2023) which most closely monitors these developments, however, argues that the value of ASEAN's digital economy could be further boosted to reach 1 trillion USD by 2030 if policymakers take action to bridge the digital divide, improve infrastructure, and harmonise policies across the region.

These developments have been matched with high interest by both policymakers and private investors in ASEAN's digital economy. At the ASEAN level the high policy priority of the digital economy has been demonstrated through policy papers and programmes like the ASEAN Digital Masterplan 2025, the Bandar Seri Begawan Roadmap from 2021, as well as the recently opened negotiations on an ASEAN-wide Digital Economy Framework Agreement (DEFA). These are complemented at the national level with comprehensive national digital economy plans present in most ASEAN economies besides bilateral initiatives such as Singapore's novel Digital Economy Agreements. Similarly, private investors have been highly active in the digital economy space,

with over 100 billion USD invested between 2016-2022, twice as much as Google, Temasek, and Bain (2023) predicted for the 2016-2025 period, allowing ASEAN to reach 200 billion USD in gross merchandise value (GMV) three years earlier than expected. Nevertheless, after a peak in 2021, private funding in ASEAN has reached a six-year low in 2023. Although this may be due to global trends towards increasing capital costs and other funding issues, funds focussed on the ASEAN economies have had lower capital returns to investors than those focussed on other geographies (Google, Temasek, and Bain & Company 2023). This raises the question of how to overcome this recent dearth in funding and ensure a continued rapid growth and development of the digital economy in the ASEAN region.

While private funding can come in multiple forms, venture capital (VC) investment funding start-ups with high growth potential, is a key driver of innovation and growth in rapidly evolving sectors like the digital economy (Flickinger 2023). Compared to other forms of private financing, VC funding is highly connected with innovation, with firms that have received VC funding at least once spending over 25% more on research and development (R&D) and having a higher research intensity as a share of total revenue (Lerner and Nanda 2020). This orientation towards innovation may be one of the reasons why VC-backed firms are so successful: While only 0.5% of US firms receive venture capital, 56% of those firms that secured an initial public offering (IPO) between 1995-2018 and were still active a year later had a VC background (Lerner and Nanda 2020). Given this high rate of innovation and success that is associated with venture capital investment, data on VC deals may not only provide an insight of the current digital economy landscape, but may also offer a glimpse into future developments in such a rapidly developing sector.

In this paper, we focus on the landscaping of ASEAN's digital economy venture capital investment landscape. We obtain the venture investment data from Crunchbase. Crunchbase is one

of the most comprehensive and up-to-date databases on venture capital and the start-up ecosystem around the world, with information provided by community contributors, partnerships with venture capital firms as well as automated data collection. The database includes information such as the start-up's location, industry, size, funding organisation, and funding rounds. Currently, for the years 2010-2023, Crunchbase includes information on over 550000 deals including over 280000 firms around the world, including 12826 deals and 6744 firms based in Southeast Asia. Of these over 340000 deals globally and 9132 deals in ASEAN are classified as involving the digital economy.

This paper relates to and aims to connect two strands in the literature on the digital economy: First, there are both academic and grey literature studies aiming to quantify the size of the digital economy, its sectoral composition, as well as make predictions on future growth trends. While multiple sources provide such analyses either on a global scale (e.g. UNCTAD 2021; World Bank Group 2024) or with a focus on the US economy (e.g. U.S. Chamber of Commerce 2024; U.S. Bureau of Economic Analysis 2023), the number of studies that focus geographically on the Southeast Asian region remain rather limited, despite the high importance of investment in the digital economy in both current and future growth trajectories for the region. Beschorner (2019) under the World Bank and Ha and Chuah (2023) take stock of digital economy developments in ASEAN with a focus on infrastructure and technology uptake and usage, rather than investments<sup>3</sup>. While these reports provide the most widely cited statistics on the current state and future development trajectories of the ASEAN digital economy, they neither compare these trends with the rest of the world nor study ASEAN's digital economy integration with other key economies. We contribute to the literature by examining industry-level digital economy investment

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<sup>3</sup> This leaves only the annual Google, Temasek, and Bain reports examining private investments in ASEAN's digital economy.

developments within ASEAN and its member countries as well as by placing it in a global context not only through comparing trends with other regions but also studying trends in investment integration with key economies around the world.

Second, there is a significant number of studies that discusses a wide range of factors that could act as potential hurdles or inhibitors to future growth in the digital economy sector. These include a lack of digital skills(e.g. Beschorner and Bartley Johns 2019; Chen 2019), insufficient infrastructure (e.g. Son 2022; Beschorner and Bartley Johns 2019), a high digital divide (e.g. Ha and Chuah 2023; Google, Temasek, and Bain & Company 2022), as well as digital policy restrictiveness (e.g. He and Tian 2023; Google, Temasek, and Bain & Company 2022). In this paper, we discuss the effects of restrictive digital and data policies. Restrictive data policies are often considered a key barrier to further digital economy growth in Southeast Asia specifically, has and they have the highest driving force in effectuating change if addressed successfully due to a combination of its large effect and the direct impact policy makers can have on this barrier (He and Tian 2023).

The rest of the paper is organized as follows: In Section 2 we take stock of the digital economy investment landscape in ASEAN compared to other parts of the world, examine the region's integration with key economies both in Asia and globally, and investigate industry-level competitive advantages. These findings are then discussed in light of restrictive digital policies as a key hurdle to future digital economic growth in the region in Section 3. Section 4 concludes.

## **2. Changing Investment Landscape**

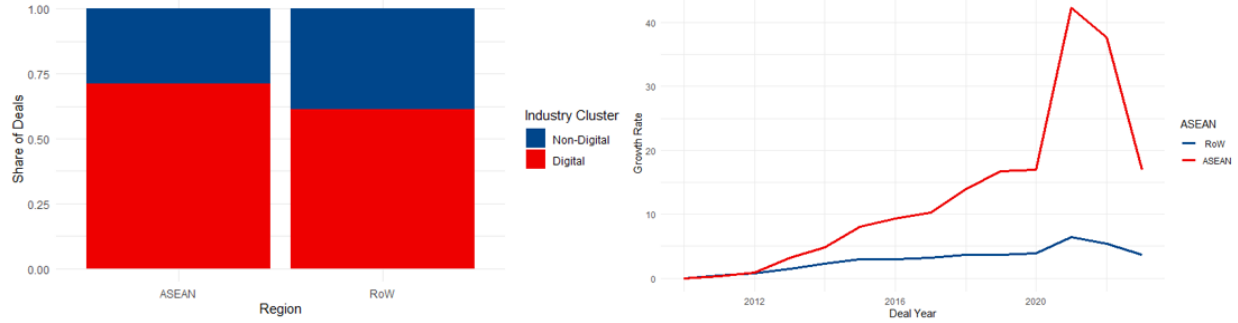
In this section, we gauge ASEAN's position in digital economy investments by comparing the degree of investment concentration in the digital economy of ASEAN to the rest of the world. Specifically, we ask which ASEAN countries are in the leading positions in the region's digital economy investment, who are ASEAN's leading investment partners, and how ASEAN's digital economy investment landscape evolved in the past few years, both at the aggregate and at the industry level, benchmarking against rest of the world.

### ***2.1 Comparing ASEAN's Investments with the Rest of the World***

We show that ASEAN countries are attracting more digital economy related investments than rest of the world in Figure 1 below. Across the world, digital economy related deals make up over 60% of all venture capital deals, but in ASEAN this number is ten percentage points (pp) higher than the global average at 71% (Figure 1, left panel). Similarly, when examining the growth of the number of VC investments into the digital economy, ASEAN has also been significantly outperforming the world average for over two decades. Both the global and ASEAN's digital economy deal growth rate peaked in 2021, and subsequently ASEAN's growth rate has more than halved to 17% in 2023<sup>4</sup>. Nevertheless, this remains over three times the global average. The drop in 2023 is likely driven by increased capital costs across the world as US hiked its interest rate, but also by a lower return rate in ASEAN than other regions across the world (Google, Temasek, Bain, page17). Despite this drop, the combination in ASEAN of a higher-than-average current share of digital economy deals, and a higher growth rate indicates that the gap between ASEAN and the rest of the world is likely to continue to widen.

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<sup>4</sup> This drop in investments is confirmed by Google, Temasek, and Bain's data who also observe a 19% and 69% decrease in private funding between 2021 and 2022, and the first halves of 2022 and 2023, respectively.



