Chapter 9

Digital Government in Promoting Trade: The Case of Cambodia

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1. Introduction

Digital transformation has become a popular buzzword in government policy documents, private sector businesses, and the media. Although it is relatively new and has not yet been well understood, especially in the developing world where new technology system adoptions are at a nascent stage, everybody seems enthusiastic and willing to adopt it without much hesitation. This may be because digitalisation is viewed as an important driver for promoting national economic activities and inclusiveness; enhancing internal business processes, efficiency, and productivity; promoting inclusiveness; and boosting international commercial activities, i.e. international trade, and foreign direct investment (FDI).

As the main component of the digital transformation, digital government will affect all aspects of economic, social, and political activities by improving public services to citizens, domestic and international investors, cross-border traders, and the entire society. With easy access to large amounts of public information, economic agents and society can conduct operations from anywhere through reliable government websites and platforms in a time-efficient, convenient, transparent, and round-the-clock manner. This will generate significant social and economic benefits through cost reduction and efficiency gains.

The concept of digital government was introduced in the late 1990s, after electronic government was set in motion following the arrival of the internet in the early 1990s (Kong, 2019). As the concept of digital government continues to evolve, it is important to have a working definition of it: 'the introduction, application, and use of digital technologies and data in government and its external relationships, including citizens, businesses, civil society and other non-governmental organizations, and other international organizations' (Lips, 2020: 3). Veit and Huntgeburth (2014) defined digital government as the use of information and communication technology (ICT) in government to transform the relationship between government and society in a positive manner.

The Government of Cambodia has made great efforts to transform the country into a digital society by developing the relevant digital policy documents and frameworks for a successful digital transformation (Government of Cambodia, 2021). Cambodia launched its digital policy initiatives in the 1990s, when email and the internet were introduced in the country. Subsequently, institutions responsible for ICT development were established and ICT policy frameworks and related policy papers were drafted and approved. In 2016, the government began implementing its Telecom/ICT Development Policy 2020 to serve as a roadmap and mechanism for the successful development of the ICT sector. Based on the ICT policy, Cambodia envisages becoming a competitive, information-based society that can provide ICT-based solutions for transforming the country into a knowledge-based economy to enhance economic growth and equitable development. Recent data from the Ministry of Post and Telecommunications (Government of Cambodia, n.d.) showed that, as of March 2021, broadband service coverage in urban and rural areas was 92.20%, while the mobile penetration, internet penetration, and broadband internet penetration rates were 125.51%, 106.23%, and 87.76%, respectively. This offers a favourable opportunity for accelerating digital transformation and digital government in Cambodia.

Digital transformation has exerted impacts on both the public and private sectors. It could significantly reduce bureaucracy, lengthy processes, and red tape, providing tremendous opportunities to increase the efficiency and effectiveness of public service delivery, cost reduction, and the improvement of internal business process. Curtis (2019) indicated that digital transformation should empower services to be available online round the clock, allowing the public to access them from anywhere; and enable employees to explore new and more efficient ways of working and provide them with the necessary tools and support. Recent studies have shown that digital transformation creates many benefits (Komarčević, Dimić, and Čelik, 2017). With digital transformation, the operating income of firms is expected to increase from 5% to 15%, their operating costs are expected to fall by between 10% and 20%, and internal business (efficiency) is set to improve by more than 30%. This empirical evidence suggests that digital transformation brings about economic and social benefits in both the public and private sectors.

The main purpose of this chapter is threefold. First, this study was undertaken to critically review Cambodia's digital policy frameworks, with particular emphasis on the Digital Economy and Society Policy Framework, 2021–2035 (Government of Cambodia, 2021) and the Digital Government Policy, 2022–2035 (Government of Cambodia, 2022). Second, it discusses the challenges and opportunities of digital government and explores ways to address them. Third, the study examines the economic impact of digital government by empirically assessing the relationship between digital government (proxied by e-government) and international trade between Cambodia and its trading partners, using panel data analysis over 2003–2018. The primary research methodology for this study involves a comprehensive examination of documents, policy initiatives, and reports from Cambodia's government and public agencies, as well as theoretical and empirical literature on digital government, technical reports, and publications by international organisations such as the World Bank and the Asian Development Bank.

The remainder of the chapter is structured as follows. Section 2 discusses the developments of Cambodia's digital policy frameworks from a historical perspective. Section 3 discusses the economic impacts of digital government theoretically and empirically, followed by three mini case studies presented in Section 4. Section 5 presents preliminary evidence of the impact of digital government on international trade for Cambodia. Section 6 concludes and offers policy implications.

2. Digital Policy Developments

Cambodia has introduced important digital policy frameworks to accelerate the country's digital transformation.

The Cambodian ICT Masterplan 2020 was the country's first digital policy framework. It was adopted and implemented in 2014 to transform Cambodia into a society driven by ICT. The master plan is based on four main pillars empowering people, ensuring connectivities, enhancing capabilities, and enriching e-Services. These will serve as strategic drivers for achieving various public administration and policy goals, as well as for accelerating inclusive socio-economic development.

Using ICT in expanding e-Government and integrating public services falls into the fourth pillar.[1] To this end, five strategies have been implemented: (i) common task-related and technical factors, i.e. standardising e-government and sharing information amongst all public organisations; (ii) nationally critical ICT resources must be developed and managed under a centralised plan; (iii) all services must be provided in a transparent and seamless manner; (iv) newly introduced technologies must be open, flexible, and practical; and (v) management of all e-government projects must be supported through the establishment of efficient and well-defined policies and institutions.

By the end of 2021, the Cambodian government provides 3,508 public services digitally – 372 (10.60%) with the application form downloadable but submission not yet made online; 416 (11,86%) with the application form downloadable and online submission; and 2,720 (77.54%) whose application form can be submitted directly to One Window Service Offices. Cambodia has 196 digital information systems providing public services – 52 (30.8%) are government-to-citizens systems; 16 (9.5%) are government-to-business systems; and 101 (59.8%) are government-to-government systems. Most of these digital information systems were developed by their respective public institutions. Some of these systems have overlapping functions, such as human resources management systems and archive management systems.

The Cambodia Digital Economy and Society Policy Framework 2021-2035 was adopted in late 2021. Accelerating digital transformation in the public sector[2] is one of the five strategic focuses of this policy framework. Based on it, the Digital Government Policy, 2022–2035 was established to build the necessary digital infrastructure for developing sustainable digital government, aimed at improving public administration, public setor efficiency, and public service delivery to meet the rising demands of the public.

