DIGITAL TRANSFORMATION: OPPORTUNITIES AND CHALLENGES

02

This chapter focuses on the rising prominence of data and its role as a building block for new and increasingly digitalised value chains. It explores digitalisation and 'datafication' of global trade, and the associated new opportunities and challenges for Commonwealth countries. The growing prominence of these trends means Commonwealth governments will need to address policy issues associated with the digitalisation of production, platform economies and e-governance.

The first sub-section explores new development models and opportunities for the Commonwealth in the digital age. The second sub-section highlights the risks and challenges facing Commonwealth countries in the context of a persistent digital divide. The third sub-section discusses regulatory frameworks for digital transformation.

2.1 Digitisation of value chains: New Opportunities

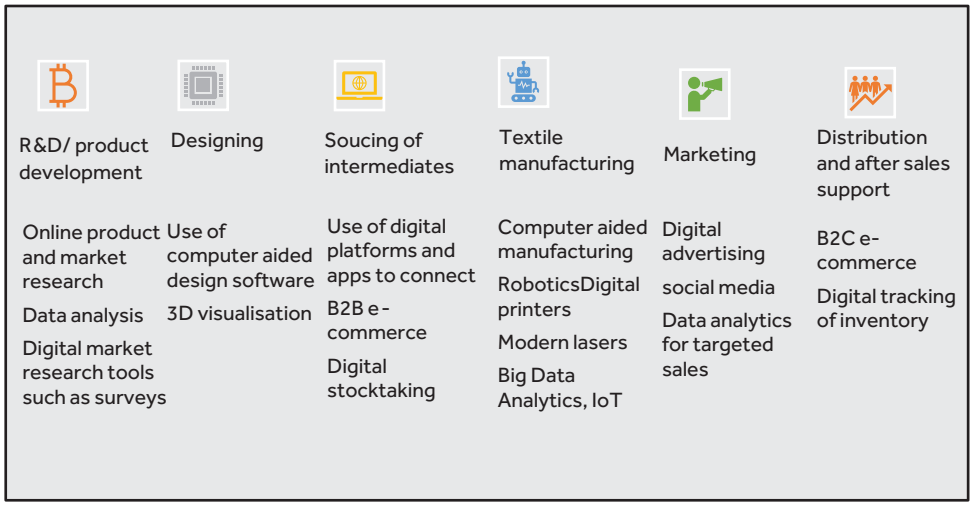
Digital technologies are being increasingly deployed across different stages of the value chain, rapidly changing the global landscape of production and trade. Figure 2.1 maps out the scope for using digital technologies across an industry-neutral value chain, which involves the use of online market research and data analysis at the R&D stage; 3D-visualisation for product design; sourcing intermediates through business-to-business (B2B) e-commerce on digital platforms; the use of robotics and automation during manufacturing; digital advertising and data analytics for targeted marketing and B2C e-commerce during point of sales. Box 2.1 provides an example of digitalised value chains in the textiles and garments industry.

This digitalisation of the value chain is opening up new pathways for development, offering Commonwealth countries new and diverse opportunities to:

- increase productivity, output, growth and employment;
- connect economically with large and dynamic diasporas;
- access global trade and financial markets;
- increase participation in global trade by taking advantage of the unbundling of production processes within larger GVCs; and
- drive down the costs of trade.

In doing so, technology – especially digital technologies and new business models that create,

Figure 2.1 Digitisation and 'datafication' of the value chain



Source: Authors.

Box 2.1 Digitisation of the value chain: the case of the textiles and garments industry

Consider the case of a textiles and apparel value chain. At the product development and R&D stage, firms carry out market and product research online, collect customer data on, for instance, apparel style and material preference, use online surveys and analyse data using online cost–benefit and data analysis tools. Firms can also use 3D-visualisation and computer-aided design for apparel, as well as logos for branding. This increases flexibility in design and reduces the cost and time required to produce new goods. In the manufacturing stage, firms use computer-aided manufacturing, modern lasers or robotics (such as 'sewbots') to automate certain tasks in apparel manufacturing, depending on the economic and technical feasibility of automation. Automation in manufacturing can make firms more efficient in production, enabling them to produce more output and exports. For instance, Banga and te Velde (2018a) highlight the case of the A-Z garments factory in Tanzania, which deployed modern lasers for cutting tasks. While this directly displaced some workers, the firm increased its overall productivity, producing higher output and exports, as well as jobs in the next stage of production i.e. stitching.

In the post-production stage, new digital technologies, particularly those associated with cloud computing and Big Data analysis, can: a) increase efficiency in business operations, logistics and inventory management; b) leverage sales data for better provision of after-sales services; and c) leverage digital advertising tools and social media applications for development of targeted sales models (Mayer 2018). Last mile delivery can also be automated – for instance, through the use of radio frequency identification (RFID) for digital tracking. For sourcing of intermediates (fibre, yarn etc.) during the manufacturing process, firms can use online B2B platforms for gaining information and access to online sellers, and also sell their products online through B2C e-commerce, i.e. using own or third-party e-commerce websites. Online exchange of intermediates is further facilitated through digital payments and online banking.

