

# COVID-19 and Technology Adoption in Small and Medium-Sized Enterprises: The Impact and the Way Forward

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# Preface



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Small and medium-sized enterprises (SMEs) represent more than 90% of all companies globally and are the primary drivers of social mobility, creating seven out of 10 jobs.<sup>1</sup> Unfortunately, these companies are struggling to embrace the Fourth Industrial Revolution (or Industry 4.0). Larger businesses (with more than 500 employees) are six times more likely to use the industrial internet of things (IIoT) than SMEs.<sup>2</sup> This risks exacerbating economic inequality, stifling opportunities for social mobility and dragging down global industrial productivity.<sup>3</sup>

It is against this background that the World Economic Forum, in partnership with the Ministry of the Economy of Brazil and the Brazilian State of São Paulo, co-designed and developed a [Policy Protocol](#) with the aim of lowering barriers and promoting the adoption of digital technology by SMEs. The protocol identified five main challenges: people and capabilities; funding; process and infrastructure; technology and readiness; and strategy and ecosystem. In addition, it named four key policy interventions to overcome them: raising awareness; expert support and upskilling; financial support; and encouraging collaborative environments. Since being piloted in 80 SMEs in São Paulo, the protocol has now reached thousands of SMEs across Brazil. It has also been scaled and implemented in South Africa, Turkey and Colombia, with several more countries on track to begin implementation in 2022.

Shortly after the protocol was launched, the world was upended by the outbreak of the COVID-19 pandemic. The pandemic has caused unprecedented challenges on all fronts. For most businesses, including SMEs, restrictions imposed to stop the spread of the virus caused a significant fall in revenue<sup>4</sup> and altered the way businesses operate. A recent survey of enterprise decision-makers estimates that COVID-19 has accelerated digital transformation efforts by six years.<sup>5</sup>

In this report, the World Economic Forum, with help from its partners Astana International Financial Centre (AIFC), Deloitte and the Centre for the Fourth Industrial Revolution Network in Azerbaijan, Brazil, Colombia, Kazakhstan, South Africa and Turkey, aims to provide insights into how the COVID-19 pandemic has affected SMEs' adoption of technology. The study is intended to complement and enhance the Policy Protocol and provide a novel contribution to the body of work seeking to understand the challenges surrounding, and facilitate adoption of, digital technology in SMEs.

The issues that SMEs must face if they are to embrace digital technology are multifaceted and will therefore require a collaborative effort from stakeholders in both the public and private sectors to identify solutions. Moreover, addressing these issues will likely benefit all stakeholders through increased productivity, expanded markets, and better business outcomes and profitability, as well as improved social and environmental outcomes.<sup>6</sup>

# Executive summary

The study conducted for this report found that the most prominent impact of COVID-19 on SME supply chains has been on the procurement side, such as issues with costs and the availability of materials, as well as delivery and logistics problems. In terms of business activities, unsurprisingly, many of the SMEs surveyed were forced to move to remote working, which resulted in increased demands being placed on their IT infrastructure. Many also faced temporary suspension of their business activities. Around 40% of the SMEs surveyed ceased their activities during the pandemic, which has caused a reduction in employee working hours or has led to redundancies in the past year.

Health restrictions put in place to stop the spread of the virus have underscored the importance of integrating digital technologies in business operations. The analysis demonstrates that companies' interest in digital technologies has grown between 2019 (pre-COVID-19 period) and 2021 (a year into the pandemic). SMEs are more interested in IoT, big data, cloud computing, artificial intelligence (AI) and virtual and augmented reality. Various use cases such as health and safety, security, process optimization, quality management, employee training and data accessibility also saw an increase in interest among SMEs.

However, despite the increase in awareness of the importance of digital technology, many companies have admitted to either suspending their digitalization plans or having no plans at all. This is partly due to the financial stress caused by the pandemic's impact on sales and operations. More importantly, this points to the continued existence of significant barriers that hamper the adoption of digital technology among SMEs.

The main barriers identified in this study largely mirrored those outlined in the [Policy Protocol](#), which include financial constraints, lack of skilled labour, infrastructure barriers to the availability of digital technology and inadequate support from executives. This underscores the importance and continued relevance of the Policy Protocol in promoting the use of digital technology among SMEs.

The COVID-19 pandemic has emphasized the need for a deeper integration of digital technology among SMEs. Addressing the barriers will likely benefit all stakeholders – the public and private sectors, as well as larger segments of society – by unlocking the economic and social potential and value of more productive and competitive SMEs.

# 1

# Methodology

Surveys and interviews were conducted with representatives from industrial SMEs, industry associations, policy-makers and other stakeholders, including vendors and academics, between February and August 2021 to evaluate the impact of the COVID-19 pandemic on digital technology adoption in SMEs. A total of 141 SMEs and 34 large enterprises in Azerbaijan, Brazil, Colombia, Kazakhstan, Turkey and South Africa were involved. The 21 industry sectors included construction,

trade, machinery, metallurgy, automotive, food processing, aerospace, textile, agriculture and chemical industries.

Data gathered from the survey was then analysed to uncover insights into the various aspects of the research questions. We next interviewed selected respondents to validate the survey results and gain a comprehensive picture of the different perspectives driving the trends in the survey data.



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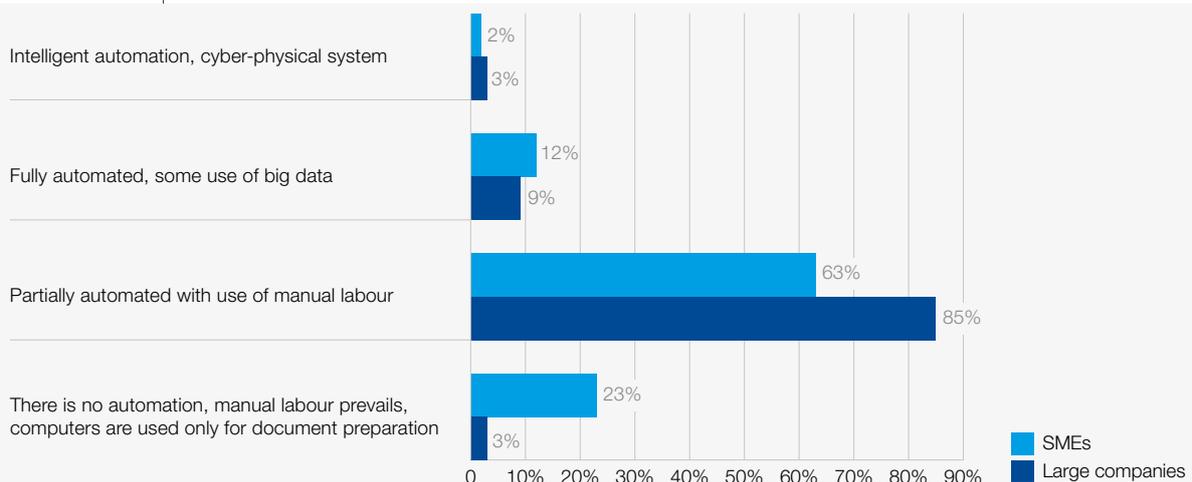
# The current state of digital technology in SMEs