For the Digital Government Policy to achieve its vision, the government has set four main strategic goals – enhancing the digital government infrastructure, building digital governance and digital public services, fostering capacity building and digital innovations, and promoting public–private partnerships– with 10 strategies and 83 priority actions.[3]
- **Enhancing digital government infrastructure.** Digital government infrastructure needs to be improved to ensure its quality, efficiency, and secured network connectivity, as well as data storage and data exchanges, which are critical for supporting the development, management, and usage of the digital government system. The digital payment system infrastructure is also to be improved through the connection with and use of national payment gateway infrastructure to ensure high reliability of payments for public and other services. In addition, comprehensive cybersecurity infrastructure will be established and strengthened to ensure a high level of security in the digital technology system so that trust and confidence in using digital government systems is built. Infrastructure for postal services is also to be built to broaden and strengthen the management and expansion of postal services.

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1 In the country's another ICT framework, the ICT Development Policy 2020, which was implemented in 2016, the government also committed to encourage promoting ICT applications in all public institutions.

2 Accelerating digital transformation in the public sector through the integration of government systems in all ministries and institutions to improve the quality of public service delivery to all citizens round the clock from anywhere.

3 This is based largely on the Cambodia Digital Government Policy, 2022–2035 (Government of Cambodia, 2022), approved on 28 January 2022.

- **Building digital governance and digital public services**. Digital governance starts with the necessary policies, the improvement of relevant legal frameworks, as well as the standardisation and architecture of digital government, which are in line with the international best practices. These are prerequisites for developing sustainable digital government with a high sense of security and efficiency, aimed at supporting the Cambodia Digital Economy and Society Framework, 2021–2035. Public services are to be improved through digital transformation of government services, i.e. the enhancement of government-to-government, government-to-citizens, and government-to-business interactions.
- **Fostering capacity building and digital innovations**. Capacity building is critically important for the success of digital government. Government leadership and employees are trained in the digital skills necessary for the adoption and use of digital technology systems so that public service delivery is enhanced to satisfy the needs of the public. Digital innovations and R&D are also to be encouraged to increase the effectiveness and efficiency of digital transformation and to ensure Cambodia's digital competitiveness in the region.
- **Promoting public–private partnership**. Active participation of the private sector in the digital government transformation process is encouraged. To this end, a coordination mechanism and cooperation has been established to facilitate a productive partnership between the government and technology firms. In addition, an incentive mechanism for digital start-ups has been initiated to promote digital entrepreneurship, research in digital technologies, and innovations for the sustainable development of digital government in Cambodia.

3. Economic Impacts of Digital Government

Governments worldwide have become increasingly digitalised by adopting ICT applications and other modern technologies to achieve their goals of being open and transparent, competent, and service-oriented through enhancing two-way communication and transactions. Several studies have assessed and documented the impacts of digital government (Asgarkhani, 2005; Lee, 2016; Codagnone et al., 2020). Through digital transformation and the use of ICTs and other digital technologies, governments create multiple societal effects, which can be broadly categorised into four dimensions: economic, administrative, social, and political (Lee, 2016). This study is largely devoted to the discussion of the economic effects of digital government.

3.1. Control of Corruption

Corruption has been identified as a major factor that is detrimental to economic growth and equitable economic development for many developing countries. Digital government may serve as an effective tool for the control of corruption and for facilitating international trade, economic growth, and development processes. This is because effective control of corruption contributes significantly to cost reduction. ICT and other technology applications introduced by the government cut corruption since

digital government technologies significantly reduce direct contact between government officials and businesses and citizens (Mouna, Nedra, and Khaireddine, 2020). Similarly, digital government makes information available instantly, so citizens and businesses can question arbitrary procedures and decisions as well as opportunistic behaviour by government officials. This promotes transparency and accountability, and increases the fight against corruption which prevails to a larger extent in many developing countries.

Empirical evidence has established the relationship between digital government and reduced corruption. Using panel data from 149 countries over 1996–2006, Andersen (2009) found that e-government is positively associated with a reduction in corruption and the promotion of accountability and transparency in the public sector. Elbahnasawy (2014) empirically investigated the impact of e-government and internet adoption on combating corruption, by using a large panel data set from 160 countries over 1995–2009. The results revealed that e-government is a powerful tool in reducing corruption. The finding indicated that e-government is a necessary tool in the anti-corruption effort but feasible only through the development of telecommunications infrastructure and improved internet services. Majeed and Malik (2016) provided evidence that e-government and press freedom combined reduced corruption for a sample of 147 countries over 2003–2012. Using data from 214 countries for 2003–2016, Park and Kim (2019) found that e-government significantly reduces corruption. A similar finding reported by Ali et al. (2022) suggested that e-government plays an important role in reducing corruption.

3.2. Cost Reduction and Efficiency Gains

The use of ICT applications introduced by the government leads to cost reduction due largely to a decrease in administrative bureaucracy and the procedures required to perform public tasks by government employees, as well as to receive public services by citizens and businesses. Moreover, government digital technologies and platforms reduce the time and number of employees needed for many types of work, thus raising productivity. Yang and Rho (2007) indicated that digital government helps the public sector become more productive by allowing routine government activities to be handled electronically. Similarly, digital government can cut costs by reducing paperwork, political connections, staffing, printing, telephone calls, and visits to government offices, amongst other things, which increases economic efficiency and benefits. In addition, digital government applications allow citizens, businesses, and the public sector to access available government information round the clock from anywhere, which improves the quality of these services (Alshehri and Drew, 2010). Lee (2016) documented the relationship between e-government and cost reduction for Korea, where citizens and businesses gain cost-reduction benefits by using e-government. Lee (2016) reported that 61% of government officials at the national level benefited from cost savings through the use of computers in their organisations. Similar results were reported at the subnational level, where 62% of officials experienced time reductions to complete tasks, thanks to greater investment in information technology by local governments.

3.3. Improving Economic Performance

Digital government can positively impact economic performance through several channels. First, with digital transformation, governments worldwide can make extensive use of ICTs and digital technologies to facilitate growth-related activities, policies, and public services, as well as promoting strong and transparent institutions – thereby contributing to long-term economic growth and sustainable development. Castro and Lopes (2022) indicated that advances in ICTs and digital technologies provide unprecedented opportunities to transform the relationships amongst governments, citizens, and businesses, contributing to achieving various strategic government goals. Second, as indicated earlier, digital government can address the chronic issue of corruption, which prevails in many transitional and developing countries (Majeed, 2020). Improved corruption control reduces costs and improves the quality of growth-enhancing institutions, which can provide strong support for economic performance (North, 1990). Third, digital government helps build the necessary ICT and digital infrastructure, which improves the performance and productivity of public sector employees. Using data from 1976 to 2010 for Indonesia, Malaysia, the Philippines, Singapore, and Thailand, Mahyideen, Ismail, and Law (2012) found that ICT infrastructure is positively associated with the economic performance of these countries through enhancing total factor productivity. Similar results are reported by Choi and Yi (2009); Czernich et al. (2011); Majeed and Ayub (2018); and Majeed (2020).