Source: Authors.

exchange and distribute value – provides untapped new ways of growing intra-Commonwealth trade and investment. This is especially true for small states, least-developed countries (LDCs) and African members that remain constrained by several barriers to trade due to their lack of connectivity, high transport costs and geographical remoteness, as well as their limited access to global trade and financial markets.

2.1.1 Productivity gains

Deployment of digital technologies by firms can increase efficiencies and enable firms to realise productivity gains. The increasing use of digital technologies in production and logistics can contribute towards reduction in production costs and increase total firm productivity, which is likely to lead to an expansion in total output, exports and employment. Several multi-country studies suggest that, on average, a 10 per cent increase in broadband penetration increases GDP growth in the range of 0.9–3.19 per cent (Quiang et al. 2009; Czernich et al. 2011; Scott 2012; Zaballos and Lopez-Rivas 2012). When applied across the Commonwealth as a whole, the implications are extraordinary; if all Commonwealth countries achieve a minimum level of broadband

penetration of 50 per cent (the world average), then Commonwealth GDP is expected to rise between US$74 billion and $263 billion (Commonwealth Secretariat 2018). The productivity-enhancing effect of digitalisation has however been observed to increase with the level of development: a 10 per cent increase in digitisation leads to a 0.5 per cent increase in GDP per capita in digitally-constrained economies, but a higher 0.62 per cent increase in GDP per capita in digitally advanced economies (Booz and Company 2012). Similarly, Banga and te Velde (2018a) find that the impact of internet penetration on manufacturing labour productivity is roughly 8 percentage points higher in middle-income countries as compared to low-income countries, but this impact can be increased in low-income countries through investment in skills development.

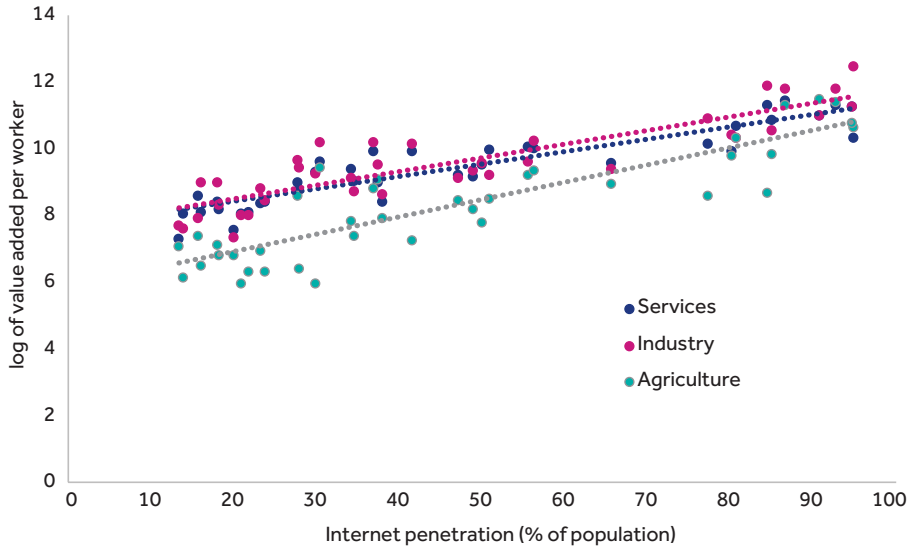
Using a sample of 38 Commonwealth countries, Figure 2.2 plots digitalisation at the country level, proxied by internet penetration, with sectoral productivity in the Commonwealth and finds that digitalisation is positively correlated with labour productivity, with the highest correlation in the services sector.

2.1.2 Diversification in production

Digital technologies also open up new opportunities for diversification of commodities and movement into more sophisticated products for some Commonwealth countries. Analysing market-related data, for instance, can help designers and producers to uncover the functionalities and features that customers particularly value, thereby identifying or even anticipating demand for specific products (Mayer 2018). Such use of market-related data for product design and development can help firms to enter sectors that they would otherwise not know whether they provided profitable sales opportunities.

Taking the case of India, Banga (2019) finds that firm-level digital capability is significantly and

Figure 2.2 Digitisation and sectoral productivity in the Commonwealth, 2017



Source: Authors' calculations based on ITU and World Bank data. Sample includes 38 Commonwealth countries.

Notes: Labour productivity is computed as log of value-added per worker in constant 2010 US$ in each sector; internet penetration is equivalent to percentage share of population with internet access.

positively affecting product upgrading of Indian manufacturing suppliers in GVCs. The author finds that the most digitally competent firms are producing 4–5 per cent more sophisticated goods than the least digitally competent firms. Ray and Miglani (2018) further bring focus to automotive firms in India such as Hyundai Motors India Limited and Mahindra and Mahindra, which initially specialised in manufacturing commercial and utility vehicles, but later on developed capabilities to serve the passenger car segment as well. Compared to traditional auto manufacturing plants, factories using digital technologies are likely to produce higher output without major changeover costs, with faster delivery time and higher quality (ibid). For Kenya, Banga and te Velde (2018b) highlight the case of Megh Industries, an automotive firm that has invested heavily in modern technologies and moved from manufacturing of transport equipment and parts to full transport seating and van conversions, which is more sophisticated and value-added in nature. Commonwealth countries can also realise product diversification through e-commerce. In Bangladesh, for instance, online trade is more diversified than offline trade (International Trade Centre 2018); the country has diversified from apparels into other products online, including agricultural products, food and beverages, and consumer electronics.