Most SMEs' operations are only partially automated or involve no automation at all.

Understanding the current level of automation and digitalization of SMEs enables us to recognize the potential for further digitalization and the benefits this would unlock in the sector. To this end, we asked respondents to indicate the level of automation in their current production and business processes. The study revealed that most of the surveyed SMEs are still at the low to moderate level of technological maturity, with plenty of potential to use digital technology to achieve their business objectives. The majority of the SMEs surveyed either only partially integrate automation into their business processes (63%) or use none at all (23%) – relying mostly on manual labour, with computers used only for administrative work. Only 12% reported being fully automated and a mere 2% used automation with intelligent technology such as AI and IoT.

This partial or “patchwork” automation prevents companies from fully benefiting from digital technologies, limiting the potential return on investments of digitalization for these enterprises and thus discouraging widespread digitalization. Respondents noted that digital solutions implemented by SMEs often have limited or specific tasks, resulting in scattered and fragmented data and application systems, duplicated functions and time-consuming data exchanges – limiting the potential returns on investments in the technology. This also shows that there is potential for digital technology to play a more prominent role in SMEs' production and business operations, with plenty more potential value to be unlocked in terms of productivity, efficiency and profitability.

FIGURE 1 Automation and digitalization level of surveyed companies



Source: Survey data

3

# The impact of COVID-19 on SME activities

The COVID-19 pandemic has caused supply-chain disruptions and production stoppages, and has forced SMEs to transition to remote work environments.

The survey reveals significant disruptions in the supply chain for most SMEs as they faced issues in procurement – both in terms of costs and availability of materials (Figure 2). Interviewees also noted that increased procurement costs – driven largely by scarcity of commodities – have had a significant impact on SME supply chains. Since raw materials form a significant share of suppliers’ operating expenses, any increase in those prices leads to a substantial rise in expenses as a result. High inflation rates and supply-chain disruptions also contribute

to the increase in procurement costs. In addition, SMEs were confronted with problems in delivery and logistics due to border closures and national lockdown measures. As the interviewees noted, during the lockdowns, suppliers took much longer to deliver materials to manufacturers due to transport difficulties. The disruption in the supply chain, quarantine measures and drop in sales have led to a sharp decrease in production capacity usage, which may in turn result in a delay or even reduction in investment in the modernization of fixed assets.

FIGURE 2 Medium to high impact of COVID-19 on the supply chain of SMES

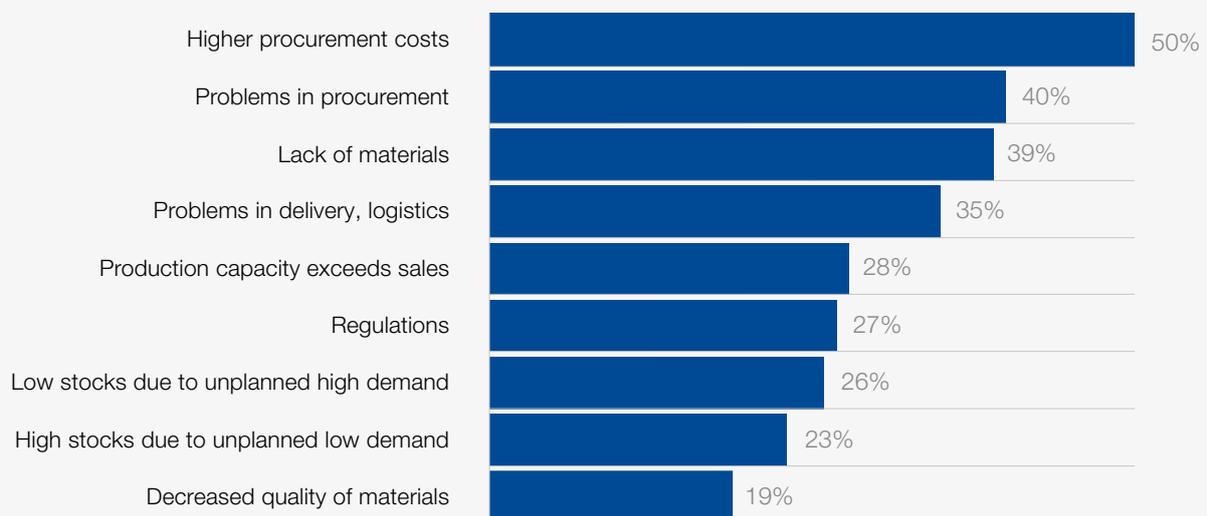
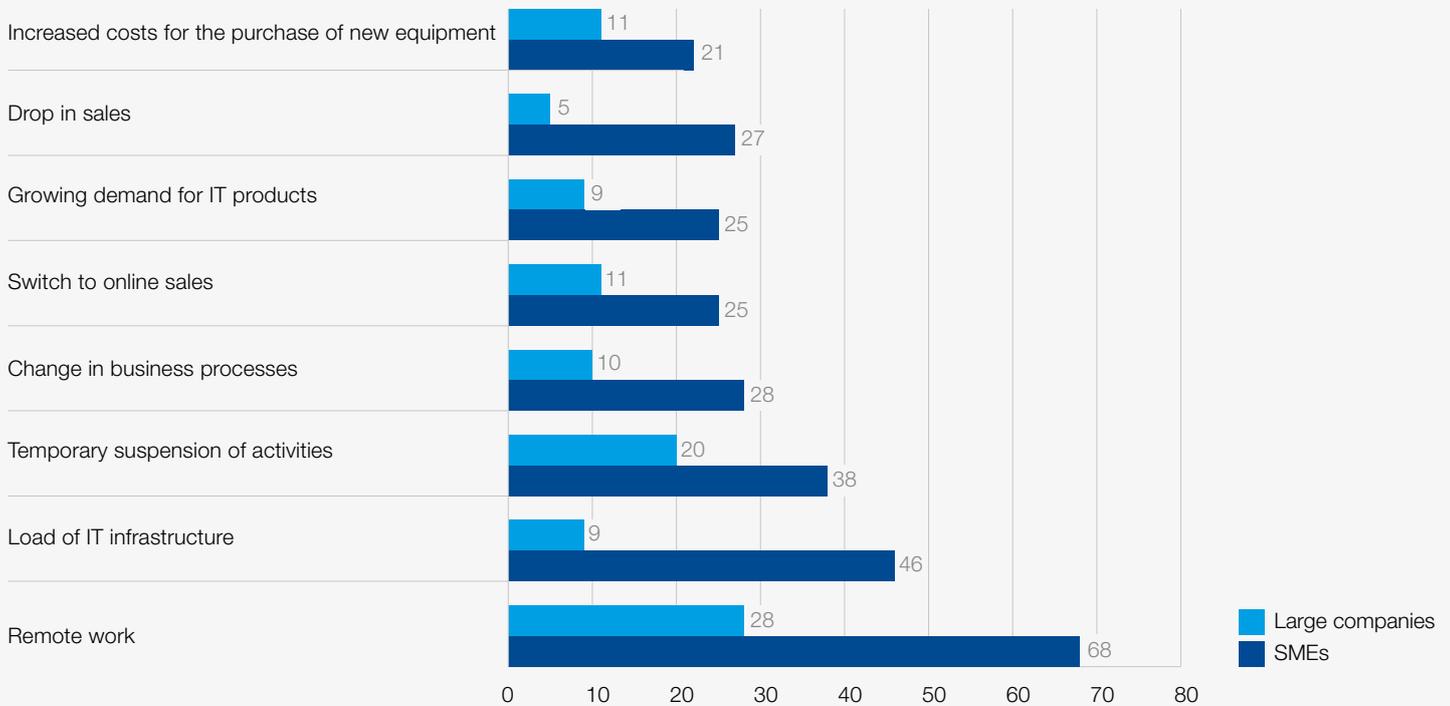