**Figure 1:** Share of Venture Capital Investments in ASEAN and the Rest of the World (left), and Growth in Number of Venture Investments in the Digital Economy (right). Source: Own calculations based on Crunchbase

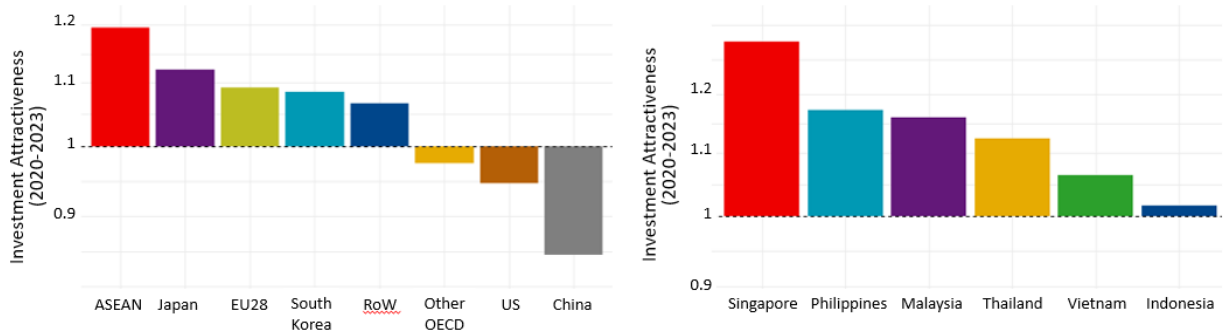
For better comparability of the attractiveness for digital economy investments of different economies, we will use a measure of revealed investment attractiveness (RIA) for the remainder of this paper. This measure is adapted from revealed comparative advantage measures used in literature on international trade (Balassa 1965). The RIA reflects the relative importance of the digital sector relative to investments in other sectors for a given economy compared to the global average:

$$RIA_{i,t} = \frac{\frac{Inv_{i,t}^{digital}}{Inv_{i,t}^{total}}}{\frac{Inv_{global,t}^{digital}}{Inv_{global,t}^{total}}}, \quad (1)$$

where  $RIA_{i,t}$  is the revealed investment attractiveness of economy  $i$  in year  $t$ ; the numerator calculates the share of digital economy investments out of total investments in economy  $i$  in year  $t$ ; and the denominator calculates the share of digital economy investments out of total investments globally in year  $t$ . Therefore, an  $RIA > 1$  indicates that a given economy has received a higher than average share of digital economy investments indicating a high digital economy investment attractiveness, while an  $RIA < 1$  indicates a lower than average share of digital investments and thus a low digital investment attractiveness.



In Figure 2 (left panel) below, we use this RIA measure to compare ASEAN with other key economies and regions around the world. ASEAN’s RIA of nearly 1.2 not only indicates a higher than average attractiveness, but as this is the highest RIA of all examined economies, it indicates that ASEAN is the economy that receives the highest proportion of digital economy investments globally. While Japan, the European Union (EU28) and South Korea also have an RIA above 1, the US and China have been relatively unattractive for digital economy investments in the past three years. To investigate who drives this high attractiveness of ASEAN as a region, the right panel of Figure 2 disaggregates the regional value into RIAs for each of the ASEAN-6 member states. Interestingly, all 6 of these major economies have an RIA above 1, indicating that it is not just an individual country that drives the region’s attractiveness, but that all ASEAN-6 economies are more attractive for digital economy investments than the world average. Nevertheless, it is important to note that although all economies have a positive RIA, Singapore has by far the highest RIA value at over 1.2, while Indonesia’s is the lowest at just above 1.



**Figure 2:** Revealed Investment Attractiveness 2020-2023 in ASEAN and Other Key Economies (left) and in ASEAN-6 Economies (right). Source: Own calculations based on Crunchbase

## 2.2 Investment Integration with the World

Formal definitions of economic and regional integration refer to the “process by which diverse national economies seek mutual gains by complementing one another more” (UN ECLAC 2009, 1). While such processes are often primarily viewed through their economic lens – for example by dividing integration into stages ranging from a free trade area, customs union, common market, to an economic union – successful integration must also be accompanied by corresponding political and socio-cultural factors (Anukoonwattaka and Lobo 2020). In this paper, however, we use the term ‘integration’ more loosely to refer to a strengthening of economic and financial ties between two economies proxied by an increase in investment flows. Such investment flows are simultaneously a driver and consequence of integration, as they may be in a virtuous feedback loop with economic policy and other socio-economic factors that mutually strengthen and are strengthened by increased financial and business ties. The importance of investment in larger regional and/or economic integration is also highlighted by the fact that most integration indices include a dimension measuring investment flows.

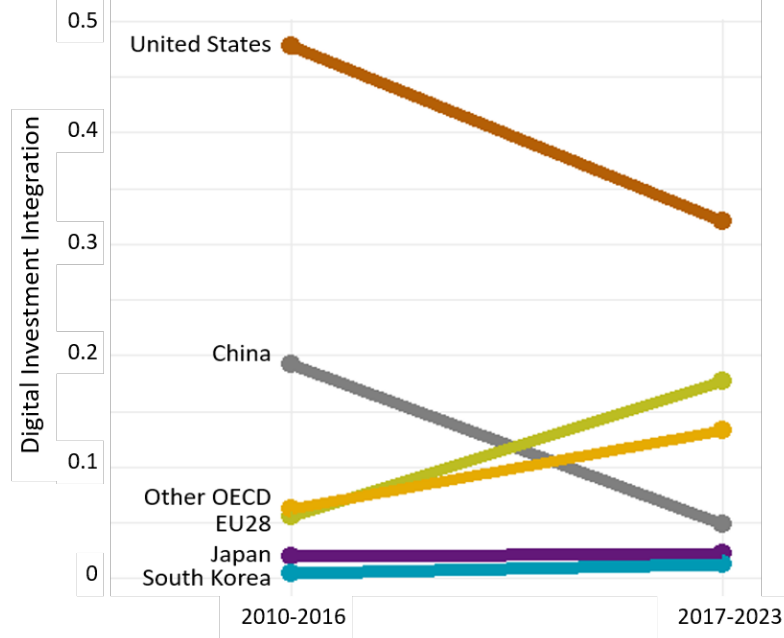
To comprehensively examine how the ASEAN region is integrated with other key economies both in the Asian continent and further afield in terms of digital economy investments, we calculate two measures: First, we measure investment integration by looking at who is investing in ASEAN member states’ digital economies by computing the share of all cross-border digital economy investments flowing into ASEAN accounted for by a given economy (see Equation 2 below):

$$Inv. Integration_{i,t} = \frac{Inv_{i,t}^{ASEAN} + Inv_{ASEAN,t}^i}{Inv_{global,t}^{ASEAN} + Inv_{ASEAN,t}^{ASEAN}}, \quad (2)$$

where  $Inv_{i,t}^{ASEAN}$  is the number of bilateral digital economy investments from economy  $i$  into ASEAN in time period  $t$ ;  $Inv_{ASEAN,t}^i$  is the number of digital economy investments from ASEAN

into economy  $i$  in time period  $t$ ;  $Inv_{global,t}^{ASEAN}$  is the global number of digital economy investments into ASEAN in time period  $t$ ; and  $Inv_{ASEAN,t}^{global}$  is the number of global digital economy investments from ASEAN in time period  $t$ .

Figure 3 below visualizes the levels of digital economy investment integration between selected key economies and ASEAN, including over time trends between 2010-2016 and 2017-2023. While the United States continues to dominate investment flows with ASEAN, its share of investments has dropped from around 0.48 to 0.33. China has experienced a similar decline in investment integration, from just below 20% to only 5% of ASEAN's digital economy investment flows involving China. Investment integration of the EU member states as well as other OECD countries has significantly increased during this time period, on the other hand, with investment flows involving these groups of countries rising from just above 5% to 18% and 14% respectively. These trends indicate two overarching phenomena: First, non-Asian economies dominate investment flows with ASEAN in the digital economy space. Second, the past decade has seen increasing diversification of ASEAN's investment partners, with the two largest economies (United States and China) dropping in share and being partially replaced by the many smaller countries and economies that make up the European Union and the OECD.