3.4. Private Investment Environment

As digital government shifts public sector functions online, it can address the challenges faced by private investors, both domestic and foreign. These include bureaucracy, red tape, inconsistent procedures, and protracted approval processes by multiple government agencies with rent-seeking behaviour. In addition, multinational enterprises often experience difficulties for several reasons (Han et al., 2021). First, the dispersed locations of public agencies make contact physically difficult and time-consuming. Additional visits may be needed if firms fail to submit paperwork that meets these agencies' requirements. Second, since approvals of business permits are often made by multiple government agencies, the approval procedures may be complicated and protracted. Third, complicated approval procedures weaken accountability and transparency, and may encourage corruption. Han et al. (2021) indicated that, with a digital government portal, procedures that were previously carried out by multiple government agencies can move much faster, becoming flexible, fast, convenient, fair, and transparent; and reducing costs. With government functions moving online, businesses can access information at much lower costs round the clock from anywhere, enhancing government accountability and reducing opportunities for corrupt rent-seeking activities (Han et al., 2021).

Similarly, Al-Sadiq (2021) indicated that digital government tends to enhance the locational advantages of a host country for several reasons. First, digital government can facilitate FDI inflows through cost and time reductions, and it improves the effectiveness of the internal processes of government services through a government one-stop portal. Second, digital government enhances access to a greater range of information about public services. This makes the public sector more inclusive, effective, accountable, and transparent. Third, digital government increases access to information and knowledge about investment opportunities in a host economy. Han et al. (2021) empirically examined the effects of e-government on FDI inflows. Their results show that e-government is positively associated with FDI. This finding was confirmed by Al-Sadiq (2021), who investigated the impact of e-government on FDI for 178 host countries from 2003 to 2018.

3.5. Trade Facilitation

International trade has played a critical role in national economic development and welfare, especially for small open economies whose economic prosperity is highly dependent on the health of the world economy. It not only promotes inclusive economic growth, equitable development, income and employment generation, and technology transfers, but also reduces poverty and narrows inequality in many developing countries. Thanks to the economic gains from commercial activities, governments around the world have made great efforts to reduce international trade costs by enhancing government transparency and public services to citizens and businesses through digital government transformation. As digital government shifts functions online and serves as a one-stop portal, it could help achieve several government goals, including better delivery of public services, improved business interactions, greater access to government information, and efficiency gains of government agencies. The benefits from digital transformation of government can be substantial, especially for countries where the level of bureaucratic processes, government inefficiency, and corruption are high. These benefits include less corruption, increased transparency, a reduction in burdensome customs procedures and excessive paperwork requirements, and a decrease in business costs.

Therefore, digital government can improve international trade facilitation by mitigating trade frictions, transaction costs, and information costs; and improving market information for trade. Freund and Weinhold (2004) examined the role of internet adoption in bilateral trade flows in goods and found that internet adoption is positively associated with trade flows. Clarke and Wallsten (2006) found that greater internet penetration promoted trade flows from developing countries to developed countries. The findings are confirmed by Yushkova (2014), Lin (2015), and Xing (2018), amongst others.

4. Case Studies

4.1. National Bank of Cambodia's Bakong

Bakong, a blockchain-based payment system, was launched in July 2019 by Cambodia's central bank, the National Bank of Cambodia (NBC). It was developed by SORAMITSU Co Ltd, a technology company based in Japan, and won an award of excellence at the Nikkei Superior Products and Services Awards. Nikkei praised the platform for its achievements in promoting financial inclusion, as it served nearly half of Cambodia's population directly and indirectly (Iwamoto, 2022). The NBC (2020) indicated that the blockchain-based Bakong has the potential to increase economic efficiency; support financial inclusion; promote the use of the Cambodian riel; and address the lack of interconnectivity and interoperability of retail payments amongst banks, microfinance institutions, and mobile payment service providers.

According to the NBC, users who have an account with one of the partner banks, microfinance institutions, or mobile payment companies can create an account on the Bakong app. At its inception in July 2019, only three partner financial institutions joined Bakong. As of March 2022, the number had grown to 60, of which 28 are in the process of technical integration. Available services include interbank funds transfers and mobile payments. Data from the NBC show that, by March 2022, around 353,143 accounts were created, reaching 7.50 million people. About 7,500 merchants are on Bakong, making about 2.52 million transactions in Cambodian riels and 10.21 million in United States dollars. The NBC also acknowledges the potential of expanding Bakong's infrastructure for the KHQR code system, e-commerce transactions, cross-border payments, remittances, and large transfers. Bakong will be connected with the Cambodia Data Exchange (CamDX) platform so that Electronic Know Your Customer (e-KYC) can be easily accessed.

Despite the rise in innovations in the banking sector, paper-based instruments (e.g. cash and cheques) still make up the largest share of transactions in Cambodia. These practices are inefficient and inconvenient, especially for large transactions, and may provide room for criminal acts, including counterfeiting and fraudulence. Digital payment systems such as Bakong can overcome these challenges, as transactions can be made conveniently round the clock from anywhere via a mobile app in real time and free of charge. In 2019, remittances sent to Cambodia totalled about $1.6 billion or nearly 6% of the country's gross domestic product (GDP) that year (UNESCAP, 2021). According to the World Bank, the average cost of sending $200 home in 2021 was around $12.60 (World Bank, 2021a). By establishing partnerships with banks in migrant-receiving nations, Bakong has the potential to significantly reduce the cost and time needed for sending remittances home, even when the receivers are unbanked or underbanked. As of January 2022, migrant workers in Malaysia can use Bakong to send money to their families in Cambodia, and the NBC is planning to expand this service to other countries (Chandran, 2021).

Promoting financial inclusion is also a priority, as the expansion of financial services to a broader section of the population is essential for poverty alleviation and inclusive economic development. However, data from the World Bank's Global Findex Database in 2021 indicated that only 33% of adults in Cambodia had a bank account (World Bank, 2021b). This exceedingly limited reach can be explained by the lack of access to physical financial institutions in rural and remote areas, as well as the need for documentation that most people in those locations often do not possess (Barajas et al., 2020). The rise of e-payment services and e-wallets, such as Pi Pay and TrueMoney, has served some parts of the unbanked and underbanked population in Cambodia, and the NBC aims to take advantage of the country's high level of smartphone penetration through the user- and mobile-friendly Bakong. This platform could also support the NBC in its de-dollarisation efforts by making transactions in riels more convenient. Wider use of the national currency would enable the NBC to implement monetary policy effectively and ensure financial stability while opening new opportunities for developing new riel-denominated policy instruments, including direct cash transfers.