Figure 3 demonstrates how the COVID-19 pandemic and quarantine measures affected business operations and activities. The pandemic prompted a switch to remote working, prioritization of online sales and changes in business processes, which placed a high demand on IT systems and increased demand

for IT products. Large companies faced similar challenges. However, unlike that of SMEs, the IT infrastructure of big companies was more prepared for such challenges, in line with the companies' higher technological maturity level.

**FIGURE 3** Number of companies citing the following impacts of the pandemic on their business operations and activities



Source: Survey data

Remote work is unsurprisingly the most prominent change in the way of doing business due to the pandemic. It is expected that a combination of on-location and remote working is likely to become a permanent feature the longer the crisis lasts as the nature of work continues to evolve.<sup>7</sup> This increases the urgency for SMEs to embrace digital technology to adapt to the new reality, while attracting talent and remaining competitive.

The majority of executives surveyed highlighted the need to make real-time decisions remotely, underscoring the importance of information and communication technology (ICT) during the pandemic. This emphasized the need to strengthen their IT systems' ability and resilience.

During the pandemic, consumers have moved towards online channels, and businesses have responded in turn. Many companies surveyed noted that they have started working with shipping partners to provide contactless delivery and pick-up options.

With regard to business activities, the restrictions imposed to curb the spread of the virus have led to a decline in demand from customers and, as a result, a drop in sales. The decrease in revenue in the past year differs across sectors, with some respondents facing a decline of up to 60%. This has exacerbated SME cash-flow issues and undermined their investment prospects.<sup>8</sup> In addition, many SMEs have been forced to suspend their activities temporarily. This leads to a reduction in working hours for employees. Worse, almost one-third of the enterprises surveyed stated they have had to lay off workers in the past year.

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# COVID-19, SMEs and digital technology

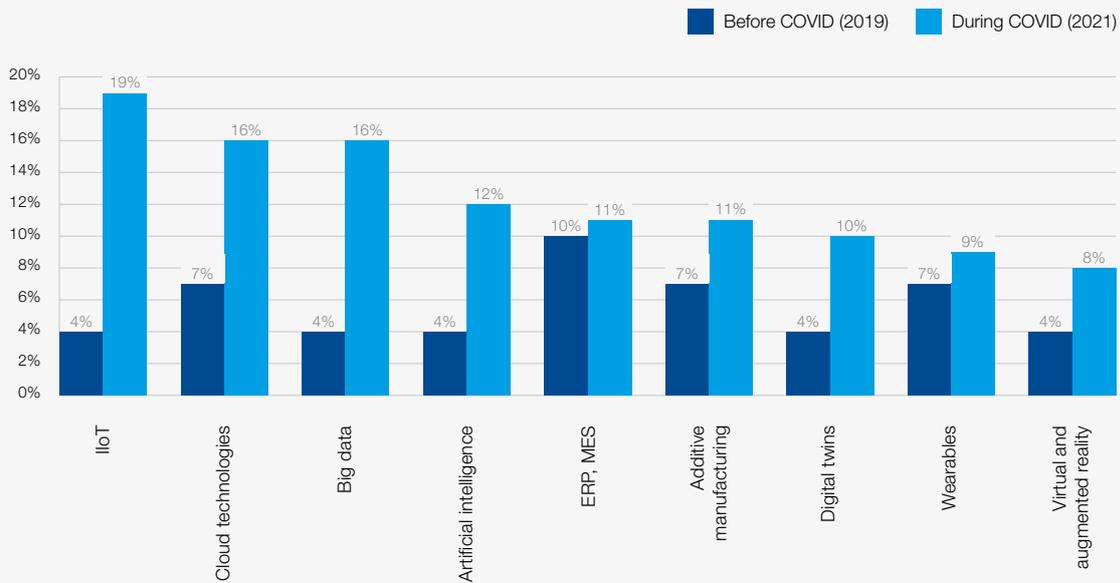
The impact of COVID-19 on operations has spurred SMEs' interest in the wider adoption and deeper integration of digital technology.