**Figure 3:** Investment Integration of Key Economies with ASEAN, 2010-2016 & 2017-2023. Source: Own calculations based on Crunchbase

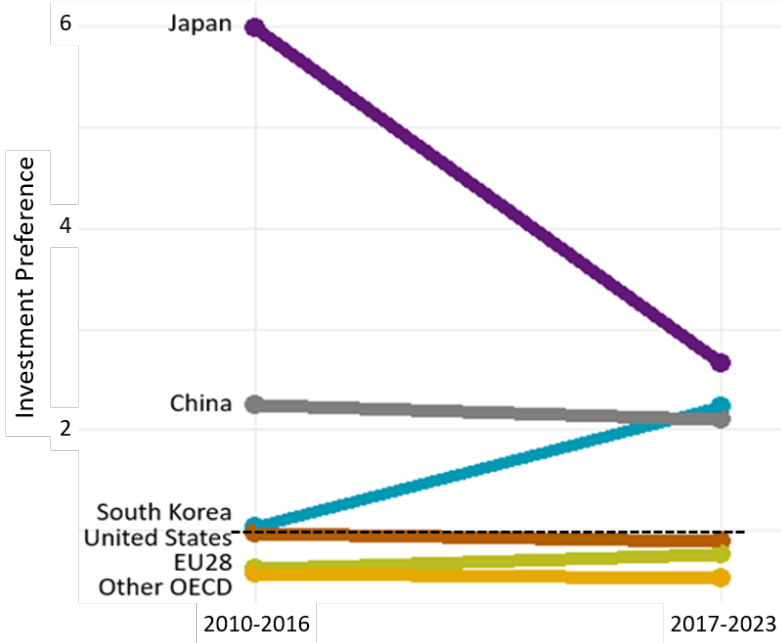
Second, we measure external economies' investment preference for investing specifically in ASEAN when making digital economy investment decisions. This is computed as shown in Equation 3 below,

$$Inv. Preference_{i,t} = \frac{\frac{Inv_{i,t}^{ASEAN}}{Inv_{i,t}^{global}}}{\frac{Inv_{global,t}^{ASEAN}}{Inv_{global,t}^{global}}}, \quad (3)$$

where  $Inv_{i,t}^{ASEAN}$  is the number of digital economy investments from economy  $i$  into ASEAN in time period  $t$ ;  $Inv_{i,t}^{global}$  is the number of global digital economy investments from economy  $i$  in time period  $t$ ;  $Inv_{global,t}^{ASEAN}$  is the global number of digital economy investments into ASEAN in time period  $t$ ; and  $Inv_{global,t}^{global}$  is the global number of cross-border digital economy investments in time period  $t$ .

Essentially, we are comparing a given economy's share of digital economy investments that flow into ASEAN with the world average share of cross-border digital economy investments

into ASEAN in Equation (3). Similar to the RIA measure discussed previously, if this measure of investment preference is larger than 1, they have a larger than average preference for investing in ASEAN, indicating a higher degree of integration, and when the preference is below 1, they have a comparatively lower degree of integration. Figure 4 below visualizes comparative trends in investment preference. It can be seen that Asian economies have the highest shares of investment outflows into ASEAN, whereas non-Asian partner economies remain below the world average in terms of investment preference for the ASEAN market. Despite a major decline over the past decade – which we argue is potentially due to a general move towards diversifying its portfolio – Japan remains the economy with the highest investment preference for ASEAN in the digital economy sector. Over the same time period, South Korea has seen a significant increase in investment preference for Southeast Asian economies to overtake China. The only other major economy to see a rise in investment preference was the EU, despite still remaining below 1, indicating below average preference.



**Figure 4:** Investment Preference of Key Economies for ASEAN, 2010-2016 & 2017-2023. *Source: Own calculations based on Crunchbase*

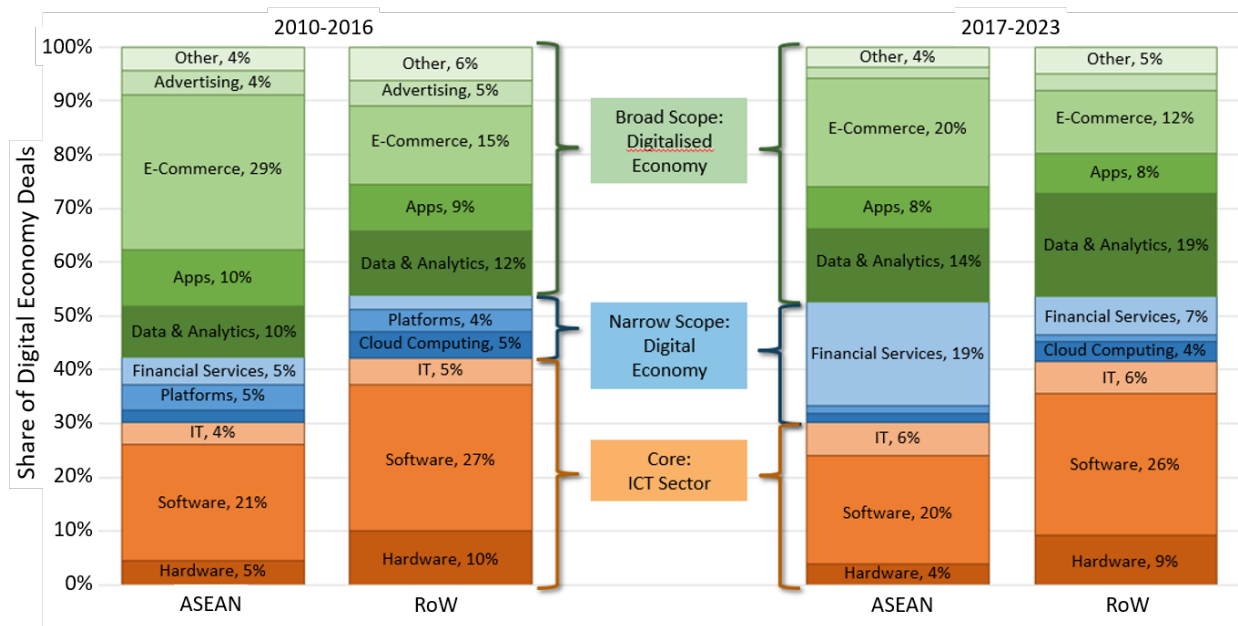
In combination, the investment integration and investment preference measure indicate that while non-Asian economies constitute the bulk of investment into ASEAN, this is primarily driven by a high overall level of foreign investments in the digital economy space rather than by a specifically high preference for investing in ASEAN. Asian economies, on the other hand, stand out for their high investment preference for ASEAN, which is likely driven by geographic proximity as well as historic and cultural ties. Interestingly, South Korea and the EU are the only two economies that have seen increases in both investment integration and investment preference across the past decade, which indicates that not only their total number of investments with ASEAN has grown faster than other economies', but that their likelihood of investing in ASEAN has also increased vis-à-vis their preference for investing in other economies. Although establishing causal relationships is beyond the scope of this paper, these increasing investment trends have co-occurred with both countries increasing their cooperation with ASEAN in the digital economy sphere pointing to a generally heightened interest in the region. Examples of this include bilateral engagement on digital regulatory issues such as the EU-ASEAN joint guide to model contractual clauses, initiatives to support digital economy development like the ASEAN-Korea Cooperation Fund that funds technology transfer and human resource development projects, as well as larger scale strategic cooperation including in digital spheres, like the EU-ASEAN Strategic Partnerships, or Korea's joining of the Digital Economy Partnership Agreement (DEPA).

### ***2.3 Taxonomy of Investment in ASEAN's Digital Economy***

As many aspects of the economy are increasingly digitalised, further disaggregating the 'digital economy' into sub-industries and industry groups becomes essential to understanding the status quo and identifying trends. The CrunchBase database already groups venture capital investment deals into various industries, based on which we create three main industry groups following Bukht

and Heeks (2017): First, the digital economy's core, the ICT sector, consist of hardware, software, and IT sectors; second; the narrowly defined digital economy includes the industries of cloud computing, platforms, and digital financial services; and third, the most broad category of the digitalised economy further consists of data and analytics, apps, e-commerce, advertising, and other sectors. In this section we decompose the venture capital data by industry and industry group on a regional level comparing ASEAN with the rest of the world (Figure 5) as well as on a country level (Figure 6). Additionally, we use the investment attractiveness for economy-industry pairs to assess the revealed competitive advantages of key ASEAN economies in various digital economy sectors.

Figure 5 below compares the share of digital economy venture capital investment deals in each industry and industry-group between ASEAN and the rest of the world as well as between the time periods 2010-2016 and 2017-2023. Across both time periods ASEAN has a lower share of deals than the rest of the world in the core ICT sector by 12 and 11 percentage points respectively. This is mostly driven by lower investments in the software and hardware industries. In turn, ASEAN countries have higher investment shares in the industries of the broadly defined digitalised economy, especially e-commerce which has a share nearly twice as high in ASEAN vis-à-vis the rest of the world in both time periods. In terms of trends, some similar patterns emerge across both regions, with e-commerce and platforms declining in share, while data and analytical services and digital financial services grew. However, the growth in digital financial services in ASEAN stands out in ASEAN with this industry making up nearly 20% of all ASEAN venture investment deals in the later time period, compared to just 7% for the rest of the world.