Bakong can address the issues of interconnectivity and interoperability of interbank payments, and that of a clearinghouse, since it brings financial institutions together on a common platform and provides a peer-to-peer feature that enables users to perform real-time fund transfers by simply scanning a QR code or keying in numbers. Despite its achievements and promises, Bakong will need to manoeuvre around two critical obstacles to achieve its objectives. The first challenge is the lack of basic and digital infrastructure, such as stable electricity and internet coverage, in rural and remote areas. Moreover, end-users of Bakong will need a considerable level of financial and digital literacy to make use of the available services, and the rise in cyber scams may also disincentivise many Cambodians from using the platform.

In the age of digitalisation, digital currencies and mobile payment systems are likely to account for a larger share of all future transactions. While developing countries generally fall behind in innovations and new technology system adoption, Cambodia's blockchain-based Bakong presents optimism for the successful development of digital payment systems in Cambodia and contributes to the government's digital policies, i.e. the Digital Economic and Society Policy Framework, 2021–2035 and the Digital Government Policy, 2022–2035.

4.2. Agricultural and Rural Development Bank's digital transformation

The Agricultural and Rural Development Bank (ARDB) has undertaken a transformation from a single-branch specialised bank with no digital banking platform to a digital-first multi-branch commercial bank. The vision and mission of the ARDB is to be a leading financial institution focused on the development of the agriculture and rural sectors in Cambodia and to uplift the agriculture and rural sectors through various methods. The goals of the ARDB are to become a fully digital bank, without the use of paper and bricks-and-mortar facilities; to maximise income from non-interest financial services; to transform subsistence farmers into agro-preneurs; and to promote the role of SME clusters for agro-processing businesses. To this end, the ARDB has adopted the following key values in its transformation: (i) a digital-first mindset to serve customers and improve operational efficiency, (ii) a collaboration-driven culture to maximise value delivery to customers, (iii) traditional distribution channels to complement digital distribution channels, (iv) 'agro-preneur' and SME clusters to drive economic growth, (v) diversified products and services to fulfil customers' needs, and (vi) a corporate culture and human resources to achieve success.

Since its receipt of a commercial banking licence from the NBC in February 2020, the ARDB has embarked on a digitalisation journey that has simplified and digitalised the customer experience through various methods. These include in-house development of technologies as well as partnerships with existing market players to offer digital technology-based services to its customers.

- **Digitalisation of loan processes to improve the customer experience**. Since February 2020, the ARDB has digitalised part of its loan application processes by harnessing the traffic from its corporate website (www.ardb.com.kh). It also provides loan applications via its mobile app. By creating an alternative method for customers to apply for loans, the ARDB can obtain more applications from customers who may be far from the bank's main office in Phnom Penh. The bank has also partnered with Wing Commercial Bank to offer loan disbursements through the Wing Cash Express agent network. With more than 8,000 agents nationwide, this partnership offers the ARDB the ability to disburse loans within 30 minutes to any customer in Cambodia, making it more convenient for farmers to borrow from the ARDB. The bank can also collect loan interest through the Wing Cash Express agent network. This increases the convenience for customers to repay the interest on their loans and may improve the ARDB's asset quality.

- **Digital banking as an alternative distribution channel of the bank**. The ARDB has launched a mobile banking App developed in-house. This has increased the convenience of reviewing account balances for customers and has provided a platform for future growth of the bank. The ARDB also offers mobile top-up services to its customers through the mobile banking app. In addition, it has established a partnership with Électricité du Cambodge (EDC) to offer bill payment services to its customers. Furthermore, it has enabled loan applications on the mobile banking App for loan extensions.

- **Digital marketing complementing traditional marketing**. As most of the Cambodian population uses Facebook, the social media platform has become an important marketing tool. The ARDB uses Facebook to promote its loans, deposit products, and other bank products to customers across the country. As the primary target customers of the ARDB mainly reside in remote rural areas of Cambodia where access to the internet is limited, traditional marketing strategies have been deployed concurrently with its digital marketing media.

4.3. CamDX

CamDX is a platform for exchanging data between different government bodies in a standardised and secure manner, based on six main principles: distribution, security, reliability, no data ownership, ease of use, and heterogeneity (Kong, 2021). The initiative was largely inspired by Estonia's X-Road, where 99% of public services are available online 24 hours a day (e-Estonia, 2022). Currently, 11 government institutions participate on CamDX, with the Ministry of Economy and Finance being the central governing authority of the platform.

Via the CamDX platform, a business owner can conduct online business registration simply, and the completed data are sent to all relevant government institutions simultaneously. After those authorities approve the application, digital certificates, which have legal value, are issued for the applicant. The cost of business registration is estimated to have been significantly reduced, by 40% (Kong, 2021). In a similar vein, the banking sector is expected to benefit considerably from the CamDX platform. An up-and-coming service on CamDX – e-KYC – allows banks and other financial institutions to request KYC data directly from the Ministry of Interior, which is also a member of the platform. As a result, the data can be effectively cross-checked with the original data owner, thus reducing the processing time to deliver banking services. More importantly, CamDX enables data to be exchanged with a high level of security.

Since its inception, CamDX has become increasingly popular. From October 2020 to December 2021, more than 5.95 million data transactions were incurred via the platform, with more than 4.76 million transactions taking place in 2021 (Figure 9.1). Moreover, by 18 January 2021, around 2,500 companies had registered and 3,000 company names had been licensed via the platform (Kong, 2021). Following the land-and-expand approach, CamDX plans to start with public services, learn from them, and make improvements when necessary before expanding to other services.