2.1.3 Expansion in trade and increased market access

Digitalisation can act as a driver of export competitiveness and increasing integration in production networks. For instance, a garment manufacturer in Kenya – New Wide garments – uses computer-aided designing (CAD) and computer-aided manufacturing (CAM) technologies, and as a result has diversified into new product lines, met international standards and expanded exports under the African Growth and Opportunity Act to the US (Banga and te Velde, 2018b). Another firm, Funkidz – a children's furniture manufacturing SME in Kenya, expanded regional markets in Uganda and Rwanda through mass production of goods with exact specifications, achieved through investment in digital technologies (ibid). For the case of Indian manufacturing firms, Banga and Banga (2019) show that an increasing share of digital assets in firm infrastructure significantly and positively impacted firm-level export intensity in the period from 2001 to 2015. In addition to digital technologies on the production side, digital technologies on the transaction side – such as digitalisation of customs, use of mobile money and e-commerce platforms – also facilitate greater trade.

2.2 Digital value chains: New Challenges

While digital technologies present new opportunities for expansion of trade in the manufacturing sector, the net impact of digitalisation on the structure of Commonwealth value chains will depend on both national and international pathways. 'National pathways' refer to the direct impact of digital investments in the Commonwealth, whereas 'international pathways' refer to the relative rate at which digitalisation is growing globally, and how that is changing comparative advantages. Herrendorf et al. (2014) argue empirically that the sectoral composition of economic activity is key to understanding economic development. National and international pathways are likely to affect employment in the Commonwealth differently across sectors, industries and tasks.

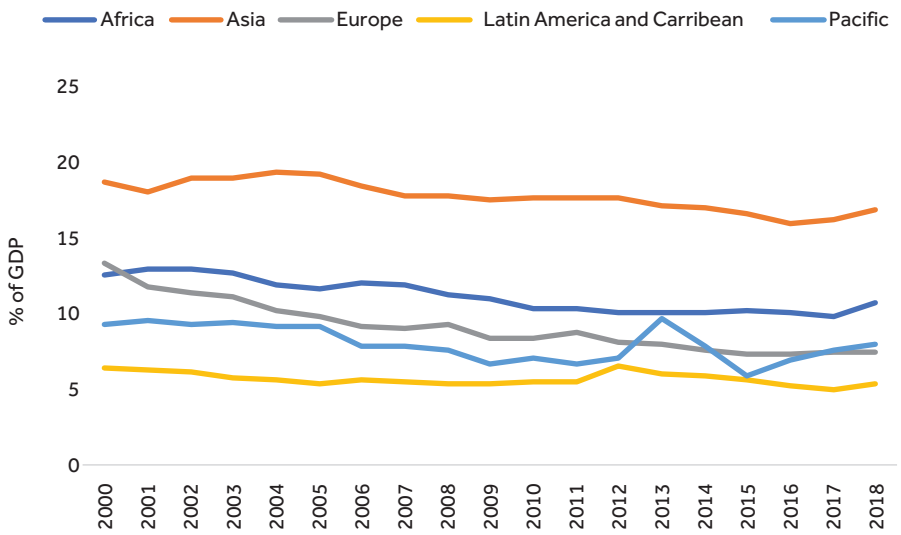
2.2.1 Digitisation and manufacturing-led development

Currently, Commonwealth countries are facing several development challenges, including: a) the need to promote more and better-quality jobs for the young Commonwealth population; b) pressure to achieve the SDGs, of which jobs form part of SDG 8; and c) demands to increase access to finance and build resilience in small states. To keep up with new entrants into the Commonwealth labour market, 50,000 jobs need to be created every day (Sarwar et al. 2018).

Many developed countries have de-industrialised; they have witnessed a declining share of manufacturing in value-added and employment. Figure 2.3 shows that the average share of manufacturing value-added has gradually declined across all Commonwealth regions in the period 2000–2018, with the largest decline in Commonwealth countries in Europe from 13.4 per cent of GDP in 2000 to 7.5 per cent of GDP in 2018. Many developing countries are experiencing 'premature de-industrialisation' (Rodrik, 2016), which refers to declining share of the manufacturing sector in value-added and employment much before the countries achieve income levels comparable to those of their developed counterparts. In Africa, for instance, the share of manufacturing value-added has declined from 12.65 per cent in 2000 to 9.88 per cent in 2017 (Figure 2.3). This has been brought about by a number of factors, including structural changes, shifts in global demand, technological changes and, more recently, digital progress. Rapid digitalisation of the global production and trade landscape is now increasing concerns regarding 'jobless growth' in Commonwealth developing countries, with automation substituting workers in various tasks across sectors.

While some digital technologies, such as cloud computing, machine learning and the internet of things (IoT), can enhance productivity in the manufacturing sector, others such as additive manufacturing and 3D-printing can lead to shortening of value chains, bringing the end market closer to the consumer. Even though deployment of 3D-printers at scale is still several years away, the cost of 3D-printing is falling rapidly in developed countries – at about 5–6 per cent per year (Banga and te Velde, 2018b). There is also a clear and persistent digital divide between the Commonwealth and the rest of the world, and between less developed countries within the Commonwealth and their more developed counterparts (as established in Chapter 1). This digital divide in 'access' and in 'use' of technologies implies that undertaking some production stages in high-wage countries will become more profitable, weakening the incentive for firms to locate production in low-wage Commonwealth member states. As extraction of 'value' becomes

Figure 2.3 Average manufacturing value-added in the Commonwealth by region, as a % of GDP, 2000–2018



Source: Authors, constructed from the World Bank's World Development Indicators (WDI).