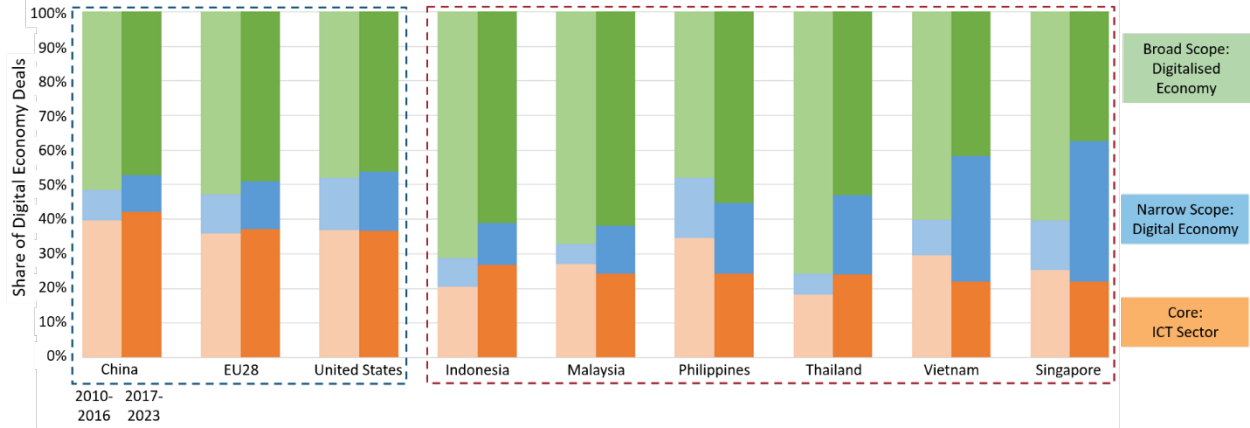


**Figure 5:** Comparing Investment by Industry in ASEAN and the Rest of the World, 2010-2016 & 2017-2023. Source: Own calculations based on Crunchbase

To further examine whether these trends are uniform across the ASEAN region or driven by country-specific patterns, we show a decomposition by economy and industry group in Figure 6. The comparison between countries and time periods shows that the three major non-ASEAN economies – China, the EU, and the US – did not see major shifts in industry group composition between 2010-2016 and 2017-2023. Additionally, while China has a somewhat higher share of core ICT sector deals and a lower share of narrowly defined digital economy deals than the EU and the US, the general industry group composition across the three major economies are remarkably similar. ASEAN economies stand in contrast to these trends. First, all Southeast Asian countries see shifts in their industry composition over time, with Malaysia, Singapore, Thailand, and Vietnam experiencing significant increases in the narrow scope digital economy, whereas Indonesia and the Philippines expanded the core and broad sectors, respectively. Second, across ASEAN, different economies have very different specialization patterns, with, for example, the



broad digitalised economy ranging in share between 38% (Singapore) and 62% (Indonesia), and the narrow digital economy ranging in share between 12% (Indonesia) and 40% (Singapore). Consequently, deal distribution by industry is not only different between ASEAN and the rest of the world, but also between different ASEAN economies.

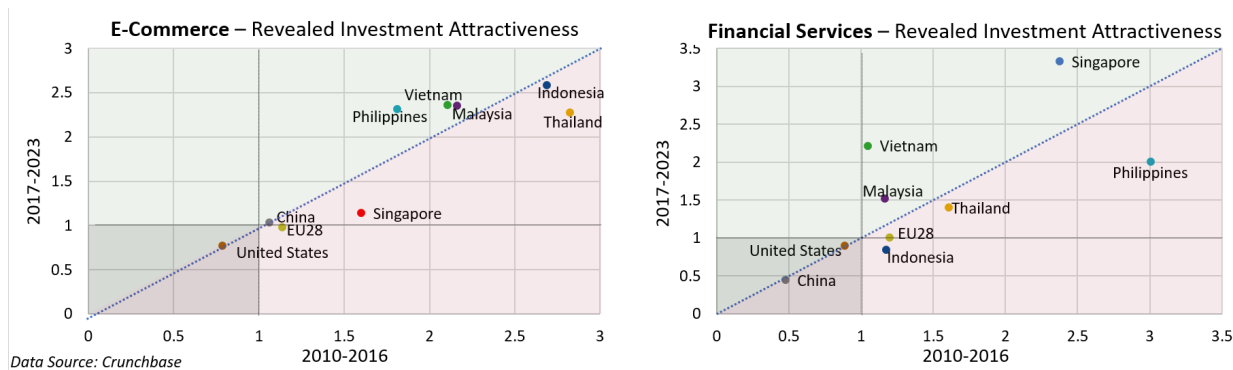


**Figure 6:** Comparing Investment by Industry in Key Economies of ASEAN and the Rest of the World, 2010-2016 & 2017-2023. Source: Own calculations based on Crunchbase.

To examine further how different Southeast Asian economies perform in terms of investment attractiveness in certain industries – both compared to each other and external economies – we next zoom into two industries previously highlighted as particularly important to ASEAN: E-Commerce due to its significantly larger overall share than for the rest of the world, and financial services for its rapid growth within ASEAN and today’s large importance to the region. Figure 7 below plots the measure of investment attractiveness of a given industry and country in 2010-2016 and in 2017-2023 on the x- and y-axis, respectively.

Within the e-commerce industry (left panel), the selected non-ASEAN economies cluster around the centre of the graph, indicating an average – or slightly below average for the US – performance of the e-commerce sector vis-à-vis other industries in terms of venture capital investments. All ASEAN economies, except for Singapore on the other hand, cluster in the top

right quadrant, highlighting that for all these economies, e-commerce plays an outsized role throughout both time periods. A possible explanation for Singapore’s outlier status could be its small domestic market that may limit the potential of e-commerce platforms that depend on economies of scale. Regarding the digital financial services industry (right panel), a wider variation emerges between countries of the same groups. Nevertheless, except for Indonesia, all ASEAN countries have a higher industry investment attractiveness than the US and China in both periods and than the EU in the latter period. Given the large growth in investment attractiveness of this sector for Malaysia, Singapore, and Vietnam, it is likely that the previously observed growth in this industry (Figure 5) is mainly driven by developments in these three markets.



**Figure 7:** Comparing Industry-Level Revealed Investment Attractiveness<sup>5</sup> for E-Commerce and Financial Services for Key Economies of ASEAN and the Rest of the World, 2010-2016 & 2017-2023. Source: Own calculations based on Crunchbase.

<sup>5</sup>  $Industry\ RIA_{i,j,t} = \frac{\frac{Inv_{i,j,t}}{Inv_{i,t}^{digital}}}{\frac{Inv_{global,j,t}}{Inv_{global,t}^{digital}}}$ , where  $RIA_{i,j,t}$  is the revealed investment attractiveness of industry  $j$  in economy  $i$

in year  $t$ ; the numerator calculates the share of industry  $j$ 's investments out of total digital economy investments in economy  $i$  in year  $t$ ; and the denominator calculates the share of industry  $j$ 's investments out of total digital investments globally in year  $t$ .

Overall, this decomposition by sub-industries and industry group making up the digital economy has highlighted that ASEAN as a region may experience different trends and patterns compared to other major economies, but that not all of these are occurring uniformly across its member states. These distinct investment patterns observed suggest that while Southeast Asia collectively seems to have certain competitive advantages, for example in the narrow and broad digital and digitalised economy, each country is also carving its own path based on varying economic contexts, industry strengths, and policy priorities.

### **3. Policy Incompatibility and Hurdles to Digital Economy Growth**

Over the last decade, Southeast Asia has cemented its status as an important destination for digital economy-related investment, despite, or precisely because, remaining internal diversity regarding the attractiveness of different sub-industries. As the digital economy will only grow in importance, it is vital that economies ensure a favourable environment for investors. While an attractive digital economy investment landscape requires various components including adequate digital skills, digital infrastructure, and a positive economic climate, arguably the most impactful and most direct for governments to influence is the policy environment (Beschoner and Bartley Johns 2019; Google, Temasek, and Bain & Company 2022; He and Tian 2023). Resultingly the digital policy frameworks implemented by Southeast Asian governments can be key determinants of future investment growth by either attracting or deterring investment. Given the rapid developments in the digital policy space globally but especially in ASEAN in the past years, this section will examine the potential impact of digital economy policy on investment before zooming in on ASEAN economies and their policy strategies to better understand the potential for future growth.