Figure 9.1. Transactions via CamDX
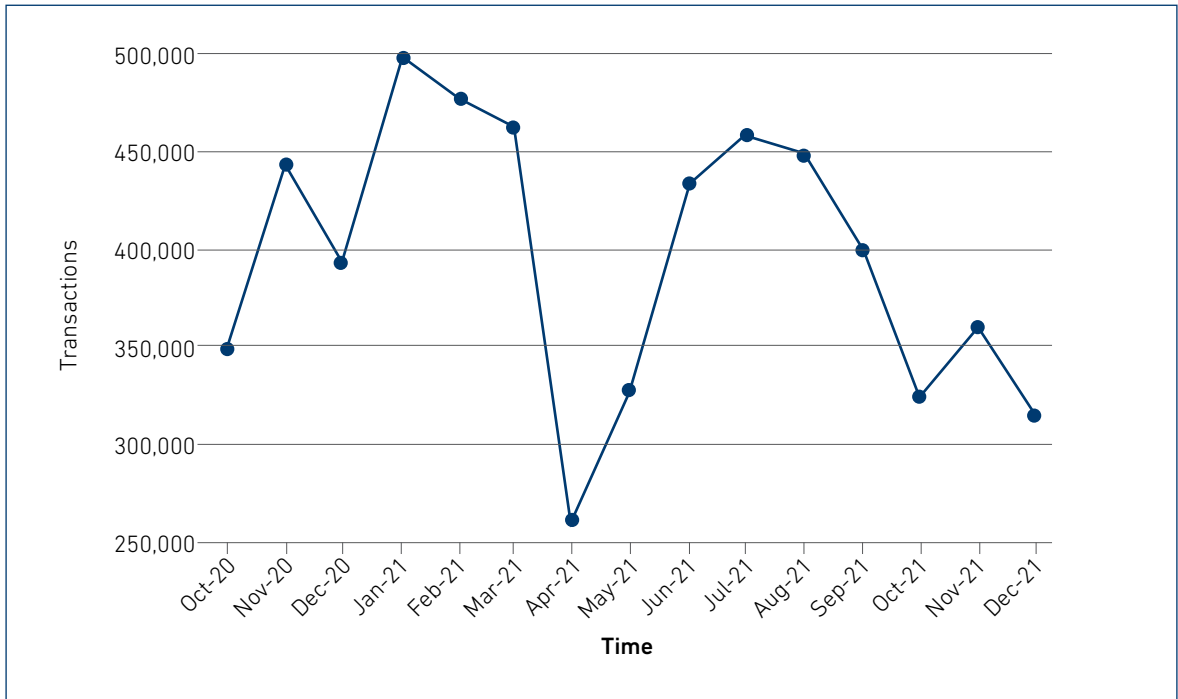
Source: CamDX. (2022).

Although CamDX is an important step towards wider use of e-government services, challenges and concerns remain that may hinder its progress and success. The first set of issues is the lack of digital literacy amongst prospective users. Hence, a task force has been established to assist the public via hotline calls, live chats, email, and social media (Kong, 2021). A study by Saputro et al. (2020) found that one of the key prerequisites to successful implementation of X-Road was the organisation's awareness of the data exchange system. The study's authors also acknowledged the challenges to educating and motivating personnel, stemming from the lack of technical resources.

With robust support and encouragement from the government and the Cambodia Digital Economy and Society Policy Framework, 2021–2035 and the Digital Government Policy, 2022–2035, CamDX has high potential for future expansion and will become a popular one-stop platform. The high level of smartphone usage and penetration, and the pressing demand for better and more efficient public services, will help promote further development of CamDX.

5. Digital Government and International Trade: Preliminary Evidence for Cambodia

5.1. Econometric Specification, Data, and Estimation Methods

The digital government system allows exporters to file export documents and process customs information on the government's digital platform, and permits them to submit their prepared paperwork and pay tariffs online round the clock from anywhere (Biswas and Kennedy, 2018). Therefore, digital government enhances efficiency and effectiveness, improves the quality of government services, reduces trade costs, and saves time by reducing the number of visits to public offices (Biswas and Kennedy, 2018; Heeks, 2018). As indicated above, digital government reduces the probability of direct interaction between exporters and government officials in charge of international trade affairs, thereby reducing the incidence of bribery and corruption (Biswas and Kennedy, 2018). This suggests that digital government can be considered as trade facilitation, since it helps facilitate international trade flows by reducing trade costs, trade impediments, and other related costs. Therefore, it is hypothesised that digital government positively influences the export performance of Cambodia.

Based on the discussion above, the relationship between Cambodia's export performance and digital government in Cambodia is modelled as follows:

$$lnEXPORT_{cjt} = \beta_0 + \beta_1\ lnDG_{ct} + \beta_2\ lnDG_{jt} + \beta_3\ lnPOP_{jt} + \beta_4\ lnGDPCAP_{jt} + \beta_5\ lnEXCH_{cjt} + \beta_6\ lnDist_{cj} + \beta_7\ BORDER +$$
$$\beta_8\ ASEAN + \beta_9\ EBA + Yeardummy + \alpha_i + \varepsilon_{ijt}$$

$where\ i = 1,2,3,...,N\ and\ t=1,2,3,...,T\ (2003\ to\ 2020)$

Ln stands for a natural logarithm. The subscripts c, j, and t refer to Cambodia, trading partners, and time, respectively. α_i is individual country-specific, accounting for the unobserved heterogeneity amongst trading partners, and ε_{it} is the error term assumed to be well behaved. The specification above suggests that the exports of Cambodia are influenced by the population of the trading partners (*POP*); per capita income of the trading partners (*GDPCAP*); Cambodia's digital government, proxied by the United Nations (UN) e-Government Development Index (*DG_c*); the trading partner's digital government, proxied by the e-Government Development Index (*DG_j*); the exchange rate between the United States dollar and trading partners (*EXCH*); and a set of binary variables including Cambodia's membership of the Association of Southeast Asian Nations (ASEAN), the land border between

Cambodia and partners (*BORDER*), and Cambodia being the beneficiary of Everything but Arms (*EBA*).4 A yearly dummy variable is included to account for the global business cycle, the extent of globalisation, oil shocks, COVID-19, and so on (Rose, 2004; Eichengreen, Rhee, and Tong, 2007). The population and per capita income of trading partners are included to capture the demand effects of trading partners for Cambodia's exports, while e-governments in Cambodia and its trading partners serve as trade facilitation in the gravity-styled specification above.

The specification is estimated by using an unbalanced panel data set covering 65 trading partners over 2003–2020 (Appendix). Data for the dependent variable (exports) and bilateral exchange rate are from the International Monetary Fund (IMF) Direction of Trade Statistics, while data on population and GDP per capita are from the World Bank's World Development Indicators. Data on distance are from the GeoDist database of the Centre d'Études Prospectives et d'Informations Internationales (CEPII). Digital government is proxied by the UN e-Government Development Index, which was first computed in 2003 and has been updated in the biennial E-Government Survey published by the UN Department of Economic and Social Affairs. The e-Government Development Index is a normalised composite index with three components: the Online Service Index, the Telecommunication Infrastructure Index, and the Human Capital Index. The index ranges from 0 to 1, with 0 being zero readiness to adopt and implement e-government activities and 1 being full readiness to adopt and implement e-government activities.