50,000
NEW JOBS

REQUIRED EVERY DAY

to accommodate new entrants into the workforce

increasingly defined by an integrated production system in the digital age, Commonwealth developing countries may therefore lose their comparative advantage of having cheaper labour. There are related concerns over limited future offshoring of manufacturing tasks to developing Commonwealth countries. As production becomes increasingly digitalised, capital-intensive technology, skills and R&D will be required at all points along the value chain. In this sense, a minimum base of industrial capabilities is likely to be required to effectively exploit advanced digital production technologies (UNIDO 2019).

While the manufacturing sector overall is the most susceptible to automation, the rate of automation will differ across industries, depending on technological and economic feasibility. The bar of competitiveness is rising in some manufacturing sub-sectors more than others, owing to the relative magnitude of automation, export concentration, service intensity and tradability (Hallward-Driemeier and Nayyar 2017). Sectors that combine relatively high export market concentration with a relatively high robot density (number of robots per 1,000 workers) are likely to be more competitive – such as electronics, computers, and optical instruments; pharmaceutical products; transportation equipment; other machinery and equipment; and electrical machinery and apparatus. In India and South Africa, for instance, more than 60 per cent of total robot deployment is concentrated in the automotive sector alone (ibid). In comparison, the paper and paper products, wood and wood products, basic metals, food, beverages and tobacco, and textiles and garments industries are less affected by global technological changes (Hallward-Driemeier and Nayyar 2017).

Sectors also differ in terms of the type of digital technologies that hold the greatest potential to disrupt production. For instance, while robotics is increasingly automating production in the electronic and automotive industries, value chains in the garments sector are increasingly aligned with 'fast fashion', which revolves around strategies of retailers maintaining low stocks, rapidly evolving customised designs and just-in-time production (Tokatli 2008). More digitally advanced firms in garment value chains may integrate production through the use of RFID and bar codes to track goods and enterprise resource planning (ERP) tools to monitor stocks and payments (McNamara 2008), while giving trusted contractors access to internal information systems to track stock levels (Humphreys et al. 2003). This split in garment value chains between digitally integrated suppliers and subcontractors that are only 'thin-integrated' may impact the potential for suppliers to upgrade. Table 2.1 summarises the sectoral impact of different digital technologies using examples from Commonwealth countries.

2.2.2 Digitisation: in search of alternative development models in the Commonwealth

Compared to developed countries, developing economies generally have a larger agricultural sector, lower employment and value-added shares in industry and manufacturing, as well as a large informal service sector (Schlogl and Sumner 2018). If the prospects for manufacturing-led industrialisation begin to look increasingly challenging in these countries due to reshoring of outsourced production in value chains or limited future offshoring (see Banga and te Velde 2018b), countries may look towards a more service-led development model. In line with this, Newfarmer et al. (2019) point to industries without 'smokestacks' as the new driver of economic growth – services such as transport, communication and finance can promote productivity growth at least as much as manufacturing activities (e.g. Ghani and O'Connell 2014; Berg et al. 2018). Services, including those related to businesses – such as call centres and data centres – and those related to manufactured products – such as design, marketing and distribution – can be particularly important for services-dependent small states in the Commonwealth.

Table 2.1 Sectoral impacts of specific technologies in the Commonwealth

Technology adoption	Sectors with most potential to be disrupted	Impacts	Commonwealth examples
Basic ICT	All	'Thin-integration': small gains in terms of improved communication and productivity	e.g. East African firms in tea GVCs: firms are using email and online search (Foster et al. 2018). e.g. Tourism in East Africa: small hotels and travel agents use ICT to research tourism sights, co-ordinate and send e-mail confirmations of bookings (Foster and Graham 2015).
Digital platforms	All	Online information exchange B2C e-commerce platforms	e.g. Kenyan tea auction (Waema and Katua 2014). e.g. Online exchange platforms: Chopal (India), Esoko (Ghana), mFarm (Kenya) and Novus Agro (Nigeria). e.g. Jumia (Nigeria), Bzzworld (PNG).
Automation/ robotics	Electronics/ automotive	Increasing robot deployment in more digitally prepared countries to meet international standards and quality; but can increase reshoring and limit offshoring in less digitally prepared countries catering to developed country markets.	e.g. Hero MotoCorp in India uses robotic arms and computerized warehouses to make almost 7 million motorbikes a year in three factories, with hopes of expanding to 20 world markets by 2020 (UNCTAD 2017).
3D-printing	Automotive, electronics, machinery	Increasing modularity of production, creating opportunities for new entrants, but resulting in shortening of the value chain as production shifts closer to end markets. Firms with knowledge of local preferences gain more.	e.g. In the United Republic of Tanzania, recycled plastic bottles are being used as the printing material for 3D-printers, for example, to 3D-print prosthetics (UNCTAD 2017).