### ***3.1 Policy Restrictiveness as Frictions to Investment***

As the digital economy has expanded rapidly in recent years, policies that both support and regulate digital infrastructure, data, user behaviour as well as many other aspects of the digital realm have become increasingly commonplace. Restrictive digital policies, in particular, refer to all those policies that slow down productivity and increase the costs of doing business in the digital economy, and they can include, among others, tariffs on digital products, restrictions on digital services, restrictions on data movements (Ferracane, Lee-Makiyama, and van der Marel 2018). One increasingly important component of restrictive digital policies are data-related policies, which generally refer to “regulatory measures that restrict the flow of electronic data between economies” (Van Der Marel 2022, 98). As most digital economy activities and transactions are heavily reliant on data, the negative impact on transactions is especially large. Despite this section focussing on the mostly negative impacts of restrictive digital policies, it is important to note that digital and data policies are not *per se* negative for businesses, as they may also increase certainty and trust in the business environment (Keck et al. 2021; Stephenson 2020) as well as break down trade barriers between countries (Chen et al. 2019).

Multiple scholars have investigated the impact of a restrictive digital policy environment on a variety of economic outcomes, both at the economy-wide level and the firm level. At the economy level, the literature finds negative impacts of digital restrictive policies on gross domestic product (GDP), foreign direct investment (FDI), as well as import and export flows. Bauer et al. (2014) study the impact of restrictive data regulations in seven large economies worldwide to find that proposed or enacted restrictive data policies range in impact on GDP between -0.1% in India and -1.1% in China. Hao et al. (2023) find that the adverse effect on economic growth is particularly strong for countries heavily reliant on imports. The particularly detrimental effects of

restrictive digital policies on trade in data-reliant sectors are confirmed by Van der Marel & Ferracane (Ferracane and van der Marel 2019), Zhang & Wang (2022), as well as Gupta et al. (2022) who finds that if an importing country would move from a completely free data regime to a highly restrictive one, ICT service imports would fall by up to 90%. In addition, a study by the OECD (2023) found that digital regulatory restrictions also negatively correlate with foreign investments. If a country like Portugal would reduce its average level of digital restrictions to be equivalent to the lowest country in their study (Switzerland), it could increase its cross-border M&As and greenfield investments by 19% and 7%, respectively.

These adverse effects of digital policy restrictiveness also manifest at the firm level, with both profits and innovation potentially negatively affected. Frey and Presidente (2024) find that firms most exposed to the European Union's General Data Protection Regulation (GDPR) saw 2.1% lower profits – an effect that is mostly driven by the higher costs of compliance. Medium-sized European firms spent around \$3 million on average in the year prior to GDPR implementation on compliance-related measures, with transaction costs additionally remaining at a permanently higher level (Prasad and Perez 2020). Regarding innovation, Blind et al. (2022) use a conditional difference-in-difference model on German firms to find that for firms affected by the GDPR, innovation shifted from radical innovation to a more incremental innovation process. In the context of East Asia, Ferracane and Van der Marel (2020) also find that in a more restrictive policy environment, firms are less likely to employ foreign technologies or patents for research. These compounded effects are corroborated by Ferracane et al. (2020), who find that, in general, the negative impact of restrictive data policy regimes has a substantial adverse effect on a firm's overall economic performance.

Due to the combination of economy-wide and firm-level effects, restrictive data policies can also have negative impacts on venture capital investment. Jia and his team have studied the magnitude of the effects of the implementation of the GDPR on venture investment in the European Union. Immediately following the rollout of the policy, they detected a 26.1% decrease in the number of venture deals in the EU (Jia, Jin, and Wagman 2021b), with effects being larger for foreign investments than domestic ones (Jia, Jin, and Wagman 2020). While the negative effects persisted, their effect size has declined with time to a 11% decrease being detected 15 months after implementation (Jia, Jin, and Wagman 2021a).

### ***3.2 Measuring Digital Policy Restrictiveness***

Given the qualitative nature of policies and the regulatory environment, creating a measure of digital policy restrictiveness that can be compared across countries is not straightforward. A commonly used measure for digital policy restrictiveness is the OECD's Digital Services Trade Restrictiveness Index (DSTRI) (Ferencz 2019), also used by some of the authors cited previously (e.g. OECD 2023). However, it focusses mostly on OECD countries and does therefore not include data for the majority of ASEAN member states. In this paper, we will use the Digital Trade Restrictiveness Index (DTRI) constructed by the Ferracane et al. (2018) at the European Centre for International Political Economy (ECIPE). This index quantitatively scores the digital trade policies of 64 countries, including the 6 major ASEAN economies<sup>6</sup>, on four dimensions: fiscal restrictions (e.g. tariffs, taxation), establishment restrictions (e.g. competition policy, foreign investment restrictions), restrictions on data (e.g. cross-border data transfer policies, content access), and trading restrictions (e.g. standards, online sales restrictions). The DTRI scores

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<sup>6</sup> Indonesia, Malaysia, The Philippines, Singapore, Thailand, Viet Nam

multiple subdimensions on a scale of 0 to 1, with 1 being the most restrictive and 0 the least restrictive, these are then aggregated to give a score between 0 and 1 for a country on each subdimension, and these are again aggregated by taking the mean to determine a country's final score. Unfortunately, the DTRI scoring currently only exists for one time period – 2018.<sup>7</sup> However, for our quantitative descriptive analysis below this does not pose a major issue, as the DTRI score acts as the independent variable and thus has to temporally precede the dependent variable – in this case the investment attractiveness.

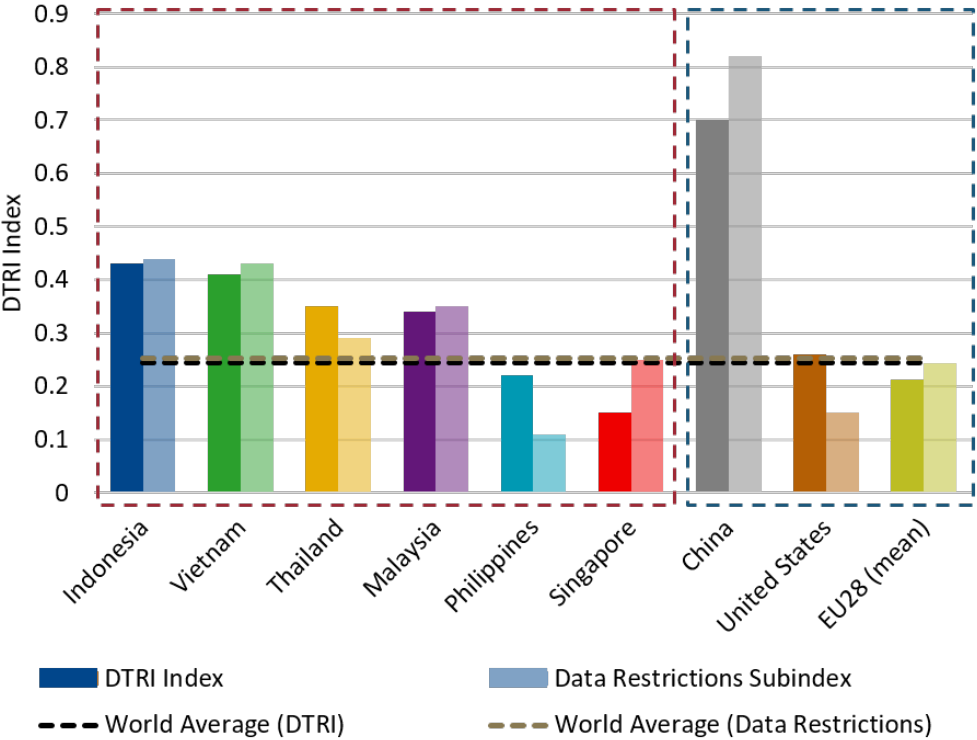
According to the DTRI index, the countries with the highest degree of digital policy restrictiveness in 2018 are China (DTRI score of: 0.70), Russia (0.46), and India (0.44), and those with the lowest degree of restrictiveness are New Zealand (0.09), Iceland (0.11), and Norway (0.13). The mean and median DTRI scores are 0.25 and 0.22, respectively. Given the importance of data policies for various economic outcomes as identified by the literature, this section will also zoom into this dimension of the DTRI, besides looking at the aggregate index. In the data restrictions subindex, the most restrictive countries are China (0.82), Russia (0.63), and Turkey (0.6), and the least restrictive countries are Panama (0.03), Costa Rica (0.04), and Chile (0.04). The mean and median scores for this subindex are 0.25 and 0.23, respectively.