To choose the most appropriate model for estimating the above specification with the panel data set, we use the Hausman test for testing the appropriateness of the fixed effects model against the random effects model. A large value of the Hausman test statistic leads to the rejection of the null in favour of the fixed effects model (Verbeek, 2017). The alternative approach to either the fixed effects or random effects models is the Hausman-Taylor method (Hausman and Taylor, 1981), which combines the fixed effects and random effects estimation strategies and allows the estimations of both time-constant and time-varying explanatory variables that appear in our econometric specification. Soeng and Cuyvers (2018) provided a detailed discussion of the panel data estimation strategy.

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4 The Everything but Arms initiative is a European Union arrangement for countries classified as least developed countries by the UN. The initiative was introduced in February 2001, and contrary to the other arrangements mentioned above, it is laid down for an indefinite period and therefore not subject to the normal 3-year revisions. This is an additional measure taken by the European Union to enhance the stability and predictability of preferences for this group of countries that most needs them.

5.2. Estimation Results and Discussion

Table 9.1 presents basic statistics and variance inflation factor (VIF) values for all the included explanatory variables. The VIF values for all variables are well below 5, suggesting an absence of multicollinearity issues amongst the included variables.

Table 9.1. Basic Statistics and VIF Values for All Included Explanatory Variables

Variable	VIF	Mean	Minimum	Maximum
Ln DG_c	1.18	–1.169	–1.350	–0.671
LnDG_j	3.85	–0.454	–1.652	–0.024
LnPOP	1.34	16.803	12.775	21.068
LnGDPCAP	4.69	9.555	5.894	11.724
LnEXCH	1.73	–2.095	–10.052	1.314
LnDist	1.31	8.789	6.280	9.886

VIF = variance inflation factor.

Notes: lnPOP is the natural logarithm of the population of trading partners; lnGDPCAP is the natural logarithm of the per capita gross domestic product (GDP) of trading partners; lnEXCH is the natural logarithm of the ratio of the United States (US) dollar to the trading partner's national currency per US dollar exchange rate; lnDG_c is the natural logarithm of Cambodia's digital government index proxied by the United Nations E-Government Development Index (EGDI); and lnDG_j is the natural logarithm of the trading partner's digital government index proxied by the EGDI.

Source: Author's calculations.

Before discussing our estimation results, we summarise the results of the statistical tests to choose the most appropriate method for the estimations of our econometric specification. The test results are reported along with the estimates of all variables, presented in Table 9.2. The autocorrelation test was carried out and the test statistics are highly insignificant, indicating the absence of autocorrelation issues. Tests for heteroskedasticity show that the null hypothesis of homoscedasticity is strongly rejected at the 1% significance level. This suggests that heteroskedasticity is present in the panel data set used for the analysis. Therefore, our econometric specification above is estimated with heteroskedasticity-robust standard errors. By excluding the time-invariant variable lnDist, we carried out the Hausman test to choose between the fixed effects and random effects models. The Hausman statistic is marginally significant at the 10% level. For comparison, we report the estimates by fixed effects and random effects methods. We also report the results by the Hausman-Taylor method, which is the alternative method to fixed effects and random effects models and is the instrumental variable technique that reduces or removes the correlation between the composite error terms and the included variables.

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5 It is often accepted that a VIF of less than 5 indicates the severity of multicollinearity (Studenmund, 2014).

Table 9.2. Estimation Results

Variable	RE	FE	RE	H-T
Constant	9.152*** (3.187)	27.486 (20.445)	-19.341*** (5.972)	-4.795 (11.788)
LnDG_c	6.326** (2.557)	6.038** (2.542)	4.657* (2.512)	5.671** (2.398)
LnPOP		-1.329 (1.125)	1.020*** (0.098)	0.585** (0.277)
LnGDPCAP		0.388 (0.405)	0.933*** (0.242)	0.530** (0.208)
LnEXCH		0.154 (0.101)	0.091 (0.067)	0.171** (0.085)
LnDist			0.024 (0.321)	-0.245 (0.992)
BORDER			2.585*** (0.860)	2.585 (2.869)
ASEAN			2.033** (0.855)	1.057 (2.689)
EBA			0.949** (0.423)	1.149 (1.159)
Time dummy	Estimated	Estimated	Estimated	Estimated
No. of observations	629	629	629	629
Overall R2	0.365	0.011	0.745	
Wooldridge test for autocorrelation	0.085	0.018	5.894	11.724
Wald test for heteroskedasticity	7623.29***	5385.33***	5.894	11.724
Hausman test	8.28	21.75*		11.724

Notes: *Ln* denotes values in logarithm. *, **, and *** denote that the slope parameter estimates are statistically significant at the levels of 10%,5%, and 1%,respectively. Standard errors are heteroskedasticity robust standard errors in parentheses. RE denotes random effects method; FE is fixed effects method; H-T represents Hausman-Taylor method.

Source: Author's estimations.

The estimated coefficients on both the population and per capita GDP of trading partners have the expected positive signs while geographic distance, as expected, is negatively correlated with Cambodia's exports to its trading partners. The estimates on population and per capita GDP are both significant at the 5% level, which suggests that these two factors are positively associated with Cambodia's exports. Geographic distance is insignificant at the conventional significance level, which is not a surprise since the improvements in transportation technologies, increased digitalisation of information, and availability of digital platforms across the globe reduce transport costs significantly and make it easy to get the needed information immediately from a very long distance at almost zero cost. The estimated coefficients on the common border, ASEAN, and EBA have expected positive signs, but are insignificant.

Interestingly, the variable of interest – digital government – is statistically significant at the 5% level, after controlling for other determinants of international trade flows. This provides evidence that higher levels of readiness to adopt and implement digital government activities in both Cambodia and its trading partners leads to higher exports from Cambodia to the rest of the world. The role of digital government in facilitating Cambodia's exports is confirmed by the estimation results of all methods (Table 9.2). The coefficient on Cambodia's digital government of 4.66–6.33 implies that a 1% increase in the level of readiness to adopt and implement digital government in Cambodia, all else being equal, leads to an estimated 4.66%–6.33% increase in Cambodia's exports to the rest of the world. These results are in line with those reported by Biswas and Kennedy (2018).