(*Continued*)

Table 2.1 Sectoral impacts of specific technologies in the Commonwealth (*Continued*)

Technology adoption	Sectors with most potential to be disrupted	Impacts	Commonwealth examples
IoT	Manufacturing sector, energy	Smart factories can allow scaling up on interconnected manufacturing, leading to more ICT services being embedded within manufacturing processes, particularly data processing services – such as cloud computing and advanced data analytics. Predictive maintenance using IoT can reduce maintenance costs of factory equipment by 10–40 per cent (Manyika et al. 2015).	e.g. Makino – one of the largest machine tool manufacturers in the world – launched its smart factory in Singapore in 2019. The facility consists of an existing assembly factory and a new state-of-the-art machining factory, designed with Industry 4.0 and Industrial Internet of Things (IIOT) capabilities to increase productivity and connectivity between its systems. The revamp is expected to nearly double the facility's machine production capacity.
Software as a service SaaS	Agriculture	Boosts overall value-chain efficiency by helping to improve the management and tracking of goods and payments in complex value chains, reduce costs and open up export opportunities for more farmers.	e.g. Value chains of nuts using SAP software in Ghana e.g. ERP software, SAGE, in Kenya (Franz et al. 2014)
Blockchain	Agriculture, mobile tech, financial services	Increases logistical efficiency and transparency.	e.g. The Satoshi Centre, Botswana's blockchain hub, is incubating a programme deploying blockchain technology in the small-scale agriculture sector. e.g. PLAAS in South Africa, is a full-spectrum farm management system and a robust e-commerce system to enable marketing but also to manage, record and transparently communicate daily agricultural production and stock for individual farmers and co-operatives (PLAAS 2018).

Source: Authors.

The academic literature and policy community have long discussed growth and development models. The Solow model explained growth through a build-up in factors of production, such as capital and labour, and an unexplained residual, which was interpreted as total factor productivity change. The endogenous growth models of Romer, Grossman and Helpman, Aghion and others explain how technological change happens, fuelled by capital investment, innovation, R&D and learning by doing. Growth in these models is path-dependent and uneven development is possible across countries depending on choices, exogenous factors and idiosyncratic issues. Many of these discussions do not consider the size of countries. However, small states face a range of additional challenges affecting their growth prospects, including the impact of their size on the viability of activities with increasing returns to scale, their generally high concentration in commodity exports and their often-remote locations (see Box 2.2 for more details).

The development of digital technology could provide a new opportunity for small states and

Box 2.2 Challenges to development in small states

Size affects the viability of activities with increasing returns to scale (e.g. agricultural and manufactured goods production). Small states cannot reap returns to scale in agriculture (as Brazil can) or returns to scale in manufacturing (as China or Mexico can). Small states also suffer from high utility and infrastructure costs. Winters and Martins (2004) argue that small is beautiful but costly, leading to the conclusion that small states are permanently disadvantaged in agriculture and manufacturing.

Remoteness (especially Pacific island states) and lack of integration raise transport costs and hence constrain value-chain participation. In the past, countries would try to develop whole sectors, but in the modern world of value chains, it is now possible to develop capabilities in specific niches within the value chain. However, if logistics costs are high, this affects both imports and exports, and hence the ability of small states to take part in GVCs.

Small states have a high concentration in the exports of commodities, which leads to increased volatility because of high exposure to volatile world commodity prices. Diversification supports growth in small states (e.g. McIntyre et al. 2018), but unfortunately most small states have struggled to diversify their economies. Small states also tend to face greater impacts from disasters such as hurricanes. Such disasters slow growth and can have immediate and long-term effects.

Governance can be better or worse in small states. On the one hand, small states have less state capacity and hence might govern less well, but on the other hand, small states could be more flexible and overcome other factors through better governance. For example, Mauritius has managed its economic transformation from a sugar-dependent economy, to one with significant textiles and garments production, to tourism and financial services in recent decades. Singapore managed its economic transformation using FDI from light manufacturing to a service-oriented economy. Botswana used its natural resource revenues well to invest in education and infrastructure, although it has achieved limited diversification compared to countries such as Indonesia.

Source: Authors.

provide a new development path for them. Digital services are much less constrained by hard borders or remoteness. IT-enabled services could be exported as long as the country has strong digital infrastructure and appropriate digital skills. Such services could include tourism, call-centre services, back office services for financial firms or software development. In the Caribbean, for instance, tourism supports some 700,000 direct jobs and 2.2 million indirect jobs – together accounting for 17 per cent of all jobs in the region (WTTC 2015). In addition, growing digitalisation is likely to increase demand for workers in ICT services and related industries, such as maintenance and repair. Overall, knowledge-intensive services and digital trade can support development strategies for small, landlocked and remote Commonwealth states that cannot rely on economies of scale in agriculture or manufacturing production and lack decent physical access to other countries (ODI 2018; Baldwin 2019).

See Box 2.3 for more discussion on e-commerce as a development pathway for the Caribbean.

Digitalisation can further support better governance and some Commonwealth countries are champions of e-governance. For example, Malta's e-government services are rated the best in Europe. However, not all of the small island state challenges listed above can be overcome. For example, disasters could still demolish telecommunications infrastructure, but while this could be rebuilt, a demolished crop cannot be recovered.