The ASEAN countries display a wide range of digital policy restrictiveness levels (Figure 8). Their aggregate DTRI ranks range between Indonesia at 4<sup>th</sup> (DTRI score of 0.43), which is the most restrictive in the region, and Singapore at 57<sup>th</sup> (0.02), the least restrictive. In terms of restrictiveness focusing on data policies only, a similarly wide range is observable – between Indonesia at 5<sup>th</sup> most restrictive (0.44) and the Philippines at rank 61 (0.11). Overall, as Figure 8 shows, within ASEAN-6 economies it is only Singapore and the Philippines that are less restrictive

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<sup>7</sup> An updated policy database can be found under the Digital Trade Integration Project (<https://dti.eui.eu/>). However, the updated quantitative index has not been published at the time of writing.

than the world average on both total DTRI score and the data restrictions subindex. Interestingly, while Indonesia, Malaysia, and Vietnam have relatively similar scores on the full DTRI and the data restrictions subindex, Singapore has significantly higher data restrictions than other digital trade policy restrictions, whereas both Thailand and the Philippines have lower data restrictions than general restrictions more akin to the model of the United States. In general, as will be examined later more qualitatively, this index highlights that ASEAN is not a homogenous policy region, but instead comprises a range of different policy models.

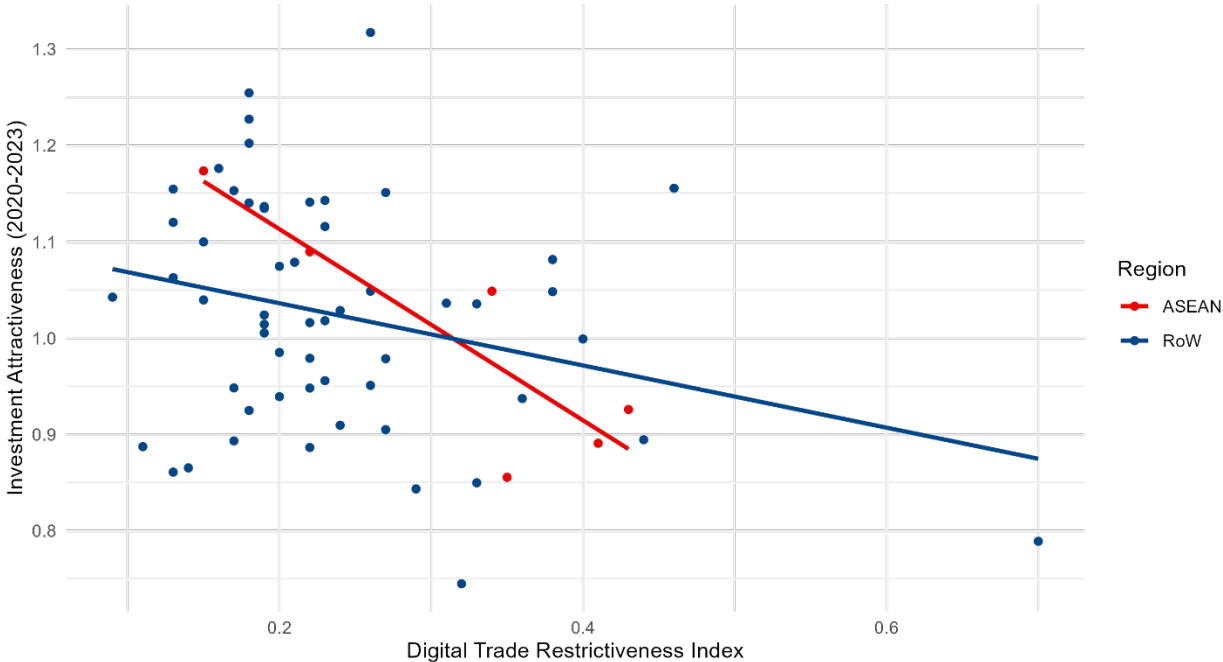


**Figure 8:** Digital Trade Restrictiveness Index Scores for Key ASEAN and non-ASEAN Economies. Source: Own calculations based on Ferracane et al. (2018)

Although a causal analysis between digital policy restrictiveness and investment attractiveness is beyond the scope of this chapter, Figure 9 below plots each country’s average cross-border investment attractiveness in the years 2020-2023 against its score on the digital trade



restrictiveness index. As the DTRI mostly reflects barriers faced by foreign entities or domestic entities doing business or investing abroad, only cross-border venture capital deals were included when calculating investment attractiveness. The results indicate that a more restrictive digital policy environment is associated with a lower investment attractiveness of a country’s digital economy in a global comparison<sup>8</sup>.

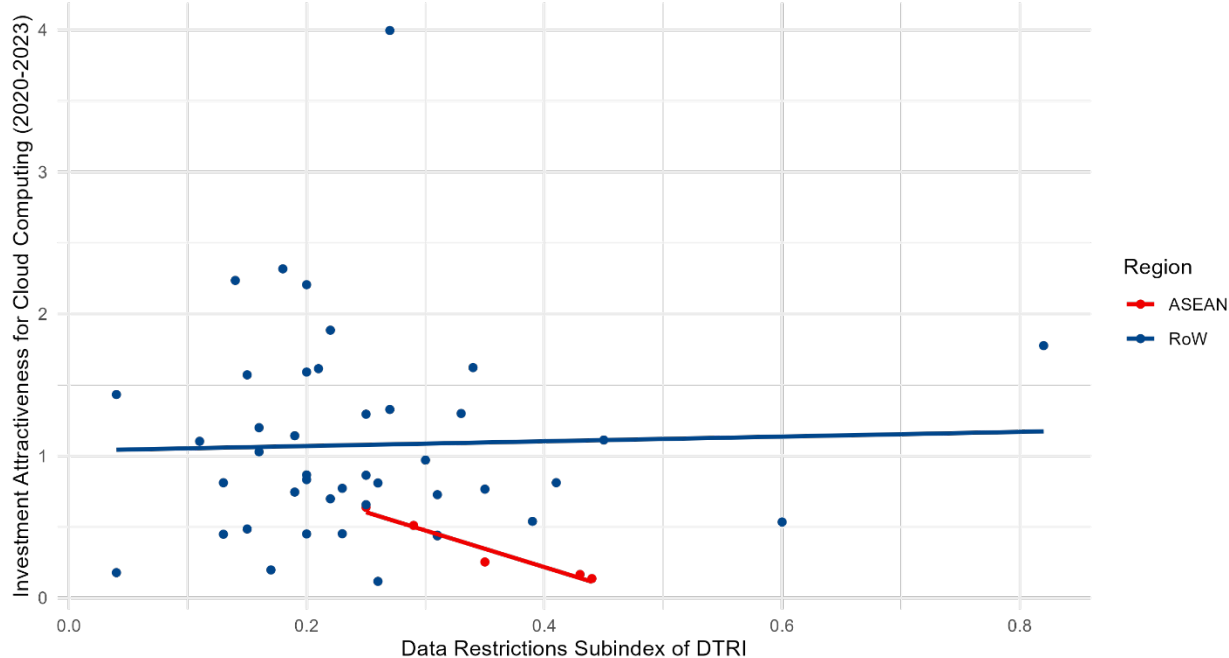


**Figure 9:** Correlation between Digital Trade Restrictiveness Index and a Country’s Revealed Investment Attractiveness for Cross-Border Investments in the Digital Economy, Mean 2020-2023. Source: Own calculations based on Crunchbase and on Ferracane et al. (2018).

In Figure 10 below, we further zoom into the effects of data restrictions more specifically by plotting the cross-border investment attractiveness of a highly data-dependent industry – cloud computing – against the DTRI’s data restrictions subindex. We find no association between the two on a global scale, which may be due to two reasons: First, China again has leverage and its

<sup>8</sup> However, it must be noted that China with its high restrictiveness score and low investment attractiveness has high leverage, with the association at the global level being weaker if it is excluded. The trend seems more pronounced among ASEAN countries.

comparatively high RIA for cloud computing may negate any trend; and second, due to the low number of deals for many smaller countries included in the sample in an industry like cloud computing the calculated RIA value may be less reliable. For ASEAN countries, however, the association is again stronger and more negative, indicating that ASEAN countries with a higher restrictiveness in their data policy environment also seem to have a lower investment attractiveness for their cloud computing sector.



