

Public Disclosure Authorized



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# Digital & Telecom

*Myanmar  
Infrastructure  
Monitoring*



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## Preface and acknowledgments

This Digital and Telecommunications Sector Monitoring Report, one of three reports in the Myanmar Infrastructure Monitoring series, presents a summary of major dynamics and challenges facing the digital and telecommunications sector in Myanmar. It first provides an overview of sector developments in the last decade, followed by an analysis of major developments since February 2021 and their implications. The report was adapted in large part as Part III: Digital Disruptions and Economic Impacts of the Myanmar Economic Monitor published by the World Bank in January 2022. The analysis uses a mixed-methods approach to conduct just-in-time monitoring, using data from global secondary telecommunications and digital sector data sources, and results from World Bank-conducted household and firm surveys (2020-2021) as well as other relevant surveys. It also utilizes data on internet restrictions from Internet Outage Detection and Analysis (IODA), Open Observatory of Network Interference (OONI) as well as anonymized, aggregated data from social networking websites (Twitter, Facebook, Google) to present descriptive results on the nature and extent of internet restrictions. Where news reports are referenced, additional efforts were made during the monitoring process to triangulate reports from several reputed news media sources to ensure veracity of information presented.

The Digital and Telecommunications Sector Monitoring Report was produced by Sharada Srinivasan, Rajendra Singh, and Sadig Aliyev under the guidance of Mark Williams (Practice Manager, Digital Development), Mariam J. Sherman (Country Director, Myanmar, Cambodia, and Laos), and Ranjit Lamech (Regional Director, Infrastructure, East Asia and the Pacific). Juhi Mittal (Visiting Associate, Department of Computer and Information Science) and Sharath Chandra Guntuku (Assistant Professor, Department of Computer and Information Science; and Senior Fellow, Leonard Davis Institute of Health Economics at the University of Pennsylvania) provided access to social media data and assisted with data analysis. Ulrich Schmitt (Operations Manager) and Kim Alan Edwards (Program Leader, Senior Economist) provided valuable advice. Arnold Marseille, Kyaw Soe Lynn, Tin Hninn Yu and the ECR team provided guidance on publication.

Myanmar Infrastructure Monitoring series comprises the energy, digital and telecommunications, and transport and logistics sectors in Myanmar. These reports are produced by a World Bank task team led by Sadig Aliyev (Program Leader, Senior Transport Specialist), Myoe Myint (Senior Energy Specialist), Rajendra Singh (Senior Digital Development Specialist), and Hongye Fan (Transport Specialist) with support from Sharada Srinivasan (Digital Development Specialist), Joonkyung Seong (Senior Energy Specialist), Win Htein Lin (Consultant), Myint Kyaw (Operations Officer), May Oo Mon (Program Assistant), and Thiri Maung Maung (Consultant). The team appreciates valuable comments and suggestions received from peer reviewers Rome Chavapricha (Senior Energy Specialist), Yin Yin Lam (Senior Transport and Trade Logistics Specialist), and Kaoru Kimura (Senior Digital Development Specialist).

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## Abbreviations and acronyms

<b>ASN</b>	Autonomous system number
<b>DICA</b>	Directorate of Investment and Company Administration
<b>FDI</b>	Foreign direct investment
<b>GB</b>	Gigabytes
<b>GNI</b>	Gross National Income
<b>IODA</b>	Internet Outage Detection and Analysis
<b>ICT</b>	Information and communication technologies
<b>IP</b>	Internet Protocol
<b>Mbps</b>	Megabits per second
<b>PPP</b>	Purchasing power parity

## Executive summary

Myanmar has experienced a series of total and partial internet shutdowns since the military coup in February 2021. These restrictions have varied in intensity across the country and over time, ranging from the complete shutdown of all wireless broadband services and nightly shutdowns of fixed line services between February and April 2021, followed by limited access to a “whitelist” of websites and services and intermittent subnational shutdowns starting in May 2021. Cumulatively, these restrictions are estimated to have cost the economy nearly US\$2.8 billion dollars (3-4 percent of FY20 GDP) between February and December 2021.

**The restrictions on internet access have had a profound impact on investments in the sector, subsequently affecting the growth of digital infrastructure and digitally enabled services in Myanmar.**

In August 2021, all firms in two industries reliant on digital technologies — information and communications technologies (ICT) and financial services — stated that they had cancelled all planned business expansions and investments. Telenor, the largest private mobile operator with 18.2 million subscribers, wrote off its Myanmar business at a loss of US\$783 million in May 2021, and is in the process of divesting its operations.

**Internet restrictions have also had important implications on household welfare, firm operations, and growth of the digital economy in Myanmar.** The share of households receiving international remittances fell from 3 percent in 2020 to 2.4 percent in 2021. In June 2021, 30 percent of firms reported pivoting to a traditional platform from digital modes. In August 2021, over one-third of surveyed firms reported that limited internet access had been a critical constraint to business operations across sectors.

**Whitelisting has affected internet use across key platforms.** While engagement with news media on Facebook has seen a marked decline, engagement on Google -- on the whitelist -- returned to pre-February 2021 levels after blanket restrictions were removed. The number of new users from Myanmar added to Twitter showed a decline in the months after restrictions were imposed, following a peak in the immediate aftermath of the coup.

**Blackouts and unreliable power supply across townships in Myanmar have also adversely affected internet access and use.** Frequent blackouts can disrupt network performance and limit mobile network access for people, leading to a dual burden borne by those suffering due to lack of electricity. Power outages affect the ability to charge and use phones, all the more challenging given the deep penetration of smartphones in Myanmar, including in rural areas.

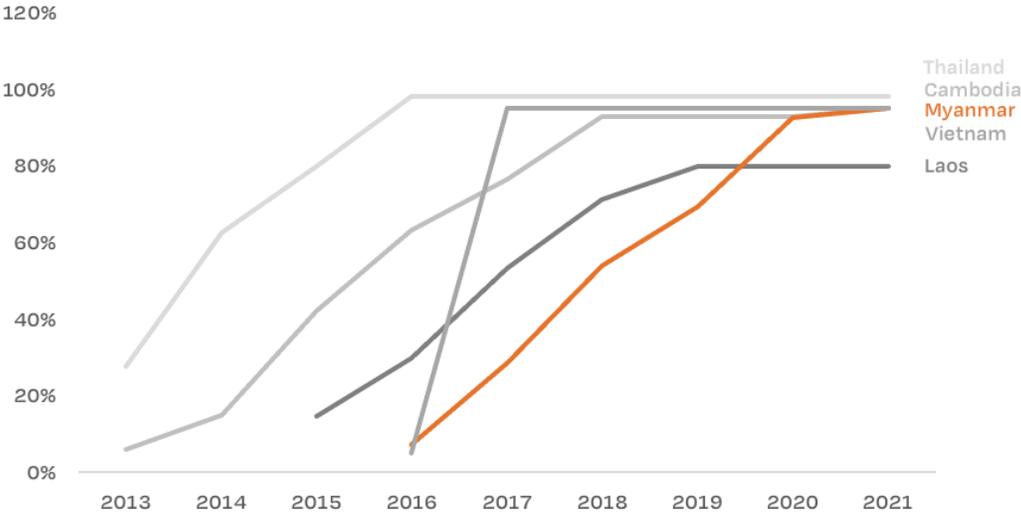
**New regulations, market exit by private sector providers, and continued internet restrictions threaten to reverse the progress made over the last decade.** Price increases for SIM cards and new taxes on data will impact the affordability of mobile services, lowering consumer demand and adversely affecting operators’ profitability. Reports of directives to install network interception equipment will further reduce trust in digital networks, platforms, and services.

**Continued internet restrictions could lead to further restraint of online economic activity and closure of many young digital start-ups that rely on consistent, reliable, and widespread internet adoption to reach markets.** To the extent that these measures remain in place, they could have significant longer-term, negative impacts on the growth of digital infrastructure and digitally enabled services in Myanmar and carry serious economic costs in the form of reduced economic growth, productivity, and output.

# Digital and telecommunications sector developments from 2011-2020 in the context of Myanmar

1. Between 2014 and 2020, Myanmar’s economy benefited from the rapid proliferation of digital technologies due to sector liberalization, market entry, and the widespread deployment of broadband networks. Mobile networks, which covered less than 10 percent of the country’s population in 2011, were near universally accessible in 2020. Fourth generation (4G) mobile networks, just launched in 2016, have achieved 95 percent population coverage (the regional average) in five years (Figure 1).

Figure 1: 4G coverage in Southeast Asia: Myanmar vs. key comparators (2013-2021)

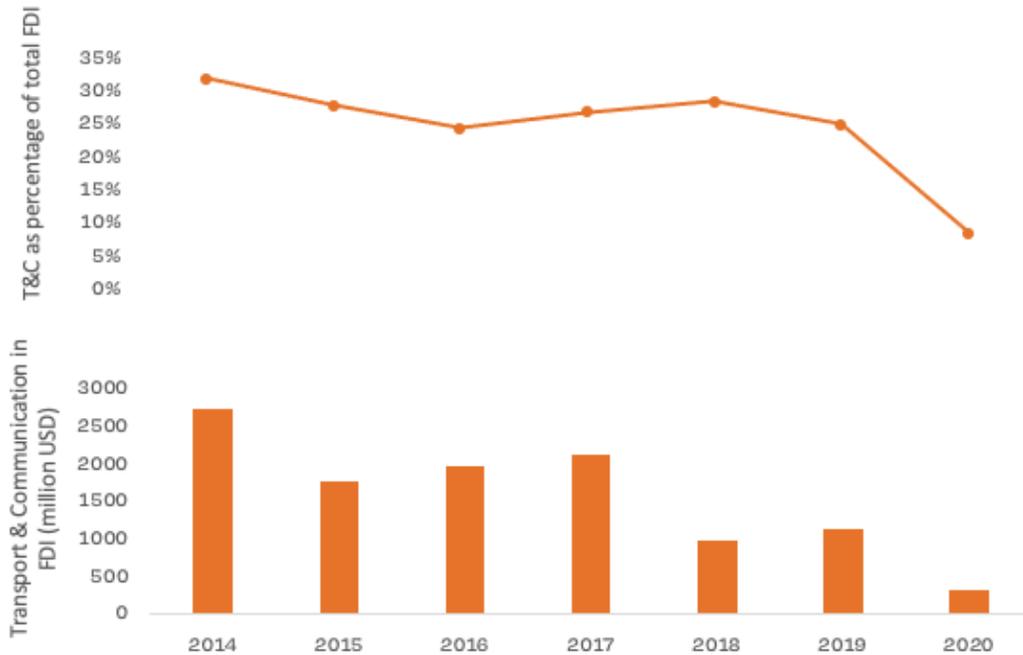


Source: GSMA Intelligence, International Telecommunications Union.