However, the problem with a services-led development model is that highly productive and tradeable services are skills-intensive, while non-tradeable services (such as social care, personal services) are not (yet) highly value-adding and may not be sufficiently scalable. Rodrik (2016) points out that the essential problem with services-led development is that services tend to require

Box 2.3 E-commerce led development: a new growth strategy for the Caribbean?

Electronic commerce is broadly defined as the production, marketing, sale, and/or delivery of goods and services via electronic means (OECD 1997). Given the small size of most Caribbean firms and their very limited capital base, the potential of e-commerce and the use of the electronic marketplace provides them with opportunities for reaching customers in distant markets without the costs of establishment or the use of intermediaries (Broome 2016). It also enables increased trade with traditional trade partners such as the US and Canada, where a large number of Caribbean migrants live and work; thus creating new opportunities particularly for entrepreneurs and new entrants. A number of Caribbean countries are in the process of drafting national e-commerce legislative frameworks. However, leveraging e-commerce is constrained by the absence of a harmonised regulatory framework, the high cost of infrastructure services such as postal competence and port logistics, limited financial instruments, a lack of stakeholder buy-in, and poorer overall ease of doing business in the Caribbean. Moreover, many instances of development strategies have been marred due to the lack of an integrated approach, which leads to policy instability and, inevitably, a lack of commitment by policy planners to implement them.

Source: Broome (2016).

relatively high skills, particularly IT services, which further needs long-term, steady investment into education, infrastructure, institutions and governance. While growing services liberalisation, combined with information technologies, can allow for online 'gig' work[1] to emerge as a new export-led development strategy (Baldwin 2016), there seems to already be a massive over-supply of workers on some digital labour platforms in Commonwealth countries (see Table 2.2).

In agriculture, fully digitally integrated systems often start with the collection of agricultural data (e.g. on the weight or quality of crops). Data-integrated devices include mobile data collection apps (Brugger 2011), tracking based on bar codes and RFID (World Bank 2011), as well as field collection devices (Foster and Graham 2015). Such devices seamlessly integrate with computerised information systems that can enable tracking of information on every transaction in great detail. As goods move along the value chain, additional segments of the information system rely on digital solutions for different purposes: tracking and facilitating payments (including with mobile money), tracking goods in processing factories, enabling agribusinesses to manage exporting by smallholders, improving data management in value chains (Armstrong et al. 2011), and sending specific information messages to farmers through short message service (SMS) (Technoserve 2016).

Agriculture Technology is already having a significant impact in the East African Community (EAC) (Krishnan et al. 2019). Uganda's AgroMarketDay app, for example, allows farmers to upload pictures of their produce, which is then auctioned to the highest bidder. Uganda's Technical Centre for Agricultural and Rural Co-operation is piloting data-capturing devices (sensors, video imaging) with the National Union of Coffee Agribusinesses and Farm Enterprises and IGARA Tea to capture geo-spatial data for customised farmer profiles (ibid). Farm Africa in Tanzania is improving access to farm inputs and providing best practice advice for crop growth. Blockchain is being used to secure farmers' land titles in Rwanda, while in Tanzania blockchain technologies are used to protect the country against counterfeit food. Research by Precision Agriculture for Development (2019) also concludes that sending SMS messages with agricultural advice to smallholder sugar cane farmers in Kenya has increased yields by 11.5 per cent, while the introduction of a low-cost mobile phone-based agricultural extension system among 1,200 farmers in the state of Gujarat in India increased farmers'

Table 2.2 Oversupply of Commonwealth workers on upwork.com

Commonwealth countries	Potential workforce	Successful workers	Oversupply (%)
India	249,698	22,772	90.8
Pakistan	66,681	6,032	90.9
UK	56,644	2,924	94.8
Kenya	18,508	898	95.1
Malaysia	13,385	317	97.6
South Africa	2,723	593	95.3
Nigeria	8,032	297	96.3
Ghana	1,656	50	96.9
Uganda	1,176	21	97.3

Source: Graham and Anwar (2019).

Notes: Potential workforce estimated by total searchable worker profiles, successful workers identified as those with at least one hour worked and $1 earned.

marginal net income by $100 a year per farmer and increased yields by 8.6 per cent for cotton (ibid).

In conclusion, digitalisation can serve-up new pathways for growth and development in Commonwealth countries. But this will be contingent on a regulatory and governance framework that fosters innovation, encourages skills development, builds digital infrastructure and co-ordinates the various aspects of the digital economy in a cohesive and effective manner. In the last sub-section of this chapter, we map out key aspects of the regulatory framework to support digital transformation.

2.3 Regulatory framework for transformation

With digitalisation and 'datafication' of the value chain, the benefits from linking global networks and digital trade are likely to be increasingly dependent on the development of 'soft' digital infrastructure, which includes the formulation of a supportive legal and regulatory framework for the digital economy. In 2015, B2C e-commerce in the Commonwealth generated roughly US$354 billion in sales, representing 3.5 per cent of GDP, but only six Commonwealth countries – the UK, Canada, Australia, India, Singapore and Malaysia – accounted for 85 per cent of the B2C e-commerce sales (Table 2.3). Although an increasing number of Commonwealth citizens are online, only 6 per cent of the Commonwealth population is shopping online, indicating the potential to increase both domestic and cross-border sales in the future, especially by tapping into the large and dynamic diasporic community (Commonwealth Secretariat 2018).