**Figure 10:** Correlation between Data Restrictions Subindex of the Digital Trade Restrictiveness Index and a Country’s Revealed Investment Attractiveness for Cross-Border Investments in the Cloud Computing Industry, Mean 2020-2023. Source: Own calculations based on Crunchbase and on Ferracane et al. (2018)

### 3.3 ASEAN’s Policy Landscape and Policy Recommendations

In recent years, alongside rapid developments in the digital economy investment space in ASEAN, the digital policy landscape has also evolved continuously. Within ASEAN, national policies regulating the digital economy and vary widely, as the large range in DTRI scores discussed above indicates. A key cornerstone of the digital policy environment are cross-border data flow

regulations, as they are necessary for seamless digital trade and innovation across multiple businesses and jurisdictions. Cross-border data transfer regulations encompass any restrictions on data transfers between countries, ranging from obtaining user consent or ensuring the recipient organization complies with specific data protection principles, to requiring government permission before data transfer or complete bans in the most extreme cases. This section will briefly discuss ASEAN's current cross-border data flow policy landscape, with a focus on trends over time and remaining incompatibilities, followed by policy recommendations to overcome these potential hurdles and further facilitate investments in the region's digital economy.

Within the ASEAN region, different countries have both varying policy priorities as well as being at different stages of policy development. While all the ASEAN-6 economies today have a fully developed personal data protection regime including specific cross-border data transfer regulations, Brunei, Cambodia, Laos, and Myanmar have not yet implemented such policies. Within the ASEAN-6 countries, all three categories of data policy regimes the World Bank describes are present (Ferracane and van der Marel 2021): The Philippines is the only ASEAN member with an open model, having no significant restrictions on data flows. The conditional model, which requires certain legal conditions such as user consent or data protection guarantees to be fulfilled before data can be exported, is the most widely employed, being currently in use in Indonesia, Malaysia, Singapore, and Thailand. Finally, Vietnam continues to use the restrictive model, imposing significant barriers to data flows, generally for national security reasons.

In the past five years, nearly all ASEAN-6 countries have updated their cross-border data flow policies, with a general trend towards reducing restrictiveness and increasing harmonization. Indonesia has undertaken the most fundamental reform shifting from a restrictive to a conditional regime through the implementation of Law No. 27 of 2022 on Personal Data Protection (PDP

Law). This law, enacted on October 17, 2022, removed many of the previous extensive data localization requirements, allowing for more flexibility in cross-border data transfers as long as certain conditions are met. These conditions include ensuring that the recipient country provides adequate data protection, implementing binding corporate rules, or obtaining explicit consent from the data subjects. While the other countries have not shifted their policy regime to a different model, many have allowed for new transfer mechanisms or an easing of legal requirements. For example, Thailand has recently implemented new transfer mechanisms, including Binding Corporate Rules (BCRs) and standard contractual clauses (SCCs), as outlined in two notifications issued by the Personal Data Protection Committee (PDPC) and effective from March 24, 2024. These mechanisms allow for greater flexibility in cross-border data transfers by providing more and clearer compliance options for businesses, while also aligning more closely with EU data protection standards facilitating business with this major economy.

Vietnam, on the other hand, is the only ASEAN country that has cemented its restrictive data flow policy regime, while simultaneously trying to create a more favourable business environment for foreign businesses. Its Decree No. 53/2022/ND-CP and Decree No. 13/2023/ND-CP require extensive data localization and government control over data flows. While the initial draft versions of Decree No. 13/2023/ND-CP on Personal Data Protection had stringent data localization requirements, these were eased in the final version to no longer require data localization for foreign firms. While maintaining stringent data protection and cybersecurity standards, this shift aims to facilitate international business and investment flows in Vietnam's digital economy.

Despite the various developments in ASEAN's data policy landscape that are tending towards more alignment and openness, the continued heterogeneity may inhibit digital economy

investments. To facilitate and further attract financial flows into digital sectors and technologies, ASEAN countries should work on (1) reducing barriers to data flows and digital trade, and (2) harmonizing digital policy regimes among ASEAN countries as well as between ASEAN members and foreign economies.

First, within a country's own national policies, barriers to data flows and digital trade must be reduced to stimulate investment inflows by creating a more predictable and efficient environment for businesses. However, this needs to be balanced with the protection of individual rights and national security. Policies should ensure that while data flows more freely, adequate safeguards are in place to protect personal data and uphold national security interests. This balance is essential to ensure that the societal costs of lowering barriers do not outweigh the benefits. By establishing clear, consistent, and protective measures, ASEAN countries can attract more investments while maintaining public trust and security.

Second, beyond national policies, ASEAN countries can benefit significantly from harmonizing their digital and data policy regimes among each other as well as with external partners. This harmonization would allow firms to transfer data more easily across borders, enabling them to leverage the full potential of the regional market. Aligning policies on issues such as consent requirements and data categorization would enhance the effectiveness of existing frameworks like the ASEAN Model Contractual Clauses. The ongoing negotiations for the ASEAN Digital Economy Framework Agreement (DEFA) are crucial in this context. DEFA can play a critical role in streamlining policies, reducing barriers, and fostering innovation and investment across the region. By creating a cohesive and interoperable digital policy landscape, ASEAN can position itself as a competitive and attractive destination for digital economy investments.

## 4. Conclusion

In this paper, we examine the venture capital investments in the ASEAN digital economy, and discuss the hurdles to further digital economy growth and policy remedies. We find that the region outperforms other parts of the world in attracting digital economy investments. The higher concentration of investments in the digital economy industries across multiple ASEAN countries indicates a broad-based appeal, rather than reliance on a single dominant economy, which is an important prerequisite for sustainable regional growth. Furthermore, while Asian countries maintain a high preference for investing in ASEAN, non-Asian economies are increasing their integration with ASEAN's digital economy by investing more in the region. At an industry level, ASEAN economies have seen significant shifts in the composition of investment inflows, with large shifts towards data-reliant services and especially digital financial services materializing. This also points towards rapid developments and innovation in ASEAN's digital economy, driving overall economic growth.

However, the landscape of digital economy investments in ASEAN is not without challenges. Restrictive digital policies, particularly those governing cross-border data flows, have the potential to pose significant hurdles to future investment growth. The Digital Trade Restrictiveness Index (DTRI) as well as a more qualitative analysis reveal a wide range of restrictiveness levels among ASEAN countries. First indications of a negative correlation between restrictive data policies and investment attractiveness, including in data-reliant sectors like cloud computing, highlight the importance of the policy environment.

To sustain and enhance the growth of digital economy investments, ASEAN countries should prioritize reducing barriers to data flows and digital trade while balancing the need for individual rights and national security. Harmonizing digital policies across the region could

significantly improve the investment climate, enabling firms to leverage the regional market more effectively. The ASEAN Digital Economic Framework Agreement presents a valuable opportunity to streamline policies, reduce barriers, and foster innovation and investment. By addressing these policy challenges and enhancing regional cooperation, ASEAN can solidify its position as a global leader in the digital economy, driving sustained economic growth and development.

## References

- Anukoonwattaka, Witada, and Richard S. Lobo. 2020. 'Regional Integration for Sustainable Development in Asia and the Pacific: ESCAP Digital and Sustainable Regional Integration Index and Indicator Framework - DigiSR II 1.0'. Bangkok: United Nations ESCAP. [https://www.unescap.org/sites/default/d8files/knowledge-products/TIID\\_DigiSRII%2B%2B%20.pdf](https://www.unescap.org/sites/default/d8files/knowledge-products/TIID_DigiSRII%2B%2B%20.pdf).
- Balassa, Bela. 1965. 'Trade Liberalisation and "Revealed" Comparative Advantage <sup>1</sup>'. *The Manchester School* 33 (2): 99–123. <https://doi.org/10.1111/j.1467-9957.1965.tb00050.x>.
- Bauer, Matthias, Hosuk Lee-Makiyama, Erik Van der Marel, and Bert Vershelde. 2014. 'The Costs of Data Localisation: Friendly Fire on Economic Recovery'. ECIPE Occasional Paper.
- Beschorner, Natasha, and Marcus Bartley Johns. 2019. 'The Digital Economy in Southeast Asia: Strengthening the Foundations for Future Growth'. World Bank Group. <https://documents1.worldbank.org/curated/en/328941558708267736/pdf/The-Digital-Economy-in-Southeast-Asia-Strengthening-the-Foundations-for-Future-Growth.pdf>.
- Blind, Knut, Crispin Miles Niebel, and Christian Rammer. 2022. 'The Impact of the EU General Data Protection Regulation on Innovation in Firms'. *ZEW Discussion Papers*, no. 22–047 (October). <https://doi.org/10.2139/ssrn.4257740>.
- Bukht, Rumana, and Richard Heeks. 2017. 'Defining, Conceptualising and Measuring the Digital Economy'. *Development Informatics Working Paper*, no. 68. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3431732](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3431732).
- Chen, Lurong. 2019. 'ASEAN in the Digital Era: Enabling Cross-Border E-Commerce'. In *Developing the Digital Economy in ASEAN*, 259–75. Routledge. <https://www.taylorfrancis.com/chapters/edit/10.4324/9780429504853-13/asean-digital-era-lurong-chen>.
- Chen, Lurong, Wallace Cheng, Dan Ciuriak, Fukunari Kimura, Junji Nakagawa, Richard Pomfret, Gabriela Rigoni, and Johannes Schwarzer. 2019. 'The Digital Economy for Economic Development: Free Flow of Data and Supporting Policies'. *T20 Japan 2019*, March. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3413717](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3413717).
- Ferencz, Janos. 2019. 'The OECD Digital Services Trade Restrictiveness Index'. OECD Trade Policy Papers 221. Vol. 221. OECD Trade Policy Papers. Paris: OECD Publishing. <https://doi.org/10.1787/16ed2d78-en>.
- Ferracane, Martina Francesca, Janez Kren, and Erik van der Marel. 2020. 'Do Data Policy Restrictions Impact the Productivity Performance of Firms and Industries?' *Review of International Economics* 28 (3): 676–722. <https://doi.org/10.1111/roie.12467>.
- Ferracane, Martina Francesca, Hosuk Lee-Makiyama, and Erik van der Marel. 2018. 'Digital Trade Restrictiveness Index'. *European Center for International Political Economy* 5. [https://ecipe.org/wp-content/uploads/2018/05/DTRI\\_FINAL.pdf](https://ecipe.org/wp-content/uploads/2018/05/DTRI_FINAL.pdf).
- Ferracane, Martina Francesca, and Erik van der Marel. 2019. 'Do Data Policy Restrictions Inhibit Trade in Services?' *Robert Schuman Centre for Advanced Studies Research Paper No. RSCAS 29*. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3384005](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3384005).
- . 2020. 'Digital Innovation in East Asia: Do Restrictive Data Policies Matter'. *World Bank Policy Research Working Paper*, no. 9124. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3526526](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3526526).
- . 2021. 'Regulating Personal Data: Data Models and Digital Services Trade'. *World Development Report 2021 Background Paper*, Policy Research Working Paper 9596, .