This section evaluates the impact of the pandemic on SMEs' attitude to digital technologies. Comparing the level of expressed interest in different types of digital technologies and use cases in 2019 compared to 2021 highlighted a notable increase in the appeal of various digital technologies and use cases for most SMEs.

In general, most SMEs showed an interest in technologies such as IoT, cloud technologies, big data and AI (Figure 4). Significantly, SMEs' interest has grown considerably in 2021 compared to 2019. This can be explained partially by the move to remote working in the past year. These technologies are crucial in supporting monitoring, data collection and collaboration among employees while working away from the office or factory.



FIGURE 4 | Assessment of SMEs' interest in using digital technologies in 2019 vs. 2021



Source: Survey data

Note: Enterprise resource planning (ERP); manufacturing execution systems (MES).

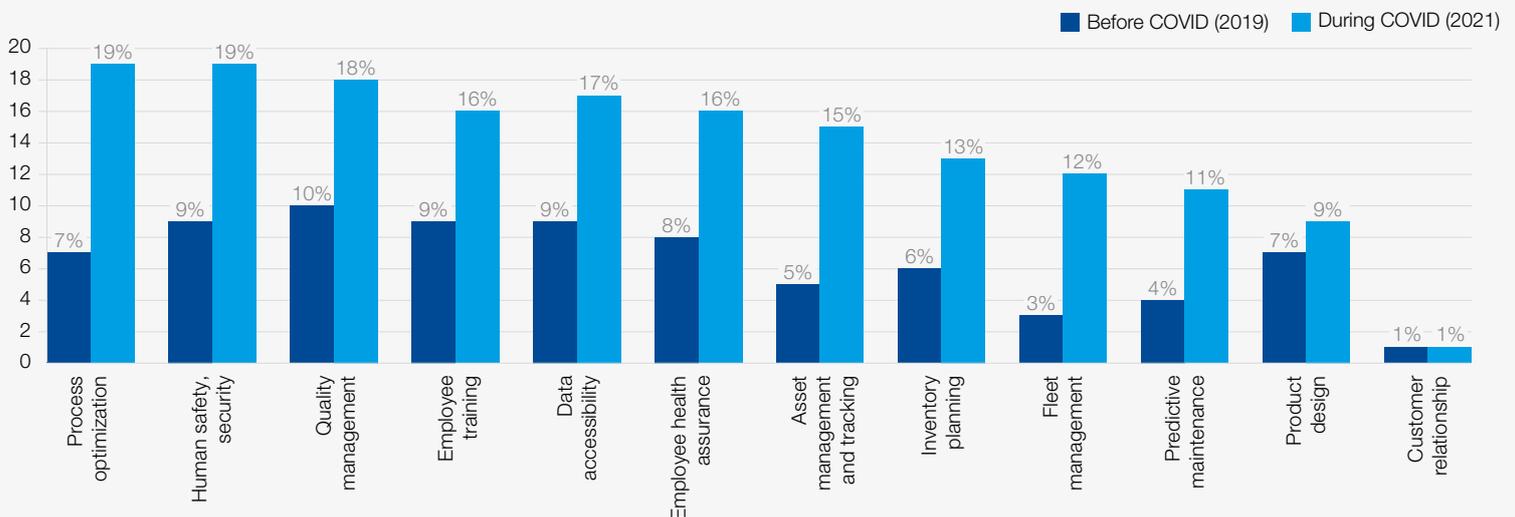
For example, IoT can be used in many different use cases such as remote asset control and maintenance and supply-chain integration. During lockdowns, IoT can support the continuation of operations with fewer workers on site. Cloud computing has helped companies continue with day-to-day operations and has facilitated workforce collaboration. It allows companies to expand and contract IT infrastructure in a cost-effective way.

AI makes it possible to figure out new ways to communicate with customers, automate business processes or optimize production operations. For instance, survey respondents pointed out that AI use cases such as predictive maintenance have become particularly important for businesses to operate effectively in remote working environments. By collecting real-time data through IoT sensors and

analysing historical data, AI can predict when and where equipment may malfunction and which parts need to be repaired before they break down, and reduce the cost of maintenance and downtime.

Similarly, the survey showed an increase in interest across a variety of use cases, but most prominently in process optimization, human safety, quality management, employee training and data accessibility (Figure 5). In general, SMEs' interest in digital solutions is growing. Agility and flexibility in operations have emerged as top priorities above raising productivity and minimizing costs, which used to be the primary objective for most businesses. In addition, technologies that enable remote work and collaboration topped the list of priorities for digital technology use cases.