In the case of African businesses, benefits from e-commerce have been particularly limited to date. Sellers from very few Commonwealth developing economies (India and South Africa are notable exceptions) can register to sell on third party platforms such as Amazon. Similarly, eBay allows registration for business in only 21 countries (UNCTAD 2015), while Jumia caters only to the

Table 2.3 B2C e-commerce sales, 2015

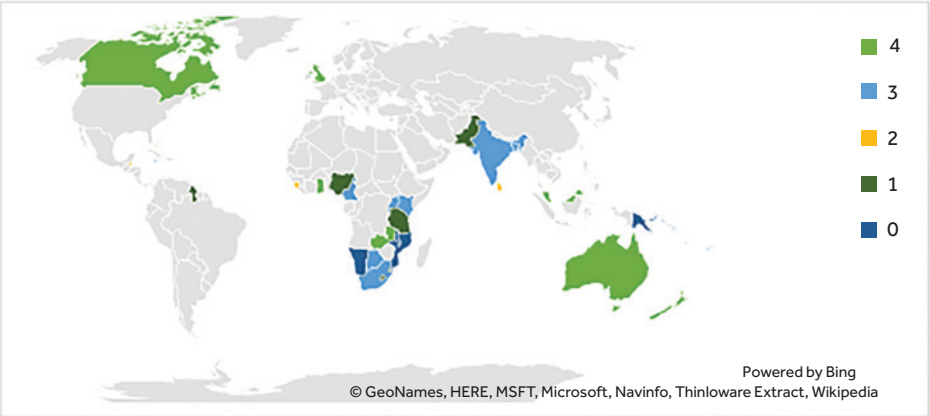
Countries	B2C e-commerce sales (US$ Billion)	% of GDP
Commonwealth countries		
UK	199.8	7
India	19.6	0.9
Canada	47.9	3.1
Australia	27.8	2.1
Singapore	2.7	0.9
Malaysia	1.5	0.5
Sub-total (Commonwealth six)	*299.3*	*3.5*
Commonwealth estimate (all countries)	354	3.5
World	2904	

Source: Commonwealth Secretariat (2018).

domestic market for African businesses plus imported goods from competitive producers. Many small states, LDCs and African Commonwealth countries therefore still have a long way to go to catch up and improve their e-commerce ecosystems to benefit from new digital trade opportunities. This includes improving access to, and affordability of, digital technologies, but importantly also requires formulating policies on 'data infrastructure'– broadly defined as the ability to collect, process and use data. Figure 2.4 uses the UNCTAD policy monitor to map the state of data legislation across 50 Commonwealth members, tracking whether each member has a legal framework for: a) electronic transactions/e-signature; b) data protection/privacy online; c) consumer protection when purchasing online; and d) cyber-crime prevention.

It is observed that Commonwealth developed countries such as Australia, Canada, the UK, New Zealand and Singapore have active legislation across all four categories, along with some Commonwealth developing countries such as

Figure 2.4 Prevalence of data legislation across Commonwealth countries



Source: Authors, constructed from WITS e-trade indicators.

Notes: Four areas of legislation include: a) electronic transactions/e-signature; b) data protection/privacy online; c) consumer protection when purchasing online; and d) cyber-crime prevention.

Ghana, Malaysia, Zambia and Trinidad and Tobago. The majority of the Commonwealth countries with legislation in only one of these areas, or for none of them, are African countries (such as Mozambique, Lesotho, Nigeria, Tanzania and Malawi) and small states such as Papua New Guinea (PNG), Solomon Islands and Vanuatu. Some small states such as The Bahamas, Lesotho, Mauritius, and Trinidad and Tobago have data protection legislation in place, while others such as Guyana, Botswana and all small Commonwealth states in Asia and the Pacific have not enacted comprehensive data protection laws. Box 2.4 presents a case study of PNG and highlights key policy gaps, including in relation to data, that need to be addressed to leverage the benefits of digital transformation.

Across the Commonwealth, data protection is governed by domestic legislation. To aid with harmonising national legislation, the Commonwealth Secretariat has developed the Commonwealth Model Law on Computer and Computer Related Crime, which contains provisions on data protection, privacy, cyber security and cybercrime. The Model Bill embodies core principles of data protection; setting limits on the collection of personal information or data; restricting the use of personal information or data for openly specified purposes; ensuring the right of individual access to personal information relating to that individual and the right to have it corrected if necessary; and identifying the parties who are responsible for compliance with relevant data protection principles.