2. **The impressive performance of the sector can be attributed to an enabling policy environment, beginning with the adoption of the Telecommunications Law in 2013, which effectively liberalized the market, facilitating private sector entry and foreign direct investment (FDI).** The first two private entrants into the retail mobile market were both foreign owned: the Norwegian-based Telenor and Qatari-backed Ooredoo. The entry of these operators introduced competition into the market for telecommunications services, previously served only by Myanmar Post and Telecommunications, a state-owned enterprise. To increase its competitiveness in the liberalized market, Myanmar Post and Telecommunications signed a joint operations agreement in July 2014 with KDDI Summit Global Myanmar Company, Ltd. Between 2013 and 2020, the Hirschmann-Herfindahl Index, a measure of competition for the mobile sector, moved from a value of 10,000 to a more competitive value of 2,962 in Myanmar.<sup>1</sup> Tower companies also saw substantial foreign investments, both by companies and development finance institutions. Over 2014-2019, foreign direct investments in transport and communications ranged between 25 to 30 percent of total foreign investments, seeing a decline only in 2020 due to the COVID-19 pandemic (Figure 2).

<sup>1</sup> Hirschmann-Herfindahl Index varies between 0 and 10,000. 10,000 indicates a monopoly. An index score below 2,500 is considered a highly competitive market; Myanmar was close to that level.

Figure 2: Foreign investments in transport and communications (total and as a percent of overall FDI)



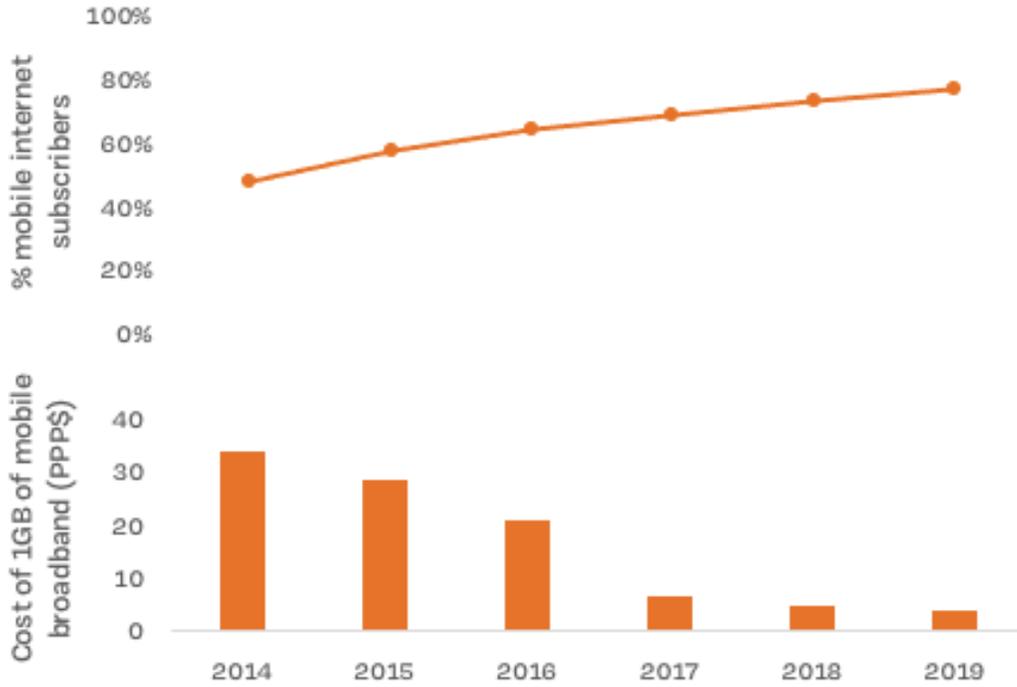
Source: DICA, Myanmar (2020).

3. **Competitive market dynamics led to mobile services becoming widely available in previous unserved areas and a substantial drop in retail prices (Figure 3).** At the end of 2019, 77 percent of the population were mobile internet subscribers, and the average cost of 1.5 gigabytes (GB) of mobile broadband represented a mere 0.75 percent of GNI per capita.<sup>2</sup> The cost of a SIM card dropped from US\$250 in 2013 to less than US\$2.00 in 2017. Low costs of smartphones facilitated this growth further: an average smartphone cost only US\$170 (PPP) in Myanmar, compared to US\$282 in neighboring Thailand.<sup>3</sup>

<sup>2</sup> Cable.co.uk data.

<sup>3</sup> IDC Quarterly Device Price Tracker, 2020 Q1 edition.

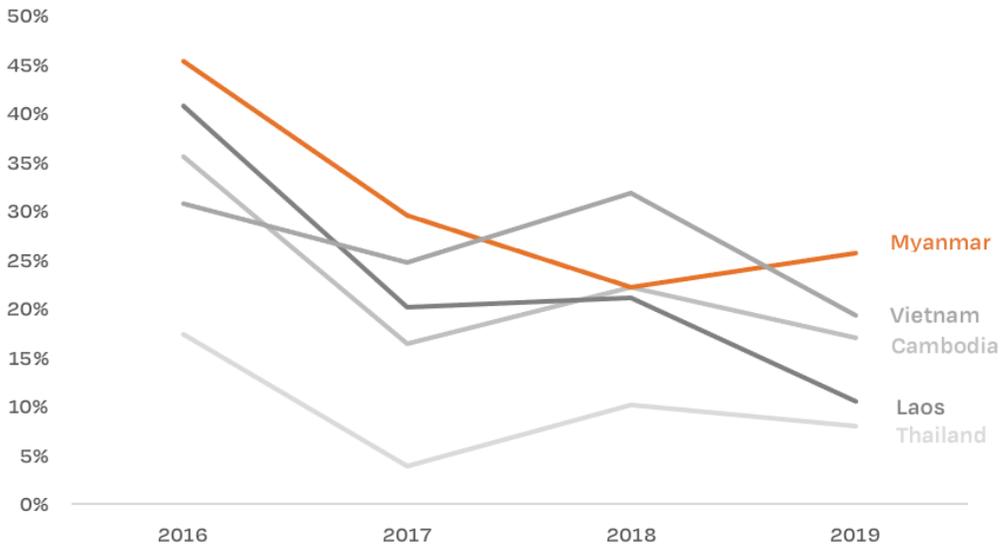
Figure 3: Adoption of mobile internet and affordability of 1GB broadband



Source: GSMA Intelligence, International Telecommunications Union.

4. **Owing to the late deployment of mobile networks, Myanmar’s population rapidly leapfrogged to adopt smartphones at a growth rate that surpassed regional peers (Figure 4).** By 2019, smartphones were used by nearly 80 percent of the population, a penetration rate on par with the United States.

Figure 4: Annual growth rate of smartphone connections (2014-2019)

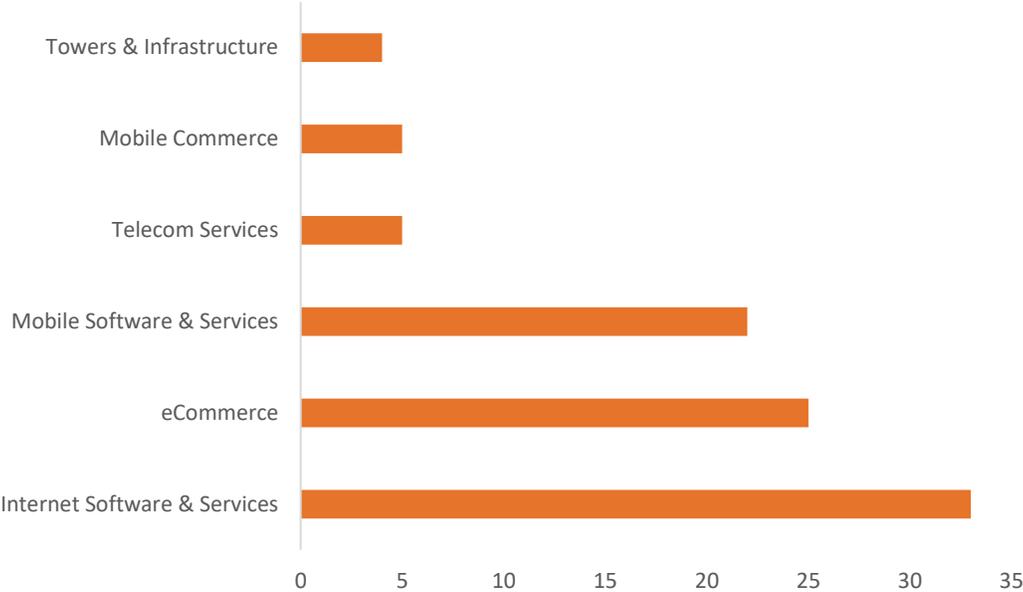


Source: GSMA Intelligence, International Telecommunications Union.