FIGURE 5 | Use cases in which SMEs were interested, 2019–2021

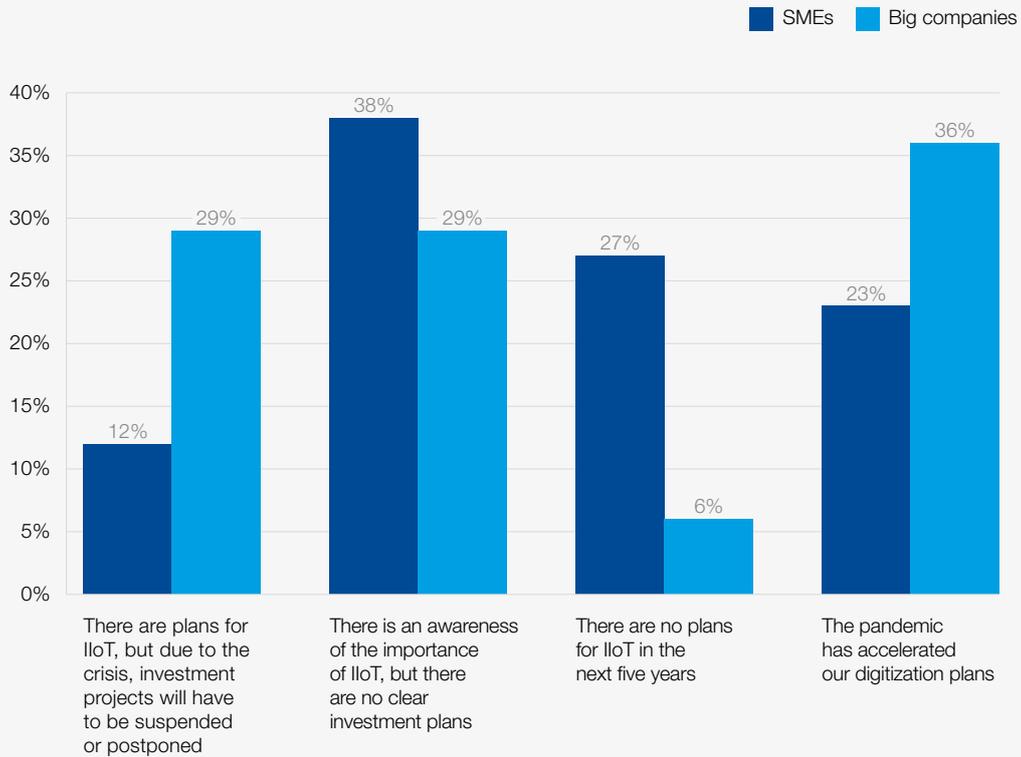


Source: Survey data

Despite their heightened awareness of the importance of digital technology, most companies have admitted to either having their digitalization

plans postponed due to financial stress caused by the pandemic or to having no plans at all.

FIGURE 6 The impact of COVID-19 pandemic on companies' plans to invest in digital technologies



Source: Survey data

Some surveyed companies reported that they had plans for digitalization but decided to suspend or postpone them due to the economic impact of COVID-19. Some respondents noted that, due to the COVID-19 crisis, their businesses are facing the risk of bankruptcy. These companies are not in a position to make long-term development plans because most of their resources are being put into keeping the business afloat. A larger portion – 38% of SMEs and 29% of large enterprises – understand

the importance of IoT technologies but do not have clear plans for investments. Meanwhile, almost one-third of surveyed SMEs do not have plans for IoT. This points to the existence of structural barriers that hinder these companies from embracing digital technology. Meanwhile, a higher percentage of large companies compared to SMEs claimed to have accelerated their digitalization process, pointing to the bigger challenges faced by SMEs in adopting digital technology.

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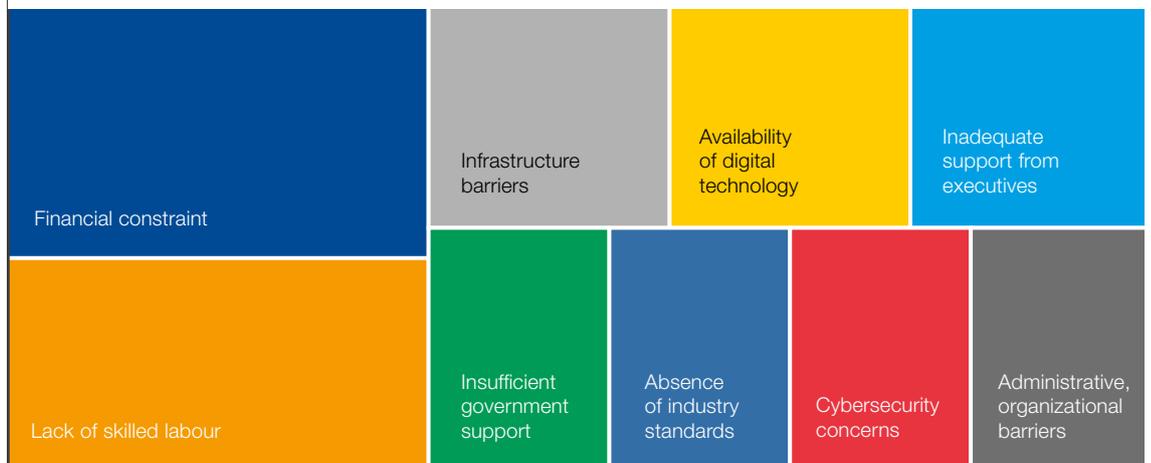
# Barriers to digital technology adoption by SMEs

Financial constraints, lack of skilled labour and infrastructure barriers are among the most-cited hurdles to the wider adoption of IoT by SMEs.

The surveyed SMEs identified a number of main barriers to a wider and deeper integration of digital technology in their business operations. These include, among others, financial constraints, lack of

skilled labour, infrastructure barriers to the availability of digital technology and inadequate support from executives (Figure 7).

FIGURE 7 Barriers to the implementation of digital technologies for SMEs



Source: Survey data

The barriers indicated by the respondents in this survey are comparable to those identified in the Policy Protocol (Figure 8). The results of

the survey not only validate this prior work but also complement it with additional insights and pandemic-related impact.

FIGURE 8 | Five main challenge areas identified in the Policy Protocol

Challenge area	Key questions	Supporting quote from Brazilian SME owner/operator
People and capabilities	<p>How might we engage and train employees and managers in Industry 4.0?</p> <p>How might we attract and retain the right talent?</p>	<p>“We have leaders who don’t know technology.”</p> <p>“You don’t find the people in the market. You can’t find a specialist in Industry 4.0 [for SMEs]. That doesn’t exist.”</p>
Business strategy, return on investment and access to capital	<p>How might we make funding less complicated and more accessible?</p> <p>How might we measure and guarantee the ROI of each IIoT investment</p>	<p>“Funding models are inappropriate ... [for example] sometimes we have to prove we have the money to be granted the funding.”</p> <p>“When ROI is not clear, it is hard to prioritize.”</p>
Infrastructure and processes	<p>How might we define a roadmap to implement IIoT and keep up the pace of upgrading to new technological developments?</p> <p>How might we determine the right use cases and business cases for IIoT implementation?</p>	<p>“Is industrial IoT [the same as] automation?”</p> <p>“I can’t wait for regulations to change. I have new technologies, but I have standards and requirements I need to follow. People are in between technology and regulation and we need to follow both.”</p>
Technology readiness	<p>How might we experiment with IIoT quickly and cheaply?</p> <p>How might we share experiences about successes, failures and best practices?</p>	<p>“We started implementing something and then I travelled to Germany and oh ... what we are doing is all wrong.”</p>
Ecosystem maturity	<p>How might we define a strategy around the entire value chain?</p> <p>How might we work collaboratively and deal with industrial exposure, competitive advantages and confidentiality issues?</p>	<p>“The biggest opportunities are in finding common problems that we can solve together.”</p> <p>“We try to focus on our product and then hire third parties to support on specific stuff. We have no space or time to try to do different things. We have to find people outside.”</p>