6. Concluding Remarks

Over the past 20 years or so, the Government of Cambodia has introduced the use of technologies and a series of digital policy initiatives, including the ICT Masterplan 2020; the Telecom/ICT Development Policy 2020; and the Law on Electronic Commerce. In 2021, the government adopted the Cambodia Digital Economy and Society Policy Framework, 2021–2035 to accelerate digital transformation in Cambodia – to transform the country's current narrow-based economy into a knowledge-based or digital one, aiming at sustaining the high economic growth achieved in the pre-COVID-19 era and realising the aspirations for inclusive economic development. The Cambodia Digital Economy and Society Policy Framework, 2021–2035 serves as Cambodia's new economic growth model. In addition, the government adopted the Digital Government Policy, 2022–2035 to develop digital government to improve people's quality of life and build trust amongst citizens through the provision of better public services.

Using both theoretical and empirical literature as a research methodology, this study discusses the impacts of e-government, with a primary focus being placed on the discussions of economic-related impacts of e-government. Thanks to the availability of data on e-government, this chapter delves into the role of digital government in enhancing Cambodia's export performance. To this end, it employed the augmented gravity model with an unbalanced panel data set from 65 trading partners over 2003–2020. We controlled for population, income per capita, geographic distance, exchange rate, a set of binary variables, and a time dummy, all of which are believed to affect Cambodia's exports to its trading partners. To report the best possible results, several statistical tests were carried out. The estimation results support the role of digital government in Cambodia and trading partners in facilitating Cambodia's exports to its trading partners globally.

The estimation results, together with the empirical evidence from the literature review, should provide some policy implications. First, digital transformation for Cambodia, which serves as trade facilitation, needs to be accelerated to facilitate and provide public services to citizens and businesses, as well as to improve the effectiveness, efficiency, transparency, and accountability of the government, as digital government transformation could reduce trade costs and eliminate unnecessary trade impediments by using a one-stop government platform and other technologies. This will help facilitate and promote Cambodia's international trade with the rest of the world. Second, as Cambodia is a small open economy that is relatively dependent on international trade for employment opportunities, poverty reduction, narrowing inequality, and welfare, efforts need to be redoubled to develop and promote inclusive digital government that is known to be an effective trade facilitation and a strategic means of reducing trade-related costs, to facilitate and increase international trade flows. Third, investments in modern technologies and building digital human resources/digital citizens are encouraged to facilitate the use of digital government applications so that internal and external commercial activities are enhanced.

References

Ali, M., S.A. Raza, C.H. Puah, and T. Arsalan (2022), 'Does e-Government Control Corruption? Evidence from South Asian Countries', *Journal of Financial Crime* 29(1), pp.258–71.

Al-Sadiq, A.J. (2021), 'The Role of E-Government in Promoting Foreign Direct Investment Inflows', *IMF Working Paper*, No. 21/8. Washington, DC: International Monetary Fund.

Alshehri, M. and S. Drew (2010), 'Implementation of e-Government: Advantages and Challenges', *Proceedings of the IASK International Conference E-Activity and Leading Technologies & InterTIC 2010*, pp.79–86. https://research-repository.griffith.edu.au/bitstream/handle/10072/40620/72631_1.pdf

Andersen, T.B. (2009), 'E-Government as an Anti-Corruption Strategy', *Information Economics and Policy,* 21(3), pp.201–10.

Asgarkhani, M. (2005), 'Digital Government and Its Effectiveness in Public Management Reform', *Public Management Review*, 7(3), pp.465–87.

Barajas, A., T. Beck, M. Belhaj, and S.B. Naceur (2020), 'Financial Inclusion: What Have We Learned So Far? What Do We Have to Learn?', *IMF Working Paper*, No. 20/157. Washington, DC: International Monetary Fund.

Biswas, T. and P.L. Kennedy (2018), 'The Role of E-governance on Bilateral Agricultural Trade', Paper prepared for the 2018 Agricultural and Applied Economics Association Annual Meeting, Washington, DC, 5–7 August.

Castro, C. and C. Lopes (2022), 'Digital Government and Sustainable Development', *Journal of the Knowledge Economy*, 13, pp.880–903.

Chandran, R. (2021), 'Cambodia Aims Hybrid Digital Currency on Blockchain at Unbanked', Reuters, 22 December. https://www.reuters.com/article/us-cambodia-tech-currency-idUSKBN2J103L

Choi, C. and M.H. Yi (2009), 'The Effect of the Internet on Economic Growth: Evidence from Cross-Country Panel Data', *Economics Letters*, 105(1), pp.39–41.

Clarke, G.R. and S. Wallsten (2006), 'Has the Internet Increased Trade? Developed and Developing Country Evidence', *Economic Enquiry*, 44(3), pp.465–84.

Codagnone, C. et al. (2020), 'Assessing the Impacts of Digital Government Transformation in the EU: Conceptual Framework and Empirical Case Studies', *JRC Technical Report*. Luxembourg: European Union (European Commission, Joint Research Centre).

Curtis, S. (2019), 'Digital Transformation – The Silver Bullet to Public Service Improvement?' *Public Money & Management*, 39(5), pp.322–24.

Czernich, N., O. Falck, T. Kretschmer, and L. Woessmann (2011), 'Broadband Infrastructure and Economic Growth', *Economic Journal*, 121(552), pp.505–32.

e-Estonia (2022), e-Governance. https://e-estonia.com/solutions/e-governance/government-cloud/

Eichengreen, B., Y. Rhee, and H. Tong (2007), 'China and the Exports of Other Asian Countries', *Review of World Economics*, 143(2), pp.201–26.

Elbahnasawy, N.G. (2014), 'E-Government, Internet Adoption, and Corruption: An Empirical Investigation', *World Development*, 57(c), pp.114–26.

Freund, C.L. and D. Weinhold (2004), 'The Effect of the Internet on International Trade', *Journal of International Economics*, 62(1), pp.171–89.

Government of Cambodia (n.d.), Monthly Report for March 2021, Unpublished.

Government of Cambodia (2021), *Cambodia Digital Economy and Society Policy Framework*, 2021–2035. Phnom Penh: Government of Cambodia, Supreme National Economic Council.

Government of Cambodia (2022), *Cambodia Digital Government Policy, 2022–2035*. Phnom Penh: Government of Cambodia, Ministry of Post and Telecommunications.

Han, Y., X.-F. Shao, S.-B. Tsai, D. Fan, and W. Liu (2021), 'E-Government and Foreign Direct Investment: Evidence from Chinese Cities', *Journal of Global Information Management*, 29(6), pp.1–17.

Hausman, J.A. and W.E. Taylor (1981), 'Panel Data and Unobservable Individual Effects', *Econometrica*, 49(6), pp.1377–98.