5. **High rates of smartphone adoption and mobile internet use were accompanied by near-universal adoption of social media services in Myanmar, both for personal communication and entrepreneurial activities.** In 2020 the number of social media users was equal to the number of internet users.<sup>4</sup> Research suggests that many internet users in Myanmar conflate the internet with popular social media services, especially Facebook.<sup>5</sup> By initially allowing its mobile application to be used without incurring data charges (zero-rating), Facebook quickly became the core internet service for many newly online Myanmar users (consumers). This trend has been observed in other social media services as well; TikTok, for example, exploded in popularity in Myanmar in 2019 and 2020, after major telecom networks began to bundle it with their services.<sup>6</sup>

6. **Several technology start-ups also emerged, predominantly in Yangon, in part due to ubiquitous connectivity and a favorable business environment.** Ninety-four such start-ups attracted at least US\$350 million foreign capital in the 2011-2019 period.<sup>7</sup> This capital influx spanned internet software and services, e-commerce, m-commerce, mobile software, and tower companies. The country improved from 133 to 126 in the 2019 UNCTAD Business-to-Consumer (B2C) E-commerce Index. In addition, some digital financial start-ups also began operating in the country in late 2017. The first and leading service provider in digital payments was Wave Money, covering over 89 percent of the country and all 14 states, with a customer base of more than 25 million by 2019. The company’s footprint extended to 85 percent of rural areas, including the remotest locations of the country, enabling ease of domestic remittances.<sup>8</sup>

Figure 5: Number of start-ups by industry in Myanmar (2011-2020)



Source: CB Insights.

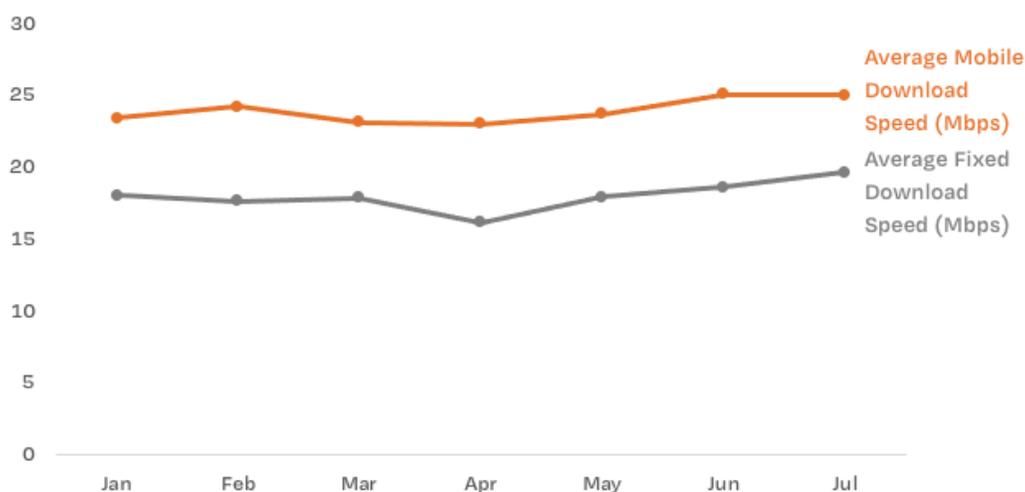
<sup>4</sup> Datareportal; GSMA Mobile Connectivity Index.  
<sup>5</sup> BSR, Myanmar Human Rights Impact Assessment, 2018.  
<sup>6</sup> Rest of World, 2021. TikTok is repeating Facebook’s mistakes in Myanmar.  
<sup>7</sup> CB Insights (Data as of December 2020).  
<sup>8</sup> GSMA Mobile for Development, 2019.

7. **Despite this tremendous growth, some key challenges remained.** First, fixed line access remained inaccessible to most of the population, with less than 0.4 percent of the population using fixed broadband services<sup>9</sup> and those experiencing poorer average speeds than mobile broadband services. Second, the benefits of the digital economy were not available equally to all in Myanmar. Urban users consumed almost five times more data on average each month than users in rural areas and small towns with poorer internet connections than those in urban areas.<sup>10</sup> In June 2019, mobile internet access was restricted in parts of Rakhine and Chin states in view of ongoing conflicts, taking over one million people offline. Third, a weak cybersecurity environment posed a threat: in 2019, Kaspersky reported that Myanmar ranked fourth globally for the highest rates of viruses, present in nearly 60 percent of computers and removeable media.<sup>11</sup>

## Effects of COVID-19 on digital infrastructure and services

8. **Digital infrastructure and services continued to grow amid COVID-19 restrictions imposed in 2020.** 4G market penetration grew from 51.56 percent to 68.25 percent,<sup>12</sup> with an addition of nearly 6 million new subscriptions.<sup>13</sup> Smartphone connections remained the dominant form of internet access, accounting for nearly 95 percent of connections. Telecommunications networks also proved to be remarkably resilient despite reported increases in traffic in March-April 2020,<sup>14</sup> maintaining average mobile download speeds of 24 megabits per second (Mbps) and fixed download speeds of 18 Mbps over the January-July 2020 period (Figure 6). Mobile broadband also became more affordable, dropping from an average price of US\$0.87 in 2019 to US\$0.78 for 1 GB, less than 1 percent of monthly average GNI per capita.

Figure 6: Average mobile and fixed download speeds (January-July 2020)



Source: Ookla Speedtest.

<sup>9</sup> Telegeography, 2021.

<sup>10</sup> Telenor, 2018.

<sup>11</sup> Kaspersky Security Bulletin, 2019.

<sup>12</sup> Market penetration is defined as the number of 4G connections as a share of the addressable population. GSMA Intelligence, 2021.

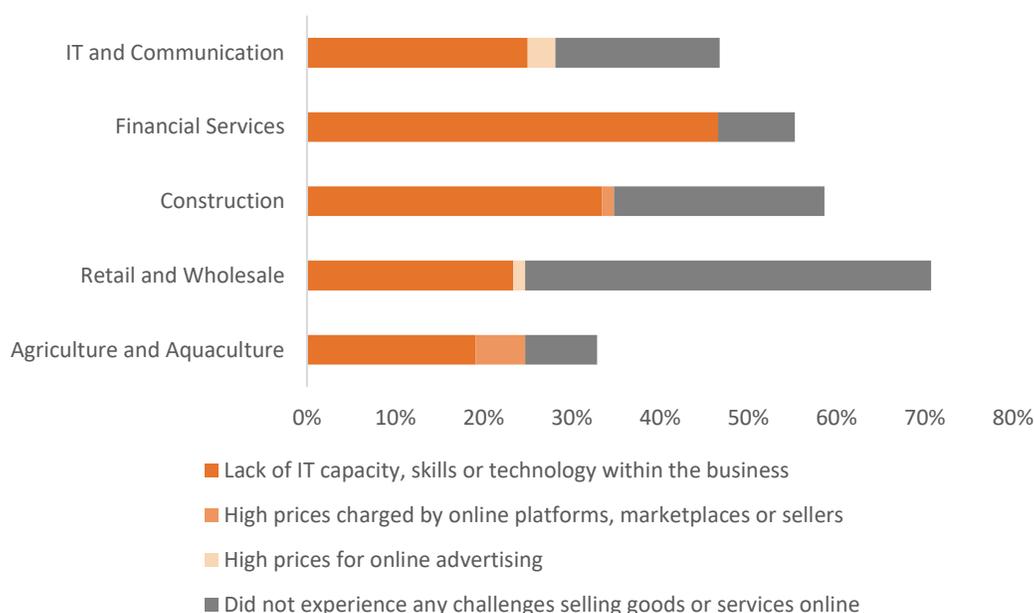
<sup>13</sup> Telegeography, 2021.

<sup>14</sup> Myanmar Times, 2021. <https://www.mmtimes.com/news/internet-data-usage-25pc-over-past-four-weeks.html>

9. **Phones and the internet supplemented educational engagement amid school closures due to COVID-19.** Household surveys suggested that most households in Myanmar owned a median number of 2 smartphones. Of the only 37 percent of students who continued to engage in learning activities after schools closed, 38 percent used phones to keep in touch with their schools and teachers and 6 percent used the internet.<sup>15</sup> However, both phones and the internet were a distant second to the predominant mode of educational engagement with parents or relatives (68 percent).

10. **E-commerce saw further growth amid the pandemic, with approximately 38 percent of firms adopting an online platform, with a 73 percent (year-on-year) increase in e-commerce payments.**<sup>16</sup> In December 2020, a WBG-conducted survey of firms across industries in Myanmar suggested that 46 percent of respondent firms in retail and wholesale faced no challenges selling online, and 1 percent considered the price of online advertising as a barrier to their business activity (Figure 7). However, the two highly digitized sectors — financial services and information and communication — did face challenges in terms of information and communications capacity, skills, and technology, relative to other sectors less reliant on technology.

Figure 7: Challenges faced by firms in select industries (December 2020)



Source: World Bank Business Pulse Surveys, Round 6 (December 2020).

11. **Finally, firms in the ICT sector reported fewer operational challenges amid COVID-19, relative to other industries.** In December 2020, while all surveyed firms in ICT sector reported a reduction in sales, only 28 percent of ICT firms reported supply disruptions, and none reported workforce layoffs or insolvency filings.<sup>17</sup> By August 2020, no firms had reported closures of businesses owing to the pandemic. However, due to the second wave of COVID-19 pandemic in September-October 2020, ICT firms did report

<sup>15</sup> High-frequency Household Pulse Surveys, Myanmar COVID-19 monitoring.