Source: World Economic Forum, 2020

The most common challenge to digital transformation cited by the surveyed SMEs is financial constraints. The interviewees revealed that financial constraints caused digitalization to be pushed down many SMEs’ list of priorities. Uncertainty in the business environment has led SMEs to focus more on short-term objectives and plans. Especially in times of crisis, SMEs focus on day-to-day operations and survival, stalling future investment plans – including digital modernization. The COVID-19 crisis has forced companies to divert funds to other areas such as health and safety, and employment protection.

Exacerbating this issue is a continued lack of access to financing for SMEs. According to International Finance Corporation (IFC) estimates, the MSME (micro, small and medium-sized enterprise) finance gap to GDP ratio in 2017 was 13% in Azerbaijan, 35% in Brazil, 19% in Colombia, 26% in Kazakhstan, 10% in South Africa and 11% in Turkey.<sup>9</sup> Interviewees also pointed out the familiar situation where banks prefer to give loans to large enterprises rather than to SMEs due to the risk of default.

Another important barrier is the lack of skilled labour needed to support digital transformation. Having a qualified workforce that can be integrated into digitalized operations is critical in realizing the return on investment in the technology. The majority of respondents mentioned skill gaps in a wide range of areas in their companies that hamper digital transformation, such as big data analytics, robotics technicians and IT managers. In addition, interviewees pointed out that SMEs are facing tough competition from larger companies to attract workers from this already limited pool of talent.

Some SMEs also noted the infrastructure barriers they are facing. A number of respondents pointed out challenges relating to internet access and speed, and a lack of availability of adequate data centres. This is especially true in rural and remote regions. Respondents also highlighted the lack of availability of digital solutions in the domestic market in the countries surveyed, exacerbated by the lower level of R&D and innovation compared to advanced economies.

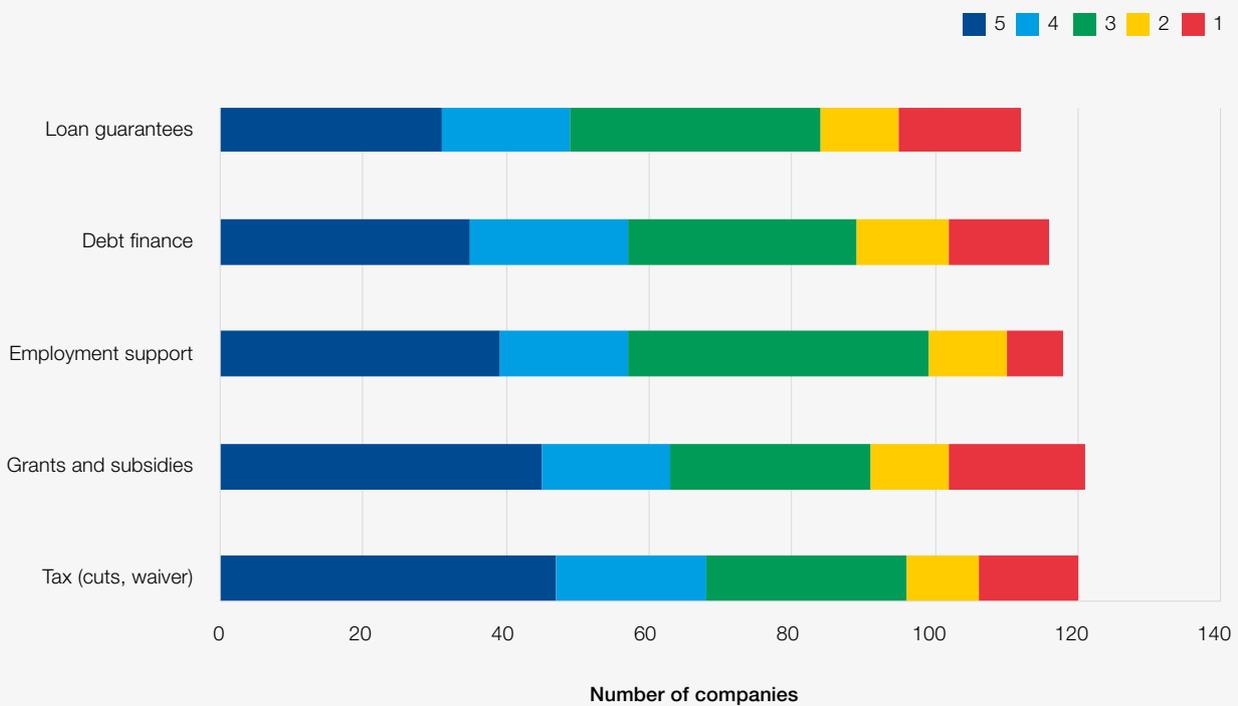
Respondents continued to find some resistance to investment in digital technology from management despite the pandemic amplifying its importance. Some respondents noted that they do not believe digitalization will benefit their company. Moreover, many SMEs are now focusing on local markets, which feature less intense competition compared to the global market. This reduces the incentives for SMEs to fully embrace innovation.

The survey also revealed SMEs' dissatisfaction with the level of government support. When the pandemic caused a drastic drop in revenue, more than half of the SMEs surveyed noted that they did not receive financial backing from their governments. When asked about the most attractive instruments of state

support to increase digital adoption, respondents said they preferred tax incentives, grants and subsidies, employment support and debt financing (Figure 9).

An absence of industry standards complicates matters and discourages SMEs from investing in digital technology. The existence of such standards not only promotes interoperability but also helps define the minimum requirements for serviceability and safety, including environmental considerations. This allows for smooth integration into other systems and reduces switching costs – avoiding “vendor lock-in”. Therefore, the absence of such standards increased both the actual and perceived costs of investing in digital technology.