The development of 'national e-commerce platforms' can make an important contribution in Commonwealth countries by improving the domestic and international market access of their producers. Public-private partnerships (PPPs) could be encouraged to form national e-commerce platforms to boost domestic as well as cross-border e-commerce, and use the data analytics of the engaged customers to forecast future demand and changing tastes and preferences. Linking domestic producers to national e-commerce platforms could also be made part of national trade promotion schemes. While many developing countries are striving to develop their national e-commerce policies/ strategies for linking their domestic producers and

Box 2.4 Regulatory challenges in leveraging the digital economy in PNG

Interviews conducted across a range of stakeholders in PNG reveal some key, but common, obstacles to the development of the digital economy in PNG. These include a lack of basic and technical skills to adapt technologies; lack of adequate legislation for new economic activities (e.g. platforms) and the new manifestations of traditional activities (e.g. e-commerce) in the digital era; lack of policies to adapt supporting services (e.g. financial) to the reality and needs of the digital economy; and inadequate basic hard infrastructure to sustain the digital economy, such as telecommunications and data networks. Being a small state, PNG also deals with specific challenges, associated with its geography and its cultural heritage; high investment and connectivity costs; and high infrastructure and operating costs due to poor electricity penetration. In addition, with more than 800 languages spoken in the country, there is a major challenge in designing digital solutions that can reach and benefit the whole population.

While there is a critical need to address all of these challenges, there are also constraints that affect policy design and implementation in general. Budget, policy and political constraints limit the space for policy action, making the simultaneous solution of barriers very difficult to address. Moreover, some constraints cannot be addressed until other barriers have begun to be lifted. Consequently, a sequential approach is more promising: addressing the most immediate and binding constraints may generate instant benefits by unlocking some projects for which that barrier was the only binding one.

The majority of the policy actions taken in PNG are focused on addressing the immediate constraints associated with the infrastructure and the accessibility of the internet. As soon as these barriers are lifted, it will be necessary to tackle new binding constraints. This requires preparation and policy design alongside the current work in lifting infrastructural barriers. In this sense, PNG must work to develop a comprehensive digital economy policy, while also updating legislation and improving the capability of its population to make use of digital products and platforms in the digital economy. For instance, while PNG is in the process of enacting an Electronic Transactions Act, there is still a complete lack of comprehensive legislation on digital issues such as data protection, cyberterrorism and/or data localisation. The latest National Trade Policy 2017–2023 does not reserve a prominent space for the digital economy. There is no comprehensive programme aiming to develop the digital economy. Moreover, PNG is struggling to accommodate existing policies and legislation in several sectors currently affected by the digital economy. For example, electronic payment systems remain very underdeveloped. This constitutes a serious hindrance to the development of many internet-based businesses. In other cases, it leads them to operate using relatively unreliable solutions based on blockchains, such as bitcoins.

Source: Authors, based on interviews with a range of stakeholders: National ICT Authority (NICTA); Ministry of Education; Ministry of Foreign Affairs; Ministry of Trade and Industry; National Research Institute (NRI), Customs Service; Ministry of Agriculture, Telikom PNG; State Solicitor; Central Bank; and Business Council of PNG.

Box 2.5 SADC e-commerce framework

Pillar	Examples of planned activities
Pillar 1: Enabled e-commerce environment	• Development of country-specific e-commerce strategies • Harmonising of cyber legislation through the identification of best practice legislation in the region • Setting up of a regional label to increase trust and confidence in websites used for e-commerce
Pillar 2: A capacity development programme for e-commerce in each member state	• Engaging with various stakeholders including legislators, the financial sector, logistics actors, SMEs, IT companies and end users, including through the establishment of knowledge-sharing platforms which would allow SADC member states to benefit from each other's experiences • Human development activities
Pillar 3: Strengthening e-commerce sub-regional and national infrastructures	• Promotion of sub-regional broadband backbones and Internet Access Points • Cost-effective, affordable and secured ICT infrastructure and broadband network access • Deployment of ICT infrastructure beyond major cities and towns • PPP protocol to support local and external investment in ICT infrastructure • Elaboration of a universal access strategy to connect those who are unconnected • Establishment of a regional electronic payment gateway and associated on-line and m-payment banking services
Pillar 4: Institutionalised framework to implement, evolve and govern the current strategy at regional level	• Establishment of a SADC Observatory for e-Commerce with representatives from the various member states which would undertake capacity-building activities, support data collection and set up a database • Establishment of a structure that would oversee regional dispute resolution relating to e-commerce

Source: UNECA et al. (2019).

consumers to e-commerce platforms, there is a need to recognise the associated risks, especially if these platforms are international. The 'network effects' of some international platforms can allow them to gather huge amounts of data on the connected economies, which can then be used by these international platforms to predict market trends, flood consumers with products associated to their tastes and preferences based on their personal data analytics, and effectively reorganise national production and sales. This would require re-examination of fiscal and competition policies in Commonwealth countries, which is discussed further in Chapter 5.

Within the Commonwealth, cross-country co-operation can help to build digital economies, develop cloud computing infrastructure, strengthen broadband infrastructure, promote e-commerce, develop digital payment solutions, share experiences on e-government, forge partnerships for building smart cities, promote digital innovations and technologies, and collect statistics for measuring digitalisation. The EAC, for example, is working towards establishing: cross-border broadband ICT infrastructure; an EAC legal framework for cyber laws to promote development of e-commerce services; and a regional framework for harmonisation of national ICT policies and regulations (EAC 2019).

The eSADC Strategic Framework is another great example of cross-country collaboration to support digital transformation. Undertaken as part of the e-SADC Initiative, SADC has developed a regional e-commerce strategy aimed at developing regional trade through e-commerce (See Box 2.5).

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End Note

1 The gig economy refers to labour market activities that are coordinated via digital platforms (Hunt and Samman 2019).