<sup>16</sup> Myanmar Economic Monitor, July 2021.

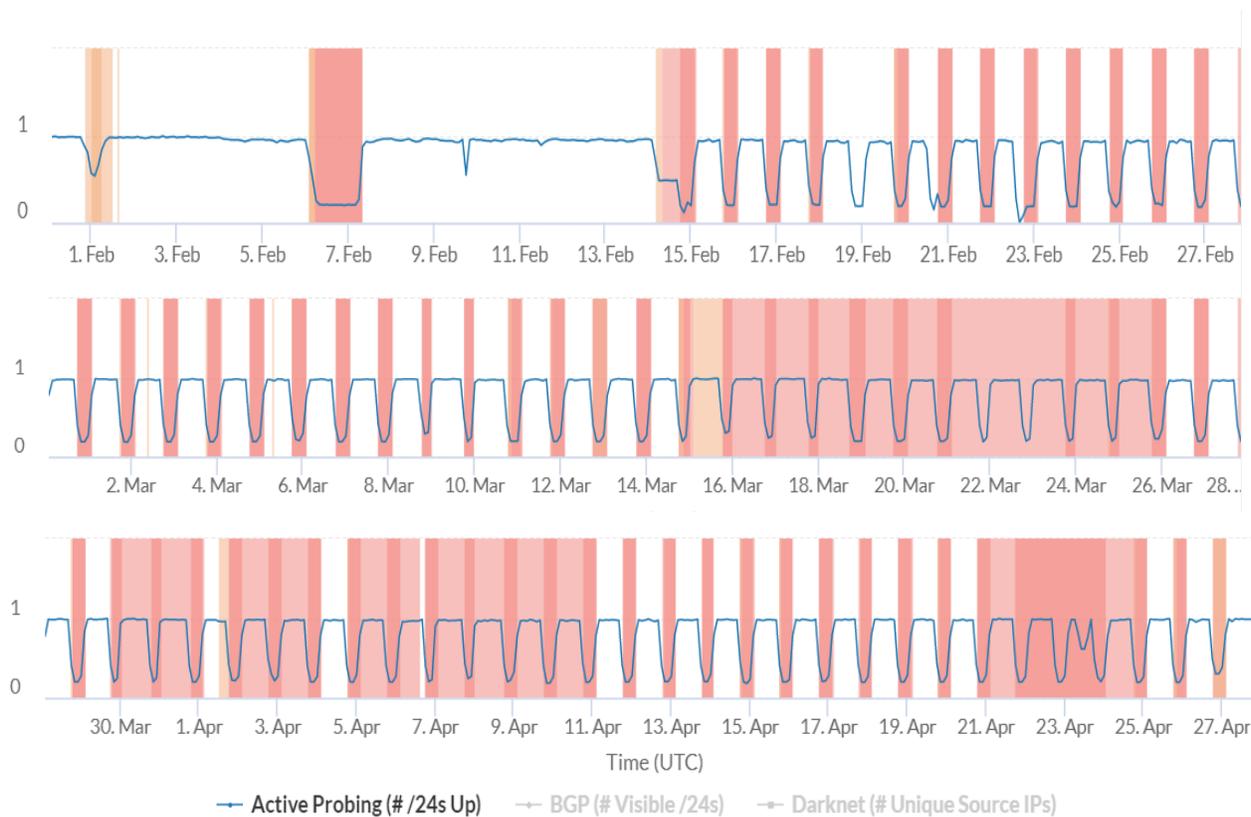
<sup>17</sup> World Bank Business Pulse Surveys, Round 6 (December 2020).

in December 2020 an average of 9 weeks of closure during this second wave. Despite the pandemic and a relatively weak investment environment, some successful firms did see investments. In May 2020, Alibaba Group's fintech arm — Ant Financial Group — announced an investment of US\$73.5 million in Wave Money.

## Effects of the February 2021 coup and its aftermath

12. In the immediate aftermath of the coup on February 1, 2021, there were a series of disruptions to internet access in Myanmar (Figure 9). These disruptions ranged from time-bound, blanket restrictions on internet access to restrictions on certain social media services between February and April 2021.<sup>18</sup> Between February 16 and April 1, 2021, a night curfew on fixed line and fiber services was imposed. On March 15, mobile data and some public Wi-Fi services were disabled. Between April 2 and April 28, a near total internet shutdown was enacted, with no access to any wireless broadband services (including cellular, public Wi-Fi, and fixed wireless broadband) and limited day-time access to fixed line services. On April 28, fixed line internet restrictions eased but with minimal impact since less than 1 percent of the population rely on fixed line services and less than 4 percent own a computer at home.

Figure 8: Total internet shutdowns as detected by active probes in Myanmar (February–April 2021)



Source: *Internet Outage Detection and Analysis (IODA)*, 2021.

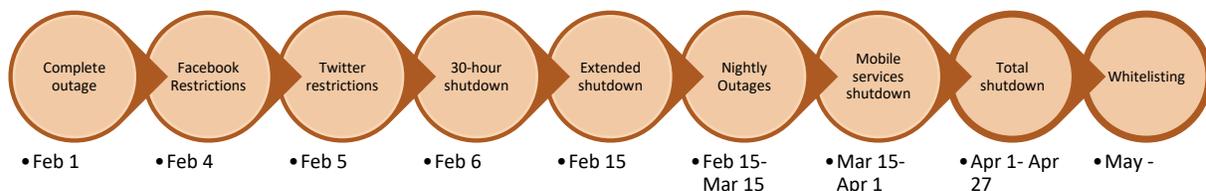
Note: the y-axis is normalized to 1, representing a functional connection. The red alert bands highlight periods during which the internet was partially or fully shutdown. The blue line represents active probing measurements. This technique involves sending

<sup>18</sup> During the early hours of February 1, internet services were disrupted across all service providers in the country. While services were briefly restored, social media services were restricted on major internet providers starting February 4. This followed with a 30-hour shutdown on February 6, 2021, and another extended complete shutdown on February 15, 2021.

network pings to various destinations and measuring the rate of returned responses. Active probing measurements use small packets of data and thus can operate even with limited bandwidth.

13. A “whitelisting” approach has been used since May 2021 where internet access is blocked, except for select websites and applications. Whitelisted websites and services included online business and banking applications; social media platforms such as WeChat, Instagram, and WhatsApp; and online services such as Grab. However, commonly used websites such as Wikipedia, Facebook, and Twitter were not on the whitelist, and continue to face restrictions on access within Myanmar.

Figure 9: Timeline of internet restrictions in Myanmar (February–December 2021)



Source: Authors based on IODA, Netblocks, and OONI data.

14. Research on the restrictions suggests wide variance across networks (Box 1). Different websites were blocked on different networks, and different censorship methods were used by different internet service providers in Myanmar.<sup>19</sup> Common circumvention tools such as virtual private networks have faced restrictions with regulations proposed in January 2022 that imposed fines of up to US\$280 on the use of such applications.<sup>20</sup> The licenses of seven major media outlets were further revoked, and telecommunications companies were ordered to block their websites.<sup>21</sup> Costs incurred by citizens and businesses to access commonly used but blocked digital platforms have increased drastically due to their reliance on virtual private networks; multiple SIM cards; or, in some cases, an additional fixed line connection to do so. The use of throttling — restricting internet speeds — has also affected quality of available service to citizens.<sup>22</sup> However, reports suggest an increased use of foreign SIM cards, communications over alternate radio frequencies, and use of short message services (SMS) for communication.<sup>23</sup> These modes do not rely on data services but face other challenges in reaching users at scale.

<sup>19</sup> Ramakrishna Padmanabhan, Arturo Filastò, Maria Xynou, Ram Sundara Raman, Kennedy Middleton, Mingwei Zhang, Doug Madory, Molly Roberts, and Alberto Dainotti. 2021. A Multi-Perspective View of Internet Censorship in Myanmar, <https://dl.acm.org/doi/10.1145/3473604.3474562>.

<sup>20</sup> Open Observatory of Network Interference, 2021.

<sup>21</sup> Voice of America. 2021, <https://www.voanews.com/a/east-asia-pacific-myanmar-military-strips-five-media-companies-licenses/6203033.html>.

<sup>22</sup> Reuters, 2021, <https://graphics.reuters.com/MYANMAR-POLITICS/INTERNET-RESTRICTION/rlgpdbreepo/>.

<sup>23</sup> Reuters, 2021, <https://graphics.reuters.com/MYANMAR-POLITICS/INTERNET-RESTRICTION/rlgpdbreepo/>.

### Box 1: Types of internet restrictions implemented in Myanmar since February 2021

**Total network shutdowns** involve disconnecting network infrastructure at key access points to the global internet, resulting in internet connections being physically prevented.

**Network throttling** is an intentional slowing down of internet speeds within a network. It is often implemented by internet service providers and leads to users experiencing low bandwidth conditions with poor service quality.

**Internet Protocol (IP) address blocking** involves internet service providers blocking communication to lists of locations that correspond to restricted websites. IP addresses are the locations of computers on the public internet.

**Domain Name System (DNS) tampering** occurs when, upon performing a DNS Lookup for a website (to map to an IP address), a wrong IP address is returned, leading to an incorrect answer or no answer to the initial query.