FIGURE 9 The importance of different type of state support for industrial companies (5 being the most important)



Source: Survey data

6

# Policy recommendations

To promote wider adoption of technology among SMEs, policy should focus on financial support, improved labour skills and enhanced infrastructure

Policy-makers have an important role to play in reducing barriers, aligning incentives for different stakeholders and creating an environment conducive to wider adoption and deeper integration of digital technology among SMEs – thereby unlocking the benefits of digital transformation. This study underscores the importance and continued relevance of the Policy

Protocol, which draws from existing policies around the world aimed at supporting SME digitalization efforts.<sup>10</sup>

The Policy Protocol identified four main policy intervention areas: raising awareness; expert support and upskilling; financial support; and collaborative environments.



FIGURE 10 | Key policy interventions needed to meet the challenges of SME digitalization

Policy protocol		Challenges				
		People and capabilities	Processes and infrastructure	Technology readiness	Business strategy, ROI and funding access	Ecosystem maturity
Raising awareness	Fourth Industrial Revolution maturity assessment tool		✓✓			
	Demo factories and lighthouses					✓
	Use case catalogue		✓			✓✓
	Online platforms					✓✓
Expert support and upskilling	Workforce training	✓				
	Management training	✓				
	Open-source tools		✓	✓	✓	
	Direct advisory services		✓✓			
Financial support	For proof-of-concepts or pilots				✓✓	✓✓
	For external expert support			✓✓	✓✓	
	For training the workforce	✓			✓	
	For implementation				✓	
Collaborative environment	Online communities			✓		✓
	Conducive environments			✓		✓✓

Source: World Economic Forum, 2020

## 6.1 Raising awareness

TABLE 1 Policy tools to raise awareness

<b>Fourth Industrial Revolution maturity assessment tools</b>	<p>Help SMEs develop their digital investment strategy, identify gaps and strengths, and pinpoint potential use cases to prioritize</p> <p>Advise policy-makers to better craft and target policy interventions and public investment</p>
<b>Demo factories and lighthouses</b>	<p>Provide practical examples of technology deployments and the value it creates</p>
<b>Use case catalogue</b>	<p>Describes tried-and-tested digital and emerging technology use cases</p> <p>Provides an overview of business cases, description of technical solutions, quantification of key performance indicator (KPI) improvements, including return on investment (ROI) estimates as well as the benefits and challenges of deploying solutions</p>
<b>Online platforms</b>	<p>Share effective techniques, success stories and useful information about funding and other support services that could help address information fragmentation facing SMEs</p>

Source: World Economic Forum, 2020

BOX 1 The Mittelstand 4.0 Competence Centres (Germany)

Supported by the Mittelstand 4.0 Agencies, the centres act as a regional consolidation of information and competence-matching to support SMEs in adopting Industry 4.0 technologies. Initially, they help SMEs to gauge their current stage of digitalization, develop an individual roadmap together with the company, decide whether a technical solution is economically viable

and which security aspects must be considered. Existing labs and test beds are adapted to SME needs. Several activities take place to increase SMEs' awareness of the potentials of adopting digital technologies, such as training courses, webinars, events, roadshows, company visits, conferences on 4.0 topics, workshops, lab tours and meetings with experts.<sup>11</sup>

Source: World Economic Forum, 2020

## 6.2 Expert support and upskilling

TABLE 2 Policy tools to provide expert support and train workforce

<b>Workforce training</b>	<p>Prepares SME workforces to integrate digital solutions into their tasks through online, in-person and on-site training</p>
<b>Management training</b>	<p>Informs management about the decision criteria and ROI calculations for investments in digital technology and operating model changes, as well as how best to manage digital technology partnerships</p>
<b>Open-source tools</b>	<p>Provide toolkits such as maturity assessment tools, implementation roadmaps, reference architectures and procurement guides for SMEs to begin their digital transformation</p>
<b>Direct advisory services</b>	<p>Offer expertise and guidance for SMEs throughout the digitalization process, allowing them to better navigate tools and standards in areas such as implementation and cybersecurity</p>

Source: World Economic Forum, 2020

BOX 2 | Longer-term educational reform

**Focus on STEM in secondary and vocational education.** Many experts, including the World Bank, propose boosting science, technology, engineering and mathematics (STEM) subjects in school.<sup>12</sup> For example, Estonia and the United Kingdom have included coding in the compulsory secondary education curriculum.

In South Korea, programming courses are now taught from an earlier age than previously.<sup>13</sup> In Canada, the government provides 3,000 STEM internship grants for SMEs annually.<sup>14</sup> Mexico has identified STEM courses and courses in electronics, automation and mechanical engineering as priority training courses.<sup>15</sup>

## 6.3 Financial support

TABLE 3 | Policy tools for financial support

<b>For proof-of-concept or pilots</b>	De-risks and incentivizes SMEs to experiment with and learn about technology adoption. This may encourage SMEs to consider broader technology adoption and larger investments as being less risky in the future
<b>For external expert support</b>	<p>Lowers the cost of business consultancy services and/or expert technical support, often in the form of grants or vouchers</p> <p>Addresses the scalability challenge and expertise gap of policy-makers developing their own expert support programmes</p>
<b>For training the workforce</b>	Allows SMEs to choose the training programmes and vendors best suited to the needs of their business and workforce
<b>For implementation</b>	Encourages SME digital transformation and at-scale digitalization projects

Source: World Economic Forum, 2020

BOX 3 | Innovation vouchers: European Union case studies

### Austria

The innovation voucher is a funding instrument designed to help SMEs that are not yet regularly innovating, which do not have their own R&D staff and therefore rely on the knowledge transfer of research institutions. The innovation voucher enables enterprises to enlist the services of research institutions and to pay for these services<sup>16</sup>

**Agencies responsible:** Research Promotion Agency (FFG) on behalf of the Federal Ministry of Transport, Innovation and Technology (BMDVIT) and the Federal Ministry of Digital and Economic Affairs (BDMW)

**Budget:** €29.3 million (\$33.6 million). The subsidy can cover up to €12,500 (80% funding quota)

No. of vouchers issued: 4,442 (2016)