Heeks, R. (2018), *Information and Communication Technology for Development (ICT4D)*. New York: Routledge.

Iwamoto, K. (2022), 'Cambodia's Digital Currency Reaches Nearly Half the Population', *Nikkei Asia*, 4 January. https://asia.nikkei.com/Business/Finance/Cambodia-s-digital-currency-reaches-nearly-half-the-population

Komarčević, M., M. Dimić, and P. Čelik (2017), 'Challenges and Impacts of the Digital Transformation of Society in the Social Sphere', *SEER Journal for Labour and Social Affairs in Eastern Europe*, 20(1), pp.31–48.

Kong, M. (2019), 'Long-Term Policy Framework for Cambodia's Digital Economy'. https://set.odi.org/wp-content/uploads/2019/11/Presentation-on-Concept-Note-of-DE.pdf

Kong, M. (2021), 'Cambodia Goes Digital: Delivering Public Services via a Local Data Exchange Platform', *AVI Commentary*, 2, pp.1–3.

Lee, J. (2016), 'Digital Government Impacts in the Republic of Korea: Lessons and Recommendations for Developing Countries', in T.G. Karippacheril et al. (eds.) *Bringing Government into the 21st Century: The Korean Digital Governance Experience*. Washington, DC: World Bank, pp.89–115.

Lin, F. (2015), 'Estimating the Effect of the Internet on International Trade', *Journal of International Trade & Economic Development*, 24(3), pp.409–28.

Lips, M. (2020), *Digital Government: Managing Public Sector Reform in the Digital Era*. New York: Routledge.

Mahyideen, J.M., N.W. Ismail, and S.H. Law (2012), 'A Pooled Mean Group Estimation on ICT Infrastructure and Economic Growth in ASEAN-5 Countries', *International Journal of Economics and Management,* 6(2), pp.360–78.

Majeed, M.T. (2020), 'Do Digital Governments Foster Economic Growth in the Developing World? An Empirical Analysis', *NETNOMICS: Economic Research and Electronic Networking*, 21(1–3), pp.1–16.

Majeed, M.T. and T. Ayub (2018), 'Information and Communication Technology (ICT) and Economic Growth Nexus: A Comparative Global Analysis', *Pakistan Journal of Commerce and Social Sciences*, 12(2), pp.443–76.

Majeed, M.T. and A. Malik (2016), 'Does E-Government Stimulate Press Freedom to Curb Corruption? A Cross-Country Study', *Pakistan Journal of Social Sciences*, 36(2), pp.1173–83.

Mouna, A., N. Baklouti, and K. Mouakher (2020), 'International Comparative Evidence of e-Government Success and Economic Growth: Technology Adoption as an Anti-Corruption Tool', *Transforming Government: People, Process and Policy*, 14(5), pp.713–36.

NBC (2020), 'Project Bakong: Next Generation Payment System'. Phnom Penh: National Bank of Cambodia. https://bakong.nbc.org.kh/download/NBC_BAKONG_White_Paper.pdf

North, D.C. (1990), *Institutions, Institutional Change and Economic Performance*. New York: Cambridge University Press.

Park, C.H. and K. Kim (2019), 'E-Government as an Anti-Corruption Tool: Panel Data Analysis Across Countries', *International Review of Administrative Sciences*, 86(4), pp.691–707.

Rose, A.K. (2004), 'Do We Really Know That the WTO Increases Trade?' *American Economic Review*, 94(1), pp.98–114.

Saputro, R., I. Pappel, H. Vainsalu, S. Lips, and D. Draheim (2020), 'Prerequisites for the Adoption of the X-Road Interoperability and Data Exchange Framework: A Comparative Study', in *Conference Proceedings: 2020 Seventh International Conference on eDemocracy & eGovernment (ICEDEG)*, Buenos Aires, Argentina, 22–24 April, pp.216–22.

Soeng, R. and L. Cuyvers (2018), 'Domestic Institutions and Export Performance: Evidence for Cambodia', *Journal of International Trade & Economic Development*, 27(4), pp.389–408.

Studenmund, A.H. (2014), *Using Econometrics: A Practical Guide*, Sixth Edition. Harlow, UK: Pearson Education.

UNESCAP (2021), 'G2P and International Digital Remittances During COVID-19: Early Lessons from Cambodia'. https://www.unescap.org/sites/default/d8files/event-documents/Cambodia_Final%20 report%20G2P%20and%20International%20Digital%20Remittances_03032021.pdf

Veit, D. and J. Huntgeburth (2014), *Foundations of Digital Government: Leading and Managing in the Digital Era*. Heidelberg: Springer.

Verbeek, M. (2017), *A Guide to Modern Econometrics*, Fifth Edition. Hoboken, NJ: John Wiley and Sons.

World Bank (2021a), 'An Analysis of Trends in Cost of Remittance Services', *Remittance Price Worldwide*, 38. Washington, DC: World Bank. https://remittanceprices.worldbank.org/sites/default/files/rpw_main_report_and_annex_q221.pdf

World Bank (2021b), *The Global Findex Database*. Washington, DC: World Bank. https://globalfindex.worldbank.org (accessed 4 January 2022).

Xing, Z. (2018), 'The Impacts of Information and Communications Technology (ICT) and E-commerce on Bilateral Trade Flows', *International Economics and Economic Policy*, 15(3), pp.565–86.

Yang, K. and S.-Y. Rho (2007), 'E-Government for Better Performance: Promises, Realities, and Challenges', *International Journal of Public Administration*, 30(11), pp.1197–217.

Yushkova, E. (2014), 'Impact of ICT on Trade in Different Technology Groups: Analysis and Implications', *International Economics and Economic Policy*, 11(1–2), pp.165–77.

Appendix 9A.1. Cambodia's Trading Partners in the Sample

Argentina	Egypt	Italy	Pakistan	Spain
Australia	El Salvador	Japan	Panama	Sri Lanka
Austria	Estonia	Korea	Peru	Sweden
Belgium	Finland	Kuwait	Philippines	Switzerland
Brazil	France	Lao PDR	Poland	Taiwan
Brunei	Germany	Lebanon	Portugal	Thailand
Canada	Greece	Lithuania	Romania	Turkey
Chile	Hong Kong	Luxembourg	Russia	Ukraine
China	Hungary	Malaysia	Saudi Arabia	United Arab Emirates
Colombia	India	Mexico	Singapore	United Kingdom
Croatia	Indonesia	Netherlands	Slovak Republic	United States
Czech Republic	Ireland	New Zealand	Slovenia	Uruguay
Denmark	Israel	Norway	South Africa	Viet Nam

Source: Authors.