15. **Some regions were affected more severely than others even after the end of the nationwide total shutdown at the end of April 2021.** Based on data from Internet Outage Detection and Analysis, outage severity — a measure that considers both the magnitude and duration of the outage — varied significantly between January and December 2021.<sup>24</sup> For instance, Yangon and Mandalay ranked highest in outage severity in the February–April period (highlighted in Figure 10 in the darkest shades of blue). However, after whitelisting was implemented in May, outage severity levels varied across states, trending toward greater censorship (restrictions on access to certain websites) but with limited total shutdowns. In the latter months of 2021, the most severe total outages were Mandalay (in July), Kayin (in August), Mandalay (in September), Tanintharyi (in October), Kachin (in November) and Yangon (in December). In certain areas, research also suggests the use of throttling before the enactment of total shutdowns.<sup>25</sup> Internet shutdowns in the July–December 2021 period were also reported to be correlated with the location of protest activity and conflict.<sup>26</sup>

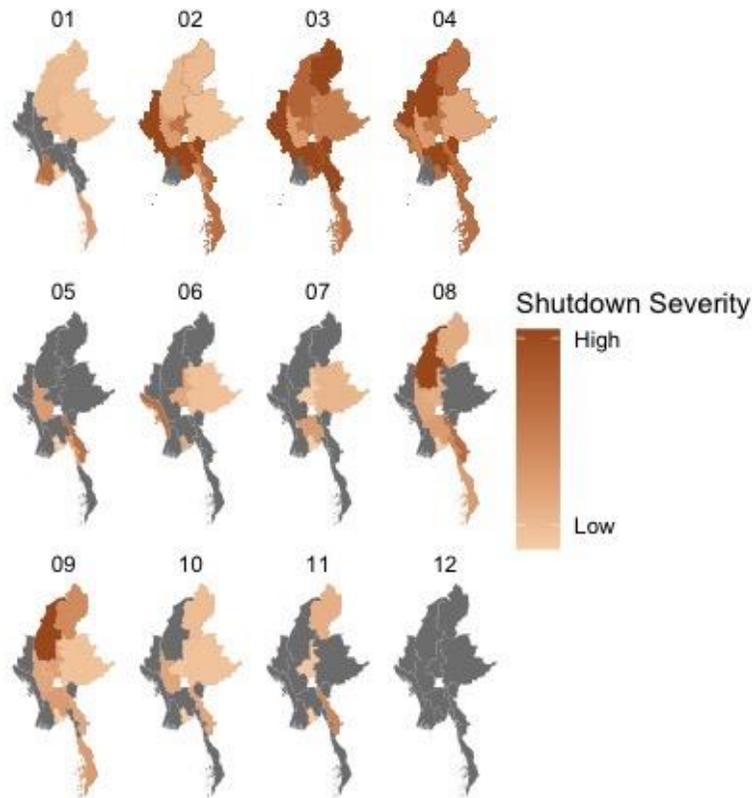
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<sup>24</sup> For an in-depth elucidation of the outage severity level calculation, visit <https://ioda.caida.org/ioda/help>.

<sup>25</sup> Washington Post using data from Monash IP Observatory, 2021, <https://www.washingtonpost.com/world/interactive/2021/myanmar-crackdown-military-coup/>.

<sup>26</sup> Radio Free Asia, 2021, <https://www.rfa.org/english/news/myanmar/internet-09162021205144.html>.

Figure 10: Outage severity of internet restrictions in various states in Myanmar (Jan–Dec 2021)



Source: Authors based on IODA data.

16. **Internet shutdowns and restrictions affect the economy by reducing access to services, information, and markets; disrupting businesses' operations; and weakening investor confidence (Box 2).** In Myanmar's case, estimates suggest that the restrictions imposed in 2021 have cost nearly US\$2.8 billion, or around 3 to 4 percent of FY20 GDP. The methodology relies on estimates from the literature on the extent of development of a country's digital economy and the multiplier effect of a disrupted digital economy. Estimates of the size of the digital economy are prone to risks of both over-estimation (due to the use of alternative communication channels amid shutdowns) and under-estimation (due to the networked nature of the digital economy and its widespread effects on supply chains, investments, revenue mobilization among others). Therefore, the US\$2.8 billion figure, while derived using up-to-date data and assumptions in line with the literature, should be understood primarily as providing an order of magnitude rather than a precise estimate.

## Box 2: Effects of internet shutdowns: Brief review of the literature

Internet shutdowns affect society in three ways: (1) They affect the functioning of businesses, adversely impacting economic activity and growth. E-commerce and digitally native services are directly affected by internet shutdowns, as are digital financial services. Other internet-dependent sectors such as tourism, ed-tech, and the news media are also adversely affected. Importantly, internet shutdowns can be regressive; earlier research shows that they impact small businesses more adversely than larger ones.<sup>/a</sup> (2) Internet shutdowns affect the ways in which outside actors – countries, development partners, and foreign investors – view a country's economic prospects. Countries may choose to deploy trade sanctions, international organizations may withdraw funds, and foreign investors may consider investments risky. (3) Internet shutdowns affect safety and security of citizens and civil society organizations. In the past, internet shutdowns have affected critical emergency services such as the functioning of hospitals and air transport and have prevented communications among family members, relatives, and refugees.

Reports from Myanmar suggest that, even amid internet restrictions, households relied on several sources to obtain information circulating online, including via calls with friends and relatives able to access the internet through fixed connections.<sup>/b</sup> Shutdowns in Rohingya refugee camps in neighboring Bangladesh since 2019 have prevented refugees from being able to contact relatives living abroad or to get information about repatriation, while also preventing access to education and jobs for these communities. They also enabled trafficking, smuggling, drug trade, and other criminal activities to proliferate without the ability for affected users to share timely information with the outside world.

In India, states that have experienced frequent shutdowns have reported loss in tourism revenues, and a deterioration in entrepreneurship activity and access to education. Amid the COVID-19 pandemic, communities in areas that faced internet shutdowns, including the Rakhine state in Myanmar, also reported the lack of access to information on the pandemic leading to a lack of awareness, risking health and jeopardizing lives.<sup>/c</sup> In Kashmir, internet shutdowns prevented downloads of contact-tracing applications and critical health services.<sup>/d</sup>

<sup>/a</sup> ICRIER. 2018. Anatomy of an Internet Blackout.

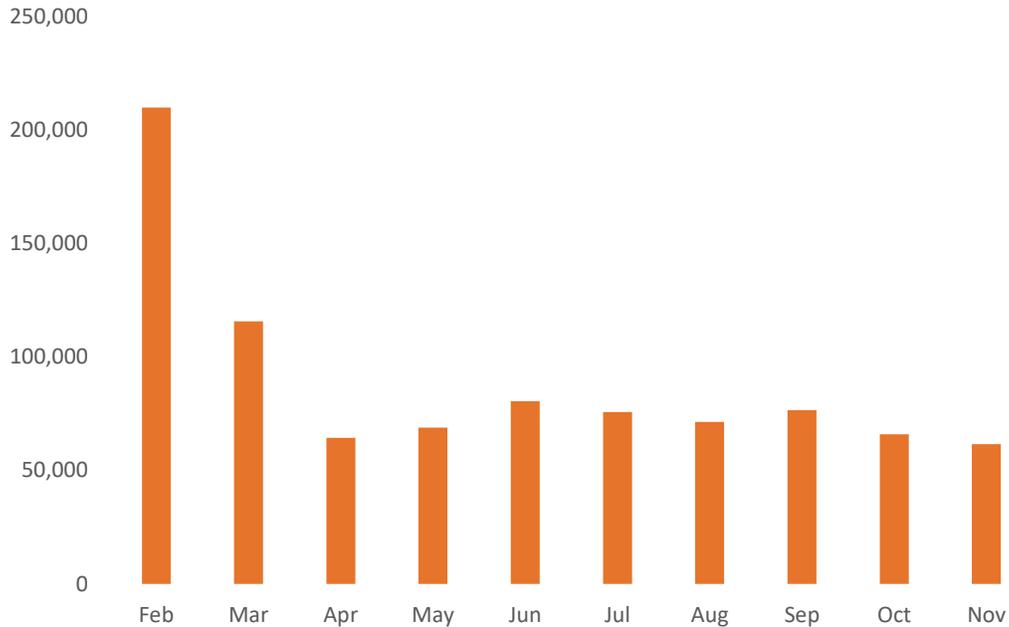
<sup>/b</sup> Frontier. 2021. Any news from the internet?: Fear and rumour in villages forced offline.

<sup>/c</sup> NPR. 2021. Parts of Myanmar Unaware Of COVID-19 Due To internet Ban, Rights Advocates Say, <https://www.npr.org/sections/coronavirus-live-updates/2020/06/24/882893419/parts-of-myanmar-unaware-of-covid-19-due-to-internet-ban-advocates-say>.

<sup>/d</sup> Reuters. 2020. Kashmir internet blackouts hinder health services, contact tracing, <https://www.reuters.com/article/us-health-coronavirus-india-tech-trfn/kashmir-internet-blackouts-hinder-health-services-contact-tracing-idUSKBN22W052>.

17. **Selective restrictions in Myanmar affected users differently across various commonly accessed online platforms.** Facebook, the most accessed social media platform in the country, saw a dramatic decrease in social media engagement across its English and Myanmar-language public news pages. Average monthly interactions with the most popular posts by users on Frontier, a popular news website, declined dramatically over time, averaging to around 65,000 by November 2021 (Figure 11).

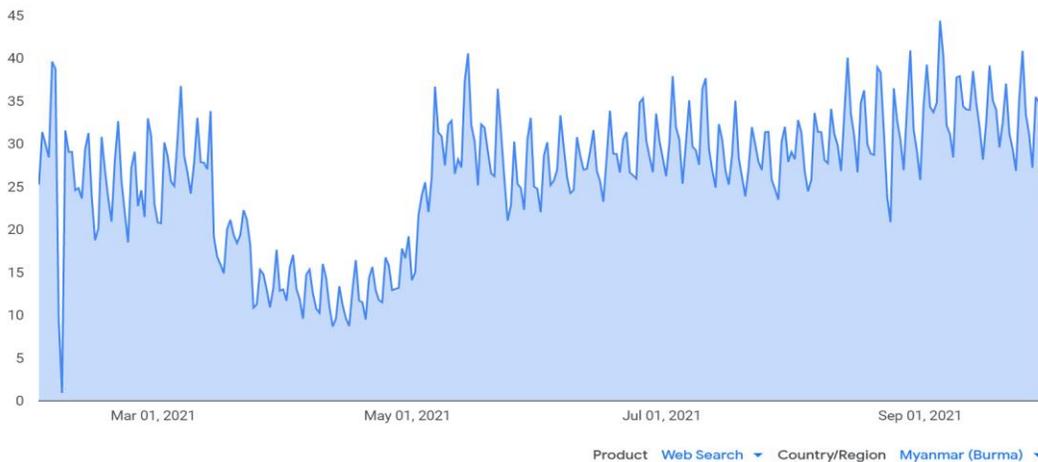
Figure 11: Average monthly interactions with the top 10 most popular posts (Feb–Nov 2021)



Source: Frontier News Media Monitor, 2021.

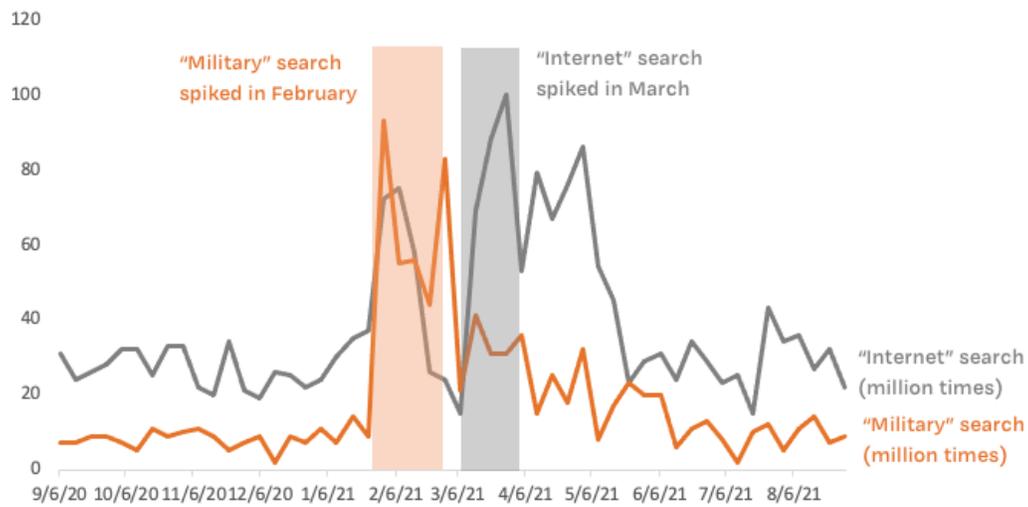
18. **Web traffic to Google, which remained on the whitelist, surged after the initial total shutdowns ended in the country** (Figure 12). Engagement on critical key search terms varied during the February–August 2021 period, with most searches focusing on the “military” in early February while searches on “internet” soared in mid-March, coinciding with the blanket restriction on all mobile services in the country (Figure 13).

Figure 12: Traffic to Google products (January–September 2021)



Source: Transparency Report, Google, 2021.

Figure 13: Google trends data on web search for key terms: ‘internet’ and ‘military’ (2020–2021)



Source: Transparency Report, Google, 2021.

19. **These restrictions had a direct impact on investor confidence, especially by key foreign investors in the telecommunications sector.** In June 2021, Telenor — a large international telecommunications company headquartered in Norway with 18.2 million subscribers in Myanmar — announced that it was writing off the value of its business in the country, worth about US\$783 million.<sup>27</sup> In July 2021, Telenor announced plans to sell its business in Myanmar to Lebanon-based M1 Group. However, the sale subsequently faced challenges and was finally approved in March 2022.

20. **While the Telenor case is notable, it is not the only example of reduced investment appetite.** This trend repeats across foreign and domestic firms in Myanmar, in sectors most reliant on digital access. A joint survey of 372 firms with foreign investors, conducted by 11 foreign chambers of commerce in March 2021, found that a clear majority of firms found the restrictions on internet access a key operational challenge.<sup>28</sup> All participants in the August 2021 WBG-conducted firm surveys across the ICT and financial services sectors reported suspending planned investments and planned business expansion, the largest compared to other industries represented in the survey (Figure 14).

<sup>27</sup> <https://thediplomat.com/2021/05/norways-telenor-writes-off-its-myanmar-operation-amid-crisis/>

<sup>28</sup> Final report of the Joint Chambers of Commerce Survey, 2021, <https://eurocham-myanmar.org/2021/05/11/results-of-the-joint-chamber-survey-published/>.

Figure 14: Share of firms reporting business expansion and investment plan change due to the coup



Source: World Bank Myanmar Business Pulse Surveys Round 8, August 2021.

21. **Internet restrictions also had a profound effect on the operations of Myanmar’s firms.** The WBG-conducted firm surveys indicate high levels of reliance on digital services, noting that across all industries digital services were used, albeit by a varying share of firms (Figure 15). Notably, 81 percent of financial services firms and 70 percent of ICT firms relied on online services and digital payments. Across sectors, nearly one-third of the firms in the August 2021 Business Pulse Survey reported that the restrictions of access to the internet affected their business operations. Across industries, all large firms reported the lack of internet access as a constraint to their continued operations (Figure 16). This constraint was particularly salient for firms in the construction, financial services, and ICT sectors. While the reliance on financial services firms for digital payments and the effects on ICT sectors are clear, the effect on the construction sector may be driven by its increased digitalization during the pandemic. During 2020, for instance, Yangon expanded the use of digital construction permits, which it had piloted for two years.<sup>29</sup> Restrictions on internet access are most likely to have adversely affected firms now forced to rely on longer, more bureaucratic processes in lieu of an automated online process (Figure 17).

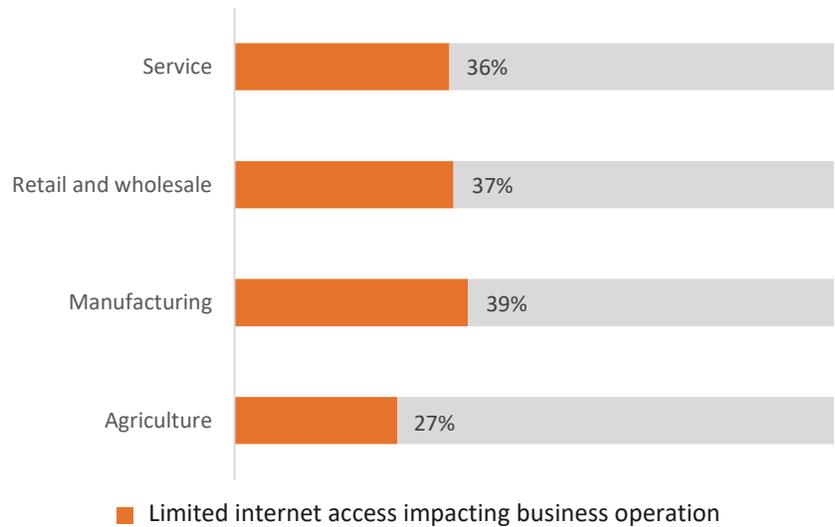
<sup>29</sup> World Bank, 2020, Building during a Pandemic: Disruption and Digital Transformation in the Construction Industry, <https://blogs.worldbank.org/developmenttalk/building-during-pandemic-disruption-and-digital-transformation-construction>.

Figure 15: Share of firms reporting the use of online payments or services



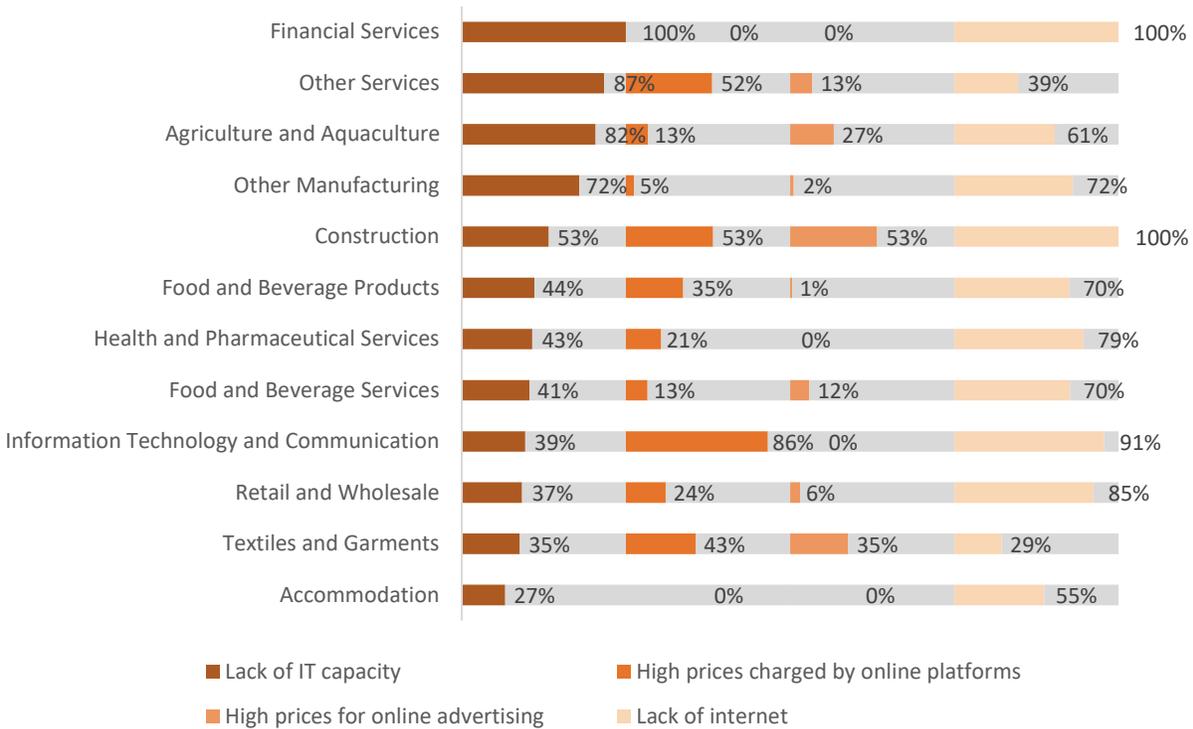
Source: Myanmar Business Pulse Surveys, Round 8, August 2021.

Figure 16: Share of firms reporting the lack of internet access as a constraint across sectors



Source: Myanmar Business Pulse Surveys, Round 8, August 2021.

Figure 17: Share of firms reporting business challenges to operating online or using digital finance



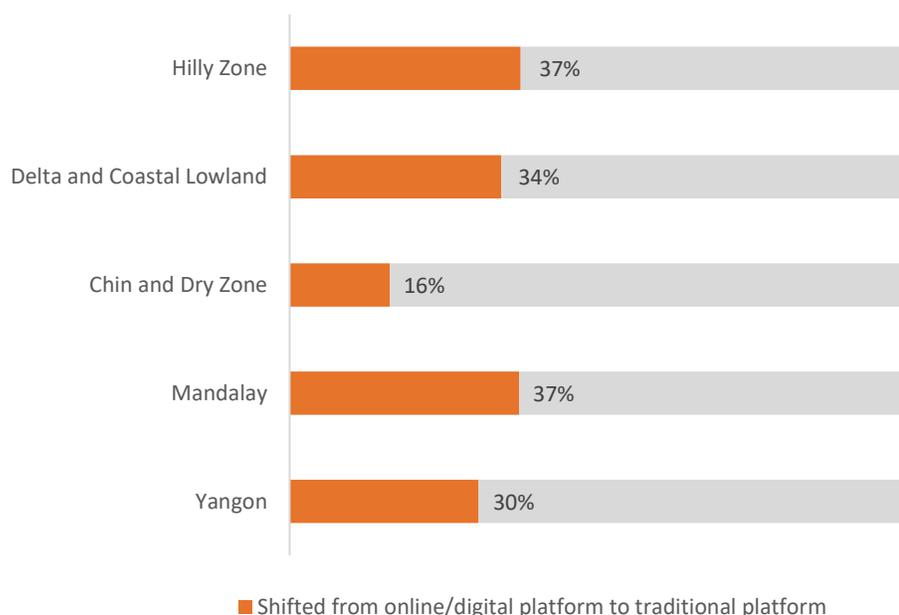
Source: Myanmar Business Pulse Surveys, Round 8, August 2021.

22. **One way in which firms have coped with these internet restrictions has been through a shift from a digital platform to a traditional platform.** In August 2021, WBG-conducted firm surveys suggested that most firms switching to traditional platforms were located in the hilly zone, followed by Mandalay and Yangon (Figure 18). One out of three small and medium-size enterprises were able to pivot away from online service modes, compared to large-size enterprises. Only one out of five large-size enterprises reported making the shift. Reports suggest that in rural areas, farmers have turned to barter in the absence of cash and mobile payments for services such as medical care.<sup>30</sup> Retail entrepreneurs have relied on cash transactions after traders’ reluctance to accept online or bank transfers.<sup>31</sup> Construction sector firms might also face challenges in lacking access to online building permitting processes in areas such as Yangon and having to pivot to more cumbersome offline processes. No financial services firms reported being able to pivot away from the internet, suggesting a high degree of reliance on digital access by the financial services sector.

<sup>30</sup> The New York Times, 2021. <https://www.nytimes.com/2021/08/07/world/asia/myanmar-cash-coup.html>.

<sup>31</sup> Reuters, 2021. <https://www.reuters.com/business/finance/lines-tokens-money-brokers-myanmars-crumbling-economy-runs-low-cash-2021-05-14/>.

Figure 18: Share of firms reporting a shift from a digital platform to a traditional platform for their product/services



Source: Myanmar Business Pulse Surveys, Round 8, August 2021.

23. **The lack of mobile internet access prevented the people of Myanmar from using online banking and payment services, increasing the reliance on cash and adversely affecting remittance flows.** Disruptions to banking activities prevented payment of salaries, leading to long lines outside bank branches in a country that has 5 ATMs per 100,000 people and relies heavily on digital financial services providers to move money. Financial services firms suffered in the immediate aftermath of the coup considering that the total number of mobile money accounts for Wave Money reduced by nearly 1 million between February and May 2021.<sup>32</sup> However, the easing of some internet restrictions and the partial recovery of the banking system have contributed to the revitalization of the digital payments business, with nearly 2 million active Wave Money users in November 2021.<sup>33</sup>

24. **There has been an adverse impact on the growth of autonomous system numbers (ASNs), domains registered on the country's top-level domain .mm, and IPv4 and IPv6 addresses.** These metrics are an indicator of internet growth within the country and provide key insights into how the digital economy is affected by the ongoing events (Figure 19). For instance, registration on the country's top-level domains is a tactic commonly used by businesses to reach the local market and provide local language content and services for global platforms. The growth in both ASNs and IPv6 addresses indicates the number of new systems and addresses that are joining the global internet. Their growth is often related to the number of new players entering the market and setting up their own systems and servers. Autonomous systems represent the number of separate "networks" in a country comprising the internet. The IPv4 and IPv6 address allocations corresponds with the actual intensity of internet use in a given country (Figure 20).

<sup>32</sup> KR Asia, 2021, <https://kr-asia.com/wave-money-has-lost-half-of-its-users-since-myanmars-coup-in-february>

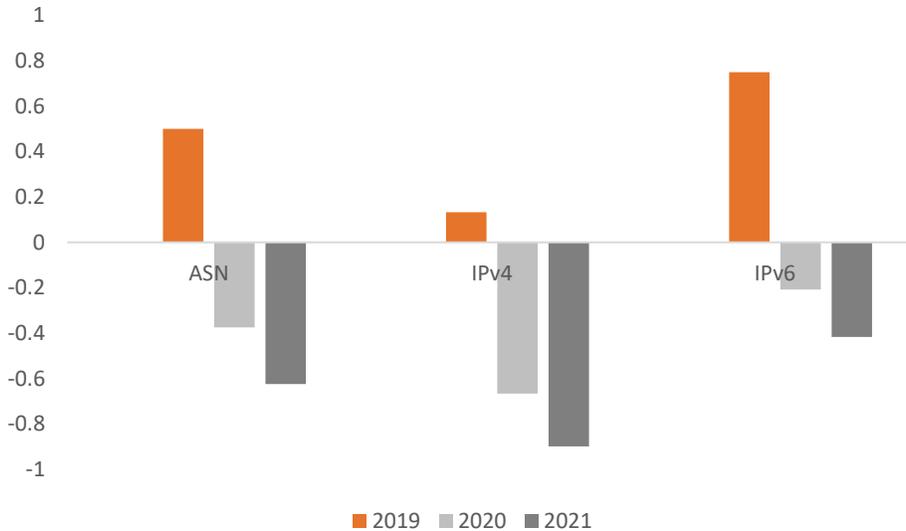
<sup>33</sup> Nikkei Asia, 2022.

Figure 19: Usage of .mm domains, 2020–2021



Source: W3Techs, 2021.

Figure 20: Trend in ASN, IPv4, and IPv6 allocations (2019–2021 against 2018 benchmark)

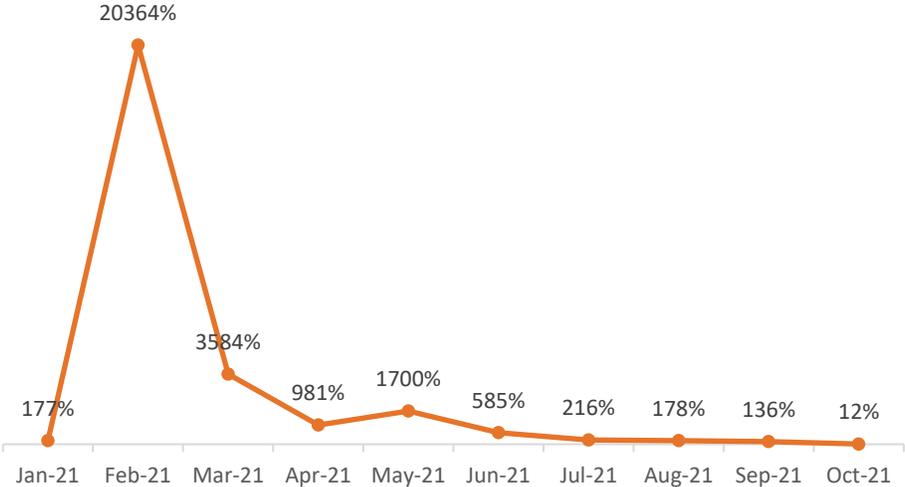


Source: APNIC, 2021

25. **The restrictions also seem to have had a dramatic impact on new users joining Twitter (measured by the year-on-year change), suggesting the effects of internet restrictions and a decline in internet use across key platforms.** Analysis of the data from tweets suggests an increase in engagement, but predominantly on ongoing political events relative to a baseline of common words used in tweets, across the English and Myanmar language. The analysis of Twitter data relies on 700,000 tweets over a

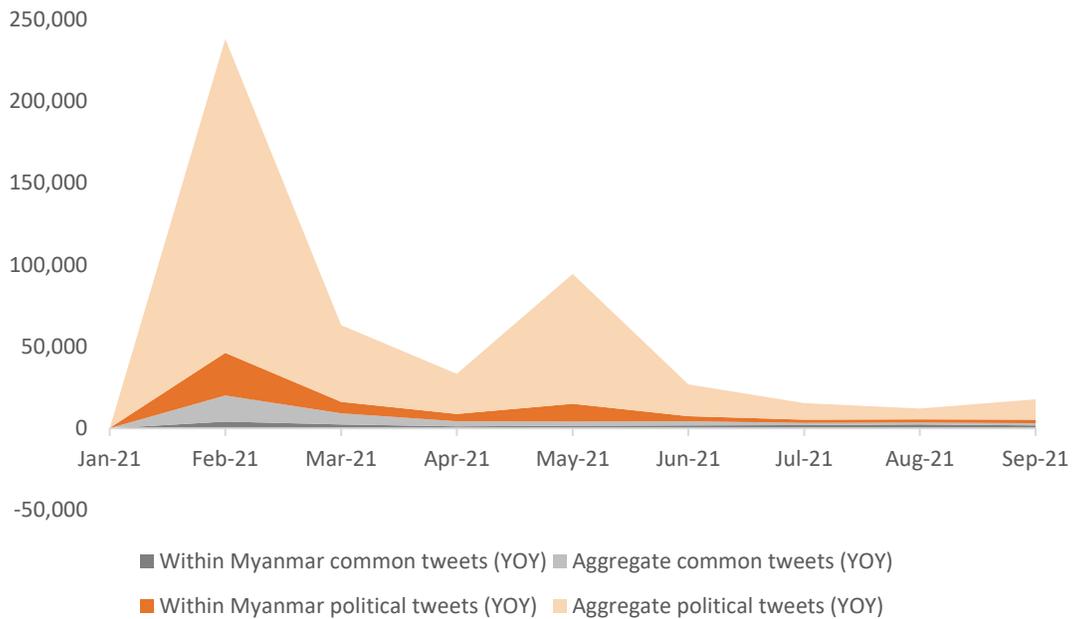
two-year period (January 2019–September 2021), filtered to include the Myanmar language text (mixed or stand-alone) and divided into tweets within Myanmar and outside Myanmar based on the user location and geo-coordinates (where available). The number of coup-related tweets is 10 times higher than common tweets in February 2021 (year-on-year average), although by July 2021, they converge. This suggests two things. First, the relative spike in Twitter engagement may reflect global attention to the country’s crisis in February 2021, with comparatively low engagement afterwards. And second, the engagement within the country may not be fully focused on the political crisis alone and may converge into conversation on common topics (Figures 21 and 22).

Figure 21: Percentage of unique authors posting Myanmar language tweets in Myanmar (year-on-year change)



Source: Authors’ calculations using Twitter data

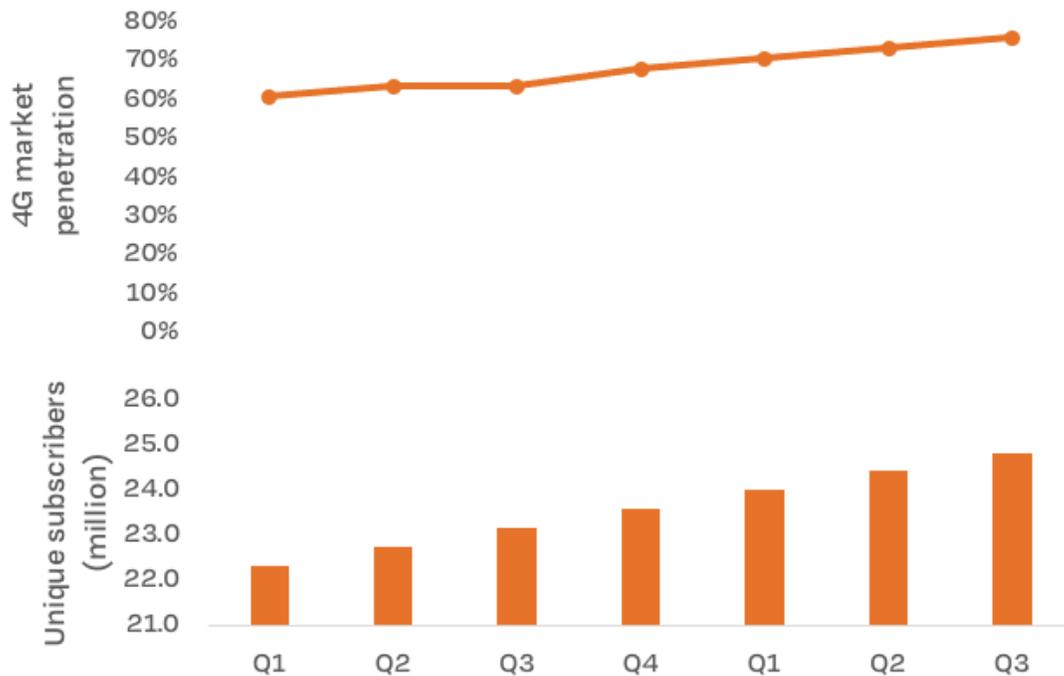
Figure 22: Number of tweets relating to the political crisis relative to commonly used words



Source: Authors' calculations using Twitter data

26. **Despite these changes, 4G market penetration grew in 2021 in line with the trend in 2020** (Figure 23). However, some of these subscriptions may derive from the switches made by users between different operators in view of the varying levels of access available on different service providers and the proliferation of phones that use multiple SIM cards within the country. From the analysis, however, there seems to be a marked decline in user growth and engagement across key digital platforms, a useful metric of actual internet usage in a data-sparse environment.

Figure 23: Mobile subscribers and 4G market penetration (Q1 2020–Q3 2021)



Source: GSMA Intelligence, 2021.

27. **The telecommunications sector in Myanmar is also adversely affected by blackouts and unreliable power supply across townships.** Evidence from other countries suggests that infrastructure investments are complementary across sectors and coordination raises impact.<sup>34</sup> Investments in electricity and internet, for example, boost productivity, enabling districts to engage in trade facilitated by road transport. Disruptions to one type of infrastructure can have several spill-over effects, not just on the telecommunications sector but also on firm productivity, learning for students reliant on online modes, and access to digital financial services and remittances. Radio Access Networks, which enable mobile signal coverage for end-users, require consistent electricity for operations. Middle-mile core network infrastructure and fixed wireless technologies are also highly reliant on consistent power supply. Consequently, disruptions can have widespread effects across the country. Frequent blackouts disrupt network performance and limit mobile network access for people, leading to a dual burden borne by those suffering from lack of electricity. Shortage of power can also affect households’ ability to charge and regularly use smartphones, a challenge given the deep penetration of smartphones in Myanmar, including in rural areas.

<sup>34</sup> Matias Herrera Dappe and Mathilde Sylvie Maria Lebrand, Infrastructure and Structural Change in the Horn of Africa, Policy Research Working Paper (English), No. WPS 9870 (Washington, D.C.: World Bank Group, 2021).

## Outlook and risks

28. **New regulations, market exit by private sector providers, and continued internet restrictions threaten to reverse the progress made over the last decade in the digital and telecommunications sector in Myanmar.** In the near-term, investments in the sector are likely to remain flat, with new entrants deterred by market and regulatory uncertainty. This is in alignment with evidence suggesting the implementation of foreign investors' business contingency plans amid intense political and economic uncertainty. Frequent shutdowns raise questions about existing networks' reliability and resilience, further dampening investor appetite. The economic uncertainty from internet shutdowns is cumulative, reducing incentives to invest while also driving existing customers away, as evidenced by the switch being made by firms to traditional modes of operation. Due to the lack of foreign investments, a security situation in flux, and the exit by major telecom sector operators, the near-term outlook for sector growth remains bleak. Current conditions are also likely to jeopardize Myanmar's hard-earned reputation as a lucrative frontier market, thereby hurting long-term growth potential.

29. **Regulatory changes introduced in December 2021 and January 2022 have already led to increased charges on SIM cards and increases to the commercial taxes on fixed and mobile data services.** These regulatory changes will impact the affordability of mobile services, lowering consumer demand and adversely impacting operators' profitability. Lower uptake is also likely to reflect the prevailing consumer sentiment, which has borne the brunt of massive job losses and an increase in poverty. Regulatory capacity for technocratic analysis and decision-making is likely to remain low, heightening policy uncertainty and further reducing prospects for sector growth. Ad hoc policy decisions to increase prices as made in early 2022 are likely to affect not merely the telecommunications sector but also spillover into those allied sectors heavily reliant on digital infrastructure such as the digital financial services sector.

30. **Frequent shutdowns and reports of directives to install interception equipment on networks will further reduce trust in digital networks, platforms, and services.** Proposed fines on the use of specific applications such as virtual private networks can further erode trust in the use of digital tools and have a chilling effect on online economic activity. Reduced volumes of online economic activity may have spillover effects on households as well as small firms that rely on digital tools for their functioning. Current policy actions are also likely to lead to the closure of many young digital start-ups that rely on consistent, reliable, and widespread internet adoption to reach markets. To the extent that these measures remain in place, they could have significant longer-term impacts on the growth of digital infrastructure and digitally enabled services in Myanmar and carry significant economic costs in the form of reduced economic growth, productivity, and output.