### Germany

Innovation voucher called Go Digital to advance digitalization of SMEs of fewer than 100 employees in IT security, digital marketing and digital business processes. Funded enterprises can receive expertise and support from consulting firms

**Agency responsible:** Federal Ministry for Economy and Energy of Germany

**Budget:** Funding rate of 50% to a maximum consultant daily rate of €1,100 (\$1,235). The funding scope is a maximum of 30 consultant days in a period of up to six months

**No. of vouchers issued:** 863 vouchers, totalling €4.2 million (\$4.8 million) (2018)

### Italy

A voucher for digitization that focuses solely on investments in ICT innovation and digitalization among SMEs

**Agency responsible:** Ministry of Economic Development of Italy

**Budget:** €45 million (\$50.6 million) in 2017–2019. Each company can receive reimbursement of 50% of its investment expenditure, up to €10,000 (\$11,250)

No. of vouchers issued: 10,000

**Sweden**

Digitization voucher focusing solely on strengthening the digital capabilities of SMEs that want to take in external competence to develop the company and increase competitiveness (through services or by hiring additional staff on a project basis)

**Agency responsible:** Agency for Economic and Regional Growth of Sweden

**Budget:** From €4,870 (\$5,480) to €24,330 (\$27,370) (50% reimbursement)

No. of vouchers issued: 236 (2017)<sup>17</sup>

BOX 4 **Financial policies to support innovation**

**Accelerated depreciation, tax credits and tax holidays for enterprises investing in digital technology.** The application of the accelerated depreciation method for investments in fixed assets allows funds to be freed up for investment in digital technology. For example, in Italy the depreciation rate of 250% of investments in new technologies in the following categories is applied: IoT, cloud technologies, robotics, additive manufacturing, augmented reality, modelling, vertical and horizontal integration, cybersecurity and big data.<sup>18</sup> Some European countries have implemented tax credits and exemptions from income tax to increase enterprises' R&D expenditure. For example, the Italian government provides a tax credit of up to 50% (up to €20 million [\$22.5 million]) for R&D expenditures for Industry 4.0. In the Czech Republic, SMEs that implement Industry 4.0 projects are exempt from income tax for up to 10 years.<sup>19</sup>

**Concessional lending and lease financing of IoT projects.** This tool has already been widely used for SMEs. In Italy, bank loans (of €20,000 to €2 million [\$22,500 to \$2.5 million]) to invest in new capital goods, factory equipment for use in production and digital technologies are subsidized under the Industria 4.0 National Plan. The contribution is calculated based on a conventional five-year depreciation plan with an annual interest rate of 2.75% and is increased by 30% in the case of investment in IoT technologies. Moreover, the state guarantees 80% of the loan.<sup>20</sup> France's Industrie du Futur (Industry of the Future) scheme offers unsecured loans that can be used to finance innovative and high-powered investment in production capacities and are granted to SMEs with a two-year deferred repayment.<sup>21</sup>

## 6.4 Collaborative environment

TABLE 4 **Policy tools to create a collaborative environment**

<b>Online communities</b>	Provide SMEs with access to potential business partners and peers
	Assist SMEs with business matching, provide services for vendor selection and encourage technology collaboration
	Share best practices and lessons learned
<b>Conducive environments</b>	Enable consolidation of clusters and hubs for SMEs and vendors, SME networking services, access to technology-testing and demonstrations, specialized information and partner matchmaking
	Provide enterprises with broadband internet with a speed of at least 100 Mbps. This will give impetus to the acceleration of digital technologies and contribute to the development of local service companies and system integrators
	Create legal conditions to ensure access to the radio frequency spectrum for enterprises. Due to the variety of different application scenarios, companies should be able to use the machine-to-machine (M2M) and IoT services of mobile operators and special system integrators or deploy their own private wireless networks that meet the quality requirements for data transmission
	Remove administrative barriers for the import of radio electronic equipment and high-frequency devices. This measure will contribute to the acceleration of IoT adoption and reduce the cost of digitalization projects

Source: World Economic Forum, 2020

# Conclusion

The COVID-19 pandemic became a wake-up call for the companies that had not implemented Industry 4.0.

The research undertaken for this paper estimated the current state of digital technology adoption in SMEs in Azerbaijan, Brazil, Colombia, Kazakhstan, Turkey and South Africa. It identified the impact of COVID-19 on SMEs and their attitude towards digital technology and pointed out the main barriers that hamper the digital transformation of SMEs.

The survey revealed that the level of technological maturity for many SMEs is still quite low, with limited integration of digital technologies in their operations.

Unsurprisingly, the survey has also shown that SMEs have been significantly affected by the pandemic. Months of decreased sales and drops in revenue have left many short of liquidity. Almost half of SMEs surveyed halted their business activities in the past year, which caused a reduction in employee working hours or even resulted in redundancies.

Businesses were also forced to switch to remote working, online sales and changing business processes. The pandemic accelerated the adoption of IoT technologies as businesses came to rely on cloud technologies, IoT, big data, AI etc. Companies that had scaled digital technology use cases prior to COVID-19 found themselves better positioned to respond to new challenges.

Despite an increase in interest, many SMEs admitted either pausing their digitalization plans or having no plans at all. This points towards the various barriers that SMEs have to overcome in achieving a wider adoption of digital technology.

SMEs have identified the following main obstacles to accelerating IoT adoption: lack of financial resources and technical know-how; low level of awareness; inadequate ecosystem of digital solutions providers; and infrastructure limitations.

To ensure that industrial companies in emerging markets are competitive, particularly during the pandemic and post-pandemic periods, sound industrial policies should be introduced. These include measures to: increase access to finance and infrastructural development; raise awareness; focus on innovation development and access to technologies; improve the workforce's knowledge base.

The governments in emerging economies could provide financial support tools and measures to support the training and upskilling of workers. Meanwhile, making high-speed broadband internet available at a reasonable price and focusing on cybersecurity training and policies will also provide a conducive environment for greater technological adoption among businesses. Building an effective ecosystem for SMEs has the potential to accelerate their adoption of digital technology. This requires key stakeholders such as industry, government, NGOs and academia to cooperate in improving the technological development of companies.

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# Endnotes

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