Subhra R Mondal
Jana Majerova
Subhankar Das *Editors*

Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19

Springer

Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19

Subhra R Mondal · Jana Majerova · Subhankar Das
Editors

Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19

Springer

Editors
Subhra R Mondal
Institute of Development Economics Research
University of Economics
Ho Chi Minh City, Viet Nam

Subhankar Das
Institute of Development Economics Research
University of Economics
Ho Chi Minh City, Viet Nam

Jana Majerova
Department of Economics and Management
AMBIS University
Prague, Czech Republic

ISBN 978-981-19-2172-8 ISBN 978-981-19-2173-5 (eBook)
https://doi.org/10.1007/978-981-19-2173-5

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Acknowledgments

We acknowledge all the potential authors who contributed to this book. Without them, we couldn't be able to complete the book. We are also thankful to Springer to give us the opportunity to work on this dynamic topic which can work as a food for policymakers to plan during COVID-19 and post-pandemic. So, here, we will also be thankful to various digital enterprises who provide their unofficial inputs which propel us to come up with this idea of digital enterprises and policy to revamp after COVID-19. So, last but not the least, we are thankful to our peers who help us to review various chapters by giving their opinions.

Contents

Editors and Contributors

About the Editors

Subhra R Mondal, Ph.D. is working as Senior Research Fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam.

Her research interests are brand management, brand equity with innovative tools, smart tourism, destination marketing, social media marketing, AI & Web 5.0, and digital recruitment. She has published 25 publications indexed with WoS and Scopus along with 2 books and 12 scientific monographs. She has over 12+ years of experience in research and teaching. She is associated with different collaborative projects in European and Vietnamese organizations.

Jana Majerova, Ph.D. works as an Associate Professor in department of Economics and Management at AMBIS University, a.s. (Prague, Czech Republic). Her professional and research activities are focused on the issue of the Sustainable brand management and bankruptcy law. She has authored more than 170 publications: 4 scientific monographs; 3 university textbooks; 1 script; 36 publications in journals registered in WoS or SCOPUS; and more than 80 papers published in conference proceedings.

Subhankar Das (Academician, Researcher, Author, Writer, Blogger, Data Science trainer, Social Media Marketing Consultant) received his Ph.D. in Social Media Advertisement & Media Planning. He has 12+ years of teaching and research experience. He is currently associated as Senior Research Fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam. He has published 20+ Research Papers in various International Referred Journals (Scopus, Thomson Reuters, SSCI, SCIE).

Contributors

Subhankar Das Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam

Monika Hudáková Department of Economics and Finance, Bratislava University of Economics and Management, Economics and Management Institute, Bratislava 5, Slovakia

Jana Kozáková Slovak University of Agriculture in Nitra, Nitra, Slovakia

Anna Krizanova University of Zilina, Zilina, Slovakia

Anna Kubjatkova University of Zilina, Zilina, Slovakia

Jana Majerova Department of Economics and Management, AMBIS University, Prague, Czech Republic

Jakub Michulek University of Zilina, Zilina, Slovakia

HO Minh-Nhat Department of Science and Technology, Ho Chi Minh City Government, Ho Chi Minh City, Viet Nam

Subhra R Mondal Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam

Nguyen Ngoc-Vinh Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam

Huu-Long Nguyen National Startup Support Center, Science and Technology Business and Market Development, Ministry of Science and Technology, Ho Chi Minh City, Viet Nam

Tran Dieu My Nguyen Association of Vietnamese Scientists and Experts, Ho Chi Minh City, Viet Nam

Xuan-Doa Nguyen Ho Chi Minh City Institute for Development Studies, Ho Chi Minh City Government, Ho Chi Minh City, Viet Nam

John Ben Prince Symbiosis Institute of Business Management, Symbiosis International University (Deemed University), Bengaluru, India

Eliza Sharma Symbiosis Institute of Business Management, Symbiosis International University (Deemed University), Bengaluru, India

Mária Szalmáné Csete Faculty of Economic and Social Sciences, Department of Environmental Economics and Sustainability, Budapest University of Technology and Economics, Budapest, Hungary