- Flickinger, Mark. 2023. 'Venture Capital Fundamentals: Why VC Is A Driving Force Of Innovation'. *Forbes*. 29 March 2023. <https://www.forbes.com/sites/markflickinger/2023/03/29/venture-capital-fundamentals-why-vc-is-a-driving-force-of-innovation/>.
- Frey, Carl Benedikt, and Giorgio Presidente. 2024. 'Privacy Regulation and Firm Performance: Estimating the GDPR Effect Globally'. *Economic Inquiry*, March, ecin.13213. <https://doi.org/10.1111/ecin.13213>.
- Google, Temasek, and Bain & Company. 2022. 'E-Conomy SEA 2022: Through the Waves, towards a Sea of Opportunity'. [https://www.temasek.com.sg/content/dam/temasek-corporate/news-and-views/resources/reports/e\\_Conomy\\_SEA\\_2022\\_report.pdf](https://www.temasek.com.sg/content/dam/temasek-corporate/news-and-views/resources/reports/e_Conomy_SEA_2022_report.pdf).
- . 2023. 'E-Conomy SEA 2023: Reaching New Heights: Navigating the Path to Profitable Growth'. <https://www.temasek.com.sg/content/dam/temasek-corporate/news-and-views/resources/reports/google-temasek-bain-e-conomy-sea-2023-report.pdf>.
- Gupta, Shagufta, Poulomi Ghosh, and V. Sridhar. 2022. 'Impact of Data Trade Restrictions on IT Services Export: A Cross-Country Analysis'. *Telecommunications Policy* 46 (9): 102403.
- Ha, Huong, and C.K. Peter Chuah. 2023. 'Digital Economy in Southeast Asia: Challenges, Opportunities and Future Development'. *Southeast Asia: A Multidisciplinary Journal* 23 (1): 19–35. <https://doi.org/10.1108/SEAMJ-02-2023-0023>.
- Hao, Shuang, Zhi Chen, Chien-Chih Wang, and Che-Yu Hung. 2023. 'Impact of Digital Service Trade Barriers and Cross-Border Digital Service Inputs on Economic Growth'. *Sustainability* 15 (19): 14547.
- He, Chuan, and Yishai Tian. 2023. 'Study on the Identification of Obstacle Paths for Digital Economy Promotion in Underdeveloped Regions Based on ISM-MICMAC Modeling'. *Transactions on Economics, Business and Management Research* 3:245–56.
- Jia, Jian, Ginger Zhe Jin, and Liad Wagman. 2020. 'GDPR and the Localness of Venture Investment'. *Available at SSRN* 3436535.
- . 2021a. 'The Persisting Effects of the EU General Data Protection Regulation on Technology Venture Investment'. *The Antitrust Source*, June.
- . 2021b. 'The Short-Run Effects of the General Data Protection Regulation on Technology Venture Investment'. *Marketing Science* 40 (4): 661–84.
- Keck, Macmillan, Seharish Gillani, Ahmed Dermish, and Jeremiah Grossman. 2021. 'The Role of Data Protection in the Digital Economy'. UNCDF | Policy Accelerator. UNCDF. <https://static1.squarespace.com/static/5f2d7a54b7f75718fa4d2eef/t/61c39ac52e86d360a8301fd6/1640210452857/EN-UNCDF-Brief-Data-Protection-2021.pdf>.
- Lerner, Josh, and Ramana Nanda. 2020. 'Venture Capital's Role in Financing Innovation: What We Know and How Much We Still Need to Learn'. Working Paper 20-131. Harvard Business School.
- OECD. 2023. *The Impact of Regulation on International Investment in Portugal*. Paris: Organisation for Economic Co-operation and Development. [https://www.oecd-ilibrary.org/finance-and-investment/the-impact-of-regulation-on-international-investment-in-portugal\\_688b30c8-en](https://www.oecd-ilibrary.org/finance-and-investment/the-impact-of-regulation-on-international-investment-in-portugal_688b30c8-en).
- Prasad, Aryamala, and Daniel R. Perez. 2020. 'The Effects of GDPR on the Digital Economy: Evidence from the Literature'. *Informatization Policy* 27 (3): 3–18. <https://doi.org/10.22693/NIAIP.2020.27.3.003>.
- Son, Chang Yong. 2022. 'Digital Connectivity: Bolstering Technical Development and Shaping the Digital Economy in South-East Asia'. Bangkok: United Nations ESCAP, Information

- and Communications Technology and Disaster Risk Reduction Division. <https://repository.unescap.org/handle/20.500.12870/4434>.
- Stephenson, Matthew. 2020. 'Digital FDI: Policies, Regulations and Measures to Attract FDI in the Digital Economy'. White Paper. Geneva: World Economic Forum. [https://www3.weforum.org/docs/WEF\\_Digital\\_FDI\\_2020.pdf](https://www3.weforum.org/docs/WEF_Digital_FDI_2020.pdf).
- UN ECLAC. 2009. 'Physical Infrastructure and Regional Integration', ECLAC Bulletin: Facilitation of trade and transport in Latin American and the Caribbean, 12 (280): 1–4.
- UNCTAD. 2021. 'Digital Economy Report 2021. Cross-Border Data Flows and Development: For Whom the Data Flow'. United Nations. [https://unctad.org/system/files/official-document/der2021\\_en.pdf](https://unctad.org/system/files/official-document/der2021_en.pdf).
- U.S. Bureau of Economic Analysis. 2023. 'U.S. Digital Economy: New and Revised Estimates, 2017-2022'. Survey of Current Business. <https://apps.bea.gov/scb/issues/2023/12-december/pdf/1223-digital-economy.pdf>.
- U.S. Chamber of Commerce. 2024. 'The Digital Trade Revolution: How U.S. Workers and Companies Benefit from Digital Trade'. [https://www.uschamber.com/assets/documents/USCC\\_Digital-Trade-Report.pdf](https://www.uschamber.com/assets/documents/USCC_Digital-Trade-Report.pdf).
- Van Der Marel, Erik. 2022. 'Data-Related Restrictions and Digital Services Trade: Comparing Asia with the Rest of the World'. In *Unlocking the Potential of Digital Services Trade in Asia and the Pacific*, edited by Jong Woo Kang, Matthias Helble, Avendano, Pramila Crivelli, and Mara Claire Tayag, 98–127. Manila, Philippines: Asian Development Bank.
- World Bank Group. 2024. 'Digital Progress and Trends Report 2023'. <https://openknowledge.worldbank.org/server/api/core/bitstreams/95fe55e9-f110-4ba8-933f-e65572e05395/content>.
- Zhang, Xiyang, and Yihuan Wang. 2022. 'Research on the Influence of Digital Technology and Policy Restrictions on the Development of Digital Service Trade'. *Sustainability* 14 (16): 10420.