Eva Nahalkova Tesarova University of Zilina, Zilina, Slovakia

PHAM Tien-Dung Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam

Pham Tien-Dung Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam

Mária Urbánová Slovak University of Agriculture in Nitra, Nitra, Slovakia

Chapter 1
Digitization of Business; Need for Recombination During COVID-19

Nguyen Ngoc-Vinh, Pham Tien-Dung, and Subhankar Das

Introduction

The outbreak of the COVID-19 pandemic has had a significant impact on the health and economy of many countries. In Indonesia, the social distancing campaign has been implemented to minimize the effects of the pandemic. Since the pandemic has affected small-medium enterprises (SMEs), they are more vulnerable to the impact of the disease than other businesses. Due to the decrease in demand, this type of business usually experiences a drop in sales. It causes it to affect the company's cash flow. The government has imposed various restrictions on travel and consumption. Due to the pandemic, people have started to shop online for their basic needs. However, some SMEs are worried that the government's rule on work from home (WFH) will cause a decrease in productivity. The profitability of businesses depends on the amount of space they have and the use of technology to manage their operations. In today's digital world, they can transact without leaving their physical stores. Due to the lack of knowledge about digital skills, many SMEs fail to realize the potential of their businesses. This condition has caused many SMEs to improve their offerings during the pandemic. The use of digital marketing can help SMEs increase sales. Due to the pandemic, many SMEs are now focusing on increasing their online sales by converting their offline stores into online platforms. The digital skills needed for SMEs to thrive in the future are the key factors considered when implementing digital transformation.

N. Ngoc-Vinh · P. Tien-Dung · S. Das (✉)
Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam
e-mail: subhankardas@idr.edu.vn

N. Ngoc-Vinh
e-mail: vinhspb@ueh.edu.vn

P. Tien-Dung
e-mail: dungpt@ueh.edu.vn

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_1

During the COVID-19 pandemic, various aspects of the economy can be considered. It can be achieved through the proper handling of purchases and fast-paced sales. Aside from being able to supply goods to consumers, the pandemic logistics can also be utilized to manage the supply chain of raw materials. Due to the prevalence of the pandemic, the government launched a stimulus program to help SMEs avoid a drastic reduction in sales. Through the program, the government can also handle complaints related to the distribution of goods. SMEs can utilize this benefit to sustain their income. Due to the current economic conditions, companies are starting to adopt technology to improve operations. One example is the use of cloud-based accounting software. The cloud-based software allows businesses to access and monitor their financial reports at an affordable price. It can also be used to keep track of inventory. It can also automate various tasks such as managing expenses and sales. It can help drive down costs and provide a better customer experience.

Digital transformation is a broad and transformative shift in the way people and businesses use technology. It is carried out using various digital platforms and methods to improve its performance. The internet is a must-have component for any business model. It can be used for multiple purposes such as data-based management, marketing, sales, and design. Through digital transformation, SMEs can quickly implement various business models and procedures. It can be done by carrying out multiple tasks such as establishing a digital value network, digital design of business models, etc.

The digital transformation is a major disruptor of the modern world in each aspect of business, where enterprises strive to adjust to every dynamic change happening with technology (Renjen, 2021). It has led to profound changes in how we live our lives, and it is here to stay. According to a Deloitte insight survey, only 30% of companies that implement digitalization successfully have a significant success rate of surviving than those who have not embraced the changes during the pandemic (Renjen, 2020). Digital transformation is already here to stay, and business associations need to start taking advantage of it (Sallomi, 2020). The first step in implementing a digital strategy is deciding what and when to embrace the change (Mondal et al., 2022). Creating an online community is a great way to allow members to connect and share with others while also providing them with training digitally (Tiwari & Mondal, 2022). One of the most cost-effective tools to save money is marketing automation (Mondal and Das, 2021).

Automation software can help the enterprise communicate with the right people at the right time for customization (Sharma & Das, 2021). Artificial intelligence and machine learning are digital tools that can be quickly built and used for social media platforms (Das, 2021a).

Cost-Effectiveness, Impactful Digitalization Alternatives

Creating a culture of digital transformation starts with cultivating a mindset of change and small-scale experimentation (Siri & Das, 2021). This process works with limited

financial resources and minimal impact. Content analytics tools are an integral part of any digital strategy. They allow you to identify which content and platforms your members use most and develop digital marketing campaigns that take advantage of these platforms (Ravi & Mondal, 2021). Creating an online community is an excellent way for members to connect and share content with like-minded individuals (Yegen & Mondal, 2021). Some organizations, for instance, provide their members with training through various online platforms. Another cost-effective tool is marketing automation. This digitalized support helps the organization segment and communicate with the right person at the right time (Das, 2021b). A.I. and machine learning tools are becoming more prevalent in the digital world (Sharma et al., 2020). They can be used to improve the interactions between members and the company.

Digitalized Transformational Alternatives

The rise of digital apps has also affected how the digitalized process takes shape during pandemics (Mondal, 2020a). Digital apps are also becoming more prevalent to provide attendees with various features and functionalities. One example of this is the content services platform (CSP) to streamline the live action through different stakeholders simultaneously so that all concerned can actively participate (Das, 2020a). Before bringing out a content management system, the organizations must have a clear goal and plan in mind. Despite the complexity of digital transformation, it can be very beneficial for an organization to take the necessary steps to become more digitally aware and successful (Das, 2021c). Doing so can help the organization stand out and become a leader in the industry.

Identifying the DNA of Digitalization

The days of incremental improvement in digital enablement are over. Instead, it is time to go big. This chapter follows the research conducted by MIT Sloan Management Review and Deloitte to explore the H.R.'s role in digital transformation. This chapter discussed the traits that make up digital DNA (Renjen, 2021; Sallomi, 2020). Some of the characteristics that make up a digital DNA include continuous innovation, collaborative work, and collaboration with other organizations.

Technology as a Driving Force

As technology changes the way work is done, it is necessary to redesign the activities and processes used to perform them (Mondal, 2021). The new technology involves finding the best combination of humans and automation. High-volume, repetitive,

and data-intensive tasks are being outsourced (Duy et al., 2020). Instead of being bound by rules and regulations, they can focus on more strategic activities.

Leadership Network

Drive work through cross-functional teams that are agile and have a low hierarchy by developing leaders with different skills sets of leadership. A great leader will remain the same. A great leader will have to convince skeptical individuals that their ideas are worth pursuing in the new digital environment (Van et al., 2020).

Digitally Superior Workforce

The future of work depends on introducing new talent categories that are more open and collaborative (Siri et al., 2020). They should also develop and acquire the skills needed to support the evolving needs of their employees. The new process includes employees with different skills sets and levels of experience (Singh et al., 2020).

Experience as the Vital Ingredient for Effective Employee

This whole process will create a truly immersive work experience by combining the physical and virtual worlds (Sharma & Das, 2020). Putting these drivers into action requires a high-impact H.R. partnership and a marketing approach to manage the evolution (Das, 2020b). Human resources should play a critical role in the growth of any digital organization. It should also be a part of its cultural behaviors and consumer-grade experiences (Mondal, 2020b).

Digitalized Human Resources for Efficient Employee

A successful digital strategy should start with a design thinking approach around the customer and the employees (Nadanyiova & Das, 2020). This approach should enable the organization to identify and address the various factors that affect the workers' development (Mohanty et al., 2019). Having the right people in place can also help accelerate the digital organization's evolution (Behera et al., 2019). It should also be part of the strategy's marketing mix. Putting these drivers into action requires a high-caliber H.R. partnership and a marketing strategy designed to manage the evolution (Gupta et al., 2019). Human resources should play a vital role in developing any digital organization. Human resources should also be part of the strategy

that enables the organization to thrive (Singh & Das, 2018). It should also create consumer-grade experiences to help the organization grow (Jain et al., 2018). To do this, enterprises should use analytics to identify and address the key factors that affect workforce development. Using analytics to identify and address the various factors that affect the development of the workforce is a vital part of the strategy (Mondal et al., 2017). It can help accelerate business by developing an insight-driven approach that enables enterprises to navigate the human factors affecting the workforce (Das & Mondal, 2016). The right digital system helps build a robust and continuous learning environment. It encourages employees to think digitally.

Digital Resource

Leaders committed to digital transformation cultivate a culture of collaboration across departments and functions so that smart ideas and tools are not limited to one area of the organization ("Small and Medium-Sized Enterprises: Engines of the Digital Revolution," 2019). They plan and execute their digital strategy in all its forms. The complexity of technology leaders' digital transformation challenges is immense (Hwang & Kim, 2021). They have been asked to support various new pressures, such as providing better connectivity and collaboration capabilities to help a slew of new demands (Barden, 2018). Although there is no proven strategy to deal with the COVID-19 pandemic, technology leaders should plan their response in three phases (Darun et al., 2019). They will then transition into the subsequent recovery, thrive, and next to regular stages. Due to the complexity of the pandemic, the recovery phase of COVID-19 will require the deployment of unprecedented levels of communication and collaboration (Syreyshchikova et al., 2020). The new standard step will be a challenging and possibly protracted period. Many technology leaders will also have to make significant changes in their operations to prepare for the inevitable impact of the pandemic (Dantas & Soares, 2021). Some of their pertinent objectives are as follows.

a. To prepare for the inevitable disruptions, leaders must support and improve the collaboration experience for their employees.
b. To support the new work environment, leaders must secure technology for enabling their employees towards seamless collaboration with others.
c. Leaders must also build effective command centers to manage the various phases of the pandemic.

As organizations recover from the recession, they must keep an eye on the future to prepare for changes (Duman & Das, 2021). When the pandemic eventually subsides, the quickly fixed methods and untested process implemented solutions may not withstand the rigorous testing (Gladys Khoase et al., 2020). Leaders must then focus on stabilizing and strengthening the various solutions and strategies rushed into action (Tawaststjerna & Olander, 2021). Technology leaders can help prepare for the

changes that will happen in the future by focusing on three key areas. Some of the critical steps which technology leaders may plan are as follows.

1. Enhance digital innovation and presence.
2. Post-modernize your operations and build a trusted technology ecosystem.
3. Scale automation pilots: Create a resilient and adaptable technology infrastructure.
4. Reallocate tech funding for agility. Learn about people inside out.
5. Post-modernize your operations and build a trusted technology ecosystem.
6. Reimagine the customer experience and connect it to the digital world.
7. Creating a link between the physical and virtual worlds can create new value.
8. Trust a critical business value. Position yourself to thrive in the future by shaping the "next to normal."

New Supply Chain and Climate Change Effects Due to COVID-19

The effects of COVID-19 have affected the supply chain and posed various inflationary risks to products. As a result, many companies have focused on assessing and de-risking their entire value chain. The potential reduction in carbon emissions has led to a renewed focus on sustainable practices. Despite the current challenges, COVID-19 accelerated digital transformation in I.T. services, Hardware/software, Semiconductors, and Networking activities. This chapter explores the multiple changes in the supply chain and the impact of climate change on businesses. The consensus is that COVID-19 will continue to be a prominent global trend a few more times than predicted previously.

The COVID-19 economic downturn is a complex and unpredictable event. It can affect the entire economy and its various moving components. During the 2008 financial crisis—the start of the digital age—the tech companies that were able to capitalize on the opportunity were able to execute their plans successfully. Many companies waited for the recovery to happen, while the others were focused on delivering an exceptional digital experience to their customers. After the crisis, these companies started to grow accelerated, exceeding expectations and achieving impressive customer growth rates.

Climate change was also an important topic at this moment, with prominent world leaders emphasizing the importance of working together to mitigate and adapt to the effects of climate change. Many of them also noted the importance of transitioning to renewable energy. There were also various debates about the future of green technologies, such as how they will transform industries and be funded. Due to the complexity of the task involved in launching and scaling a green tech company, it can be difficult for startups to commercialize these ideas successfully during and after COVID-19. COVID-19 encourages companies to integrate sustainability into their digital transformation plans so that the new enterprises can survive and sustain

in the long run. This digital sustainability can be achieved by following two critical integrations such as.

1. Digital sustainability can be done using data-sharing and tracking platforms that help companies reduce their environmental impacts.
2. Data-sharing and tracking platforms can help companies reduce their environmental impacts without causing them to become more costly.

In 2020, most companies accelerated their digital transformation efforts. However, how many digital techno-leaders could sustain and grow their businesses long-term? Maintaining and growing a sustainable business is often linked to higher operational performance and better business success. It was the case when the COVID-19 pandemic emerged. According to the World Economic Forum, climate action failure is considered the second most imminent threat to our society. Society must support sustainable businesses and develop future environmental sustainability. Companies must align their goals and decisions with data-driven initiatives to meet expectations. Sustainable development goals are the essential things enterprises can aim at during and post-COVID-19.

The rapid emergence and evolution of COVID-19 have allowed us to rethink how technology can make more sustainable decisions. For instance, by 2030, the value of data collected by artificial intelligence in the design of waste disposal could be $127 billion annually.

Using environmental factors as input into a company's decision-making process can rethink how business models are built. New models such as product-as-a-service and leasing are being introduced to improve the efficiency of operations. It is why many service-providing enterprises are shifting their focus away from traditional product-only processes to a platform-as-service provider. Customers are looking for ways to reduce their energy and capital expenditures by taking advantage of cloud computing and its associated benefits. Digital enterprises are also looking to minimize their carbon footprint by consuming less energy and operating their infrastructure as a service. With the help of blockchain, many digital enterprises have been able to track the movement of its critical ingredients throughout their supply chain.

Consumers are expecting companies to be more concerned about the sustainable environment. It is especially true for younger generations. Both employees and potential employees expect companies to be more sustainable. It will help them capitalize on their opportunities in 2022. It helps them retain and attract top talent. Digital leaders need to adopt a strategy that focuses on sustainable business practices to avoid being left behind in the digital transformation race. It will help them realize their goals and position themselves for success in 2022.

During COVID-19, many small-medium enterprises were being taken over by larger digital enterprises. So, after acquiring these smaller entities, their executives found themselves in a place of indecision. But, due to the more prominent company's proactive planning, the executives of smaller ones are now focused on the most critical capabilities: workforce safety and security, enterprise agility, and cost management. As executives prepare for the uncertain future, they shift their top priority. Leaders believe that continuous digital transformation is the essential benefit their

organizations can cash on. However, they are not focusing on the right relationships with their customers during the pandemic. According to executives, the essential use of continuous digital transformation is more focused on workforce resilience and competitiveness. The complexity of today's world has caused business leaders to reassess their expectations. In response, their perspectives have been re-examined. The rapid pace of change and unrelenting disruption has swept away old barriers during the pandemic.

COVID-19 has accelerated digital transformation in more than 60% of all organizations worldwide (Das, 2021a). This study identifies a few critical insights that business leaders can use to guide their organizations through this transformative period. The wisdom in this study help business leaders recognize the various factors shaping their organizations' digital transformation. They also provide a playbook for leaders who are ready to take on the changes in their industries. Implementation of game-time pivots, such as the rise of distributed workforces and the remaking of supply chains, are authentic and potentially disrupt industries. The pace of transformational changes has become the norm, and organizations that can adapt are more likely to succeed in this environment. The COVID-19 pandemic is accelerating digital transformation faster than most organizations expected.

Before the pandemic, many organizations were worried about their ability to manage the complexity of the digital transformation process. However, during the crisis, those fears were largely unfounded. After years of being afraid to rely on technology, leaders are now more confident in their capabilities. New platforms' rapid emergence and adoption helped organizations quickly implement digital transformation. Although new technology was not immediately available, the existing tools were used to their fullest potential. Those enterprises that started immediately saw immediate results. The pandemic has completely changed the way businesses operate globally.

Findings and Discussion

According to our survey, over 55% of organizations have made permanent changes to their strategy. A majority of responding enterprises of the study stated that they see a shift toward more cloud-based processes and management. Following the pandemic, many organizations made significant changes. They shifted to a more cloud-based approach to operations. Sixty percent of the respondents said they used automated process acceleration. After years of being convinced of the capabilities of technology, executives are planning to invest in various new technologies such as artificial intelligence (A.I.), blockchain, and cloud to improve their organizations' operations and ward off COVID-19. The key to success is ensuring that the people in your organization are equipped with the necessary skills and capabilities to handle the changes brought about by new technologies. While many of these digital transformation goals focus on increasing the number of tech-related competencies, the human element is still the key to success (Van et al., 2020). According to our observation during the

study, expected growth is due to the development of skilled workers. The study found that the most robust growth for an organization is attributed to its employees and customers.

Despite the various factors that have eluded techno-leaders, more than three-fourths of them believe that the changes caused by COVID-19 will continue affecting the way customers behave. It is where customer experience management is expected to become a top priority. Almost three-fourths of executives predict changes in customer behavior to continue following COVID-19. Despite this, 60% of them stated that they would use AI-based tools to improve the customer experience. If digital transformation is their primary goal, how do they plan to improve the customer experience? Most executives believe that employee satisfaction is their top priority. They acknowledge that working under stress has caused their employees to suffer. If they are not convinced of this, they are failing their employees. A large majority of respondents stated that they would start adopting a more cloud-based approach to their business operations. The COVID-19 survey revealed that they have adjusted their approach to change management and are now focusing on cloud-based activities. Following the pandemic, many organizations shifted to a more cloud-based approach. Almost 70% of the respondents stated implementing an automated process acceleration system. They also indicated that they would be increasing their investments in digital transformation. They noted that they would start investing in artificial intelligence, blockchain, and the Internet of Things to recover from the COVID-19 crisis.

Despite the number of employees who believe that their immediate authority genuinely cares about their well-being, only half of them think that their employers' support and training efforts are practical. It suggests that leaders should start taking the initiative to improve their employees' well-being. The trust gap between employees and their employers is not simply a matter of perception. Since the pandemic started, about 22% of employees have left their job. It indicates that the employer's commitment to human resources is being questioned. The rise of artificial intelligence and automation has reduced the number of people needed to do the work. It also caused many companies to focus on cost-cutting instead of employee well-being. The stress caused by the pandemic has affected the way executives define their company's vision. As a result, they tend to focus on the current priority instead of developing a new one. The shifts in the leaders' priorities have caused them to focus on their internal operations instead of improving the customer experience.

Over the next two years till 2023, leaders plan to improve their organizations' capabilities over external growth. Most new entrants are focused on addressing these areas of concern. Out of all the digital enterprises considered for the study, eighty-seven percent focus on cost management, eighty-seven percent concentrate on the flexibility of operation. Eighty-six percent believe cash flow and liquidity are their priority, and seventy-six percent of all enterprises prioritize cybersecurity. On the other hand, seventy-five percent of all organizations focus on information technology (I.T.) resiliency, and sixty-five percent of all leaders believe in the internet of things (IoT), cloud computing, and flexibility. Fifty-eight percent think of new product development as a priority, and fifty-two percent emphasize new market entrants.

According to the survey results, we can see corporate priorities have shifted to include safety and security, crisis management, and cash-flow management. Most leaders also expect these areas to become more critical in the future. For the respondents, cost control is also becoming more urgent. They also noted that resiliency is becoming more critical. Supply-chain reliability is also becoming an increasingly important factor. Platform-based businesses are expected to be the norm in the next couple of years. Over ninety percent of industries also have concerns about cyber security. AI-powered solutions are also likely to improve this area's performance. The COVID-19 pandemic has not affected all industries and organizations. It is because the various sectors have different needs and want. Some economists refer to this environment as a K-shaped consumer environment, where they thrive while the others languish. The stock market's bifurcation is just one example of how the various sectors have different needs and want.

Most businesses require more than just scale to thrive. They also need to work together to create ecosystems and solve real problems. Health-related industries, such as hospitals and healthcare, were expected to be the most likely winners from the pandemic. Entertainment, telecommunications, and media were also expected to benefit from the rise of home-based orders. However, these industries were expected to lose to the effects of the pandemic. Over the next two years, leaders of enterprises expect the number of partners and collaborations to increase significantly. Within sectors, the expectation is that the broader reach of the pandemic will help define winners.

Flexibility is not a guarantee of success, and large enterprises have successfully operated in volatile industries. Large enterprises that can manage agility have been the ones that have successfully held steady in a volatile sector. Large enterprises that can handle volatility have outperformed in the past. Along with this, there has been an increased appreciation for employees' contributions. Due to the importance of growth and competitiveness, organizations have a renewed focus on managing their expansion and development. This explains why digital transformation is not expected to have the same positive impact on customer service. A renewed focus on these two factors requires organizations to re-evaluate their operations and plans for new ventures. Doing so will require them to keep their goals in mind and approve their resources according to their needs. If the goal is to improve competitiveness, then the process of allocating and approving resources will have to be thoroughly reviewed.

Before the coronavirus, sustainable development focused on addressing consumers' environmental concerns. The demand for products and brands that are authentic was driving regulators' attention. They were increasingly looking for products and brands that were authentic. People avoided public places during the coronavirus outbreak and used more individual packaging. Since they were afraid of getting sick, many people sent their goods to their homes. Despite the coronavirus outbreak, the interest in environmental issues remains strong. It has resulted in the use of more hazardous products. As corporations try to improve their operations through various sustainable measures, they face new regulations and standards. How can we improve the efficiency and effectiveness of our supply chains? Due to the

rise of interest in sustainable issues, many companies have considered meeting this standard. Doing so will require adopting new materials and processes and improving efficiency and data collection. Leaders must step up their game to optimize supply chains through more sophisticated questions.

The pandemic served as a wake-up call that the unexpected and plausible are more prevalent than we thought. It has caused many companies to rethink their operations and strategies. It has also provided some lucky individuals with an unexpected windfall. Although the pandemic may have caused changes in design, processes, and financial priorities, these are unavoidable. The rapid pace of digital transformation and cloud adoption is expected to accelerate in the next couple of years. It is an opportunity for executives to manage complexity and drive business competitiveness. While others wait for the normal to return, it presents an opportunity for executives to work complexly and develop digital transformation strategies. The risks and opportunities posed by the pandemic are too significant to allow people to return to their everyday lives. One of the most significant barriers to progress is organizational complexity.

According to data, employee burnout contributes to the rise of complexity. It can be triggered by the overload of work that employees feel due to the complexity of their jobs. To thrive in the new environment, organizations must act quickly and decisively. It all starts with ensuring that the customers get priority and trust, which they deserve. They must work in three critical areas: strategy, operations, and finance. Work environments should enable people to lead and engage in new ways. They should also support their mental health and well-being. Mental health and well-being should also be prioritized. Doing so can help build trust and attract the right talent.

1. Use artificial intelligence and other technologies to make processes more intelligent.
2. Companies should adopt a continuous change strategy and minimize risk to prepare for uncertainties and opportunities.

Implementations and Suggestions Towards Restructuring of Digital Enterprises for Future

The discussions and findings of this chapter suggested that there can be a tricyclic framework for digital transformation in the prevailing pandemic. In the first frame, there is **RETORT**, the second is **RECUPERATE**, and the third is **RISE**. In this 3-R frame, digital enterprises will cyclically move from one aspect to another. In the first frame, enterprises deal with the present crisis and maintain continuity, which means they must find ways to retort. Then in the second frame, digital enterprises will learn and evolve stronger to recuperate from the initial crisis. In the last frame, enterprises will define and shape new normal operations to ultimately come out of the situation and rise. Figure 1.1 represents this 3R or tricyclic framework.

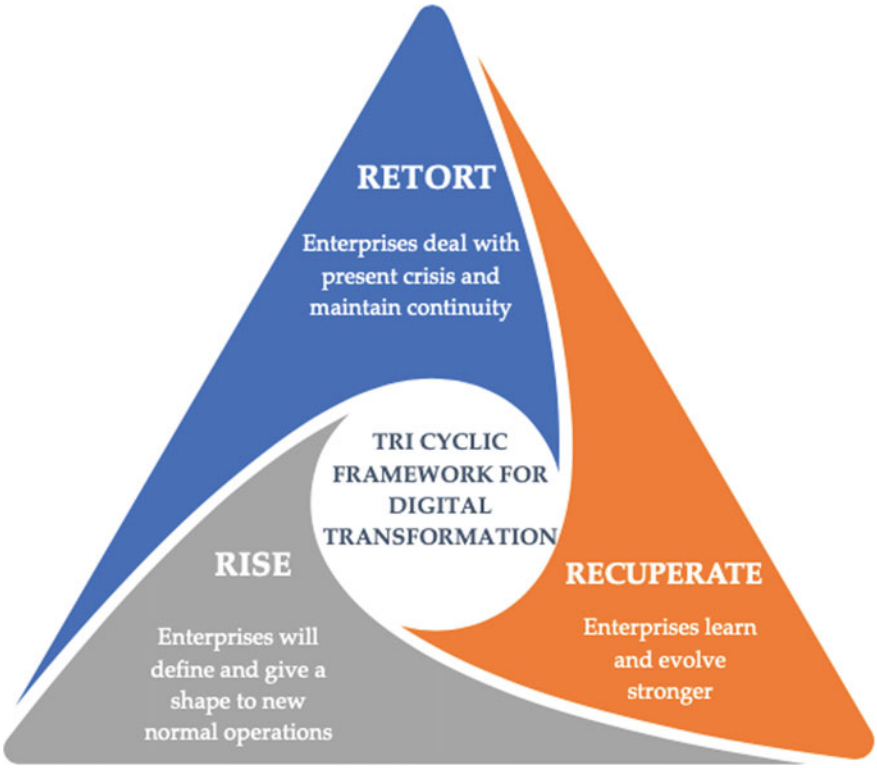

Fig. 1.1 Tricyclic framework for digital transformation (*Source* Authors' research)

Retort: The coronavirus pandemic caused by COVID-19 has surpassed other recent epidemics. It has caused significant economic damage and killed millions of people. Although the impact of the COVID-19 outbreak varies depending on the industry and geographic region, we believe that the five qualities of resilient leadership are essential to successful leaders. Reinforcement of resilient leaders is a process that involves identifying five qualities that distinguish individuals from failures during a crisis. This step is followed by developing a strategy and implementing actions geared toward addressing three dimensions. As business leaders brace for the uncertainties await them, they are also looking for practical solutions to address their most pressing concerns. In this chapter, the authors try to provide practical guidance on implementing resilient leadership strategies and actions in five steps.

1. Design from the heart and the head are the two critical components of resilient leadership. Leaders who can manage uncertainty and respond effectively to crises are those who can both empathize with their employees and customers.
2. Resilient leaders can handle the challenges of today's world while still creating opportunities for tomorrow.

3. Believing in the importance of speed over elegance, resilient leaders act with courage.
4. Believing in the power of the narrative, resilient leaders seize the opportunity to tell a compelling story while being transparent about their current realities.
5. Resilient leaders are focused on the long-term horizon, anticipating the emergence of new business models that will transform the world.

Recuperate: Leaders of resilient organizations recognize that recovery is a journey that can be utilized for the organization's benefit. Five critical steps will guide the organization's journey from recovery to success.

1. Understand the required mindset shift: The concept of the recovery period shifts from an abrupt and unpredictable phase to a more settled yet still uncomfortable state of mind.
2. Identify and navigate the uncertainties and implications: The focus of leadership shifts from an inward-looking approach to a market-facing one. Leaders should also consider the destination in terms of stakeholder outcomes.
3. Embed trust as the catalyst to recovery: The goal of recovery management is to manage the transition from the crisis to the organization's restoration.
4. Define the implementation and launch recuperation: This process involves developing a recovery strategy that addresses the various impacts of the crisis on the organization. This strategy should also consider the different financial resources needed to support the operations.
5. Imbibe learning other's successes: The recovery mindset shifts from a reactive mode to a more optimistic one. Leaders should adopt a strategy that confidently addresses the future.

Rise: The COVID-19 pandemic has caused unprecedented damage to various sectors and human communities. It has also pushed organizations and individuals into uncharted territories. Technology leaders are no exception, as they have had to grapple with many of the most critical issues facing organizations today. Some of these include the rapid emergence and evolution of digital channels, the need for increased collaboration capabilities, and the complexity of their infrastructures. So, to rise, enterprises must leverage technology in a more significant way which must be sustainable and scalable at the same time. Here authors tried to present this stage in the following steps as follows.

1. Quick rise to fasten recovery and achieve sustainable growth: Due to the complexity of the COVID-19 pandemic, the recovery phase will require an orchestration of various configurations and changes in existing setups to rise. This transition will need many technology leaders to take stock of their past actions and make necessary adjustments. The leaders must support and enhance the productivity and experience of the workforce through secure technology and solutions that support the new work environment.
2. Stable operations to facilitate resilience: The world will eventually reopen. While quick fixes may be implemented to get back to normal, they may not

stand up to rigorous tests. To get back to normal, technology leaders need to step back and analyze their solutions and processes and develop a strategy for their deployment. Digital leaders must scale automation pilots, build a resilient I.T. architecture, improve customer support operations, and more.

3. Reshaping the new normal: As organizations recover from the pandemic, they should also look at the future competitive landscape to rise. While it is likely that many changes will occur, we already see signs of seismic shifts in society and behavior. Digital leaders must plan to reimagine the way customers experience goods and services by focusing on human-centric approaches.

Conclusion

The COVID-19 pandemic has highlighted the various ways that organizations could have been affected by the pandemic. Video conferences and remote monitoring have been around for a decade, but few companies are rushing to implement them. Since people tend to adopt until the need is urgent, this pandemic has allowed them to change their attitudes. COVID-19 provided an opportunity to learn, but it also likely won't be a long-term memory. Instead, take advantage of it and tell your people what they need to be prepared for the next crisis. There are three phases to consider when transforming a company: the planning phase, the journey, and the lack of knowledge. This chapter aims to reimagine the work environment in the future and how it will change as technology is used. It involves identifying the most effective ways to use automation and human skills to improve efficiency and minimize risk. Instead of focusing on repetitive tasks, humans are freed up to engage in activities that provide value-add or strategic activities. Enterprises must drive work through cross-functional and agile teams with limited hierarchy. This requires different leadership skills. As organizations embark on a digital transformation journey, they need to identify and weave key digital DNA traits to accelerate their progress. Here, the guide will help determine the most critical digital characteristics and help organizations start. The future of work requires a new approach to talent management, including establishing a more open talent economy. This includes identifying which skills are needed to build and adopt a more flexible workforce. In an increasingly connected world, organizations are starting to harness the power of experience design to drive bottom-line results. By creating consumer-grade experiences, they aim to improve the productivity and performance of their workforces. Those who can improve their workforces' productivity and engagement will see significant rewards. The future of work also involves introducing new talent categories such as freelancers, gig, and private labels. To achieve this, organizations should start by understanding which skills are needed and which can be bought or rented. Creating a change management culture is an integral part of any digital transformation strategy. This process should identify the right tools and methods to help employees develop and evolve.

References

Barden, O. (2018). Researching new literacies. Design, theory and data in sociocultural investigation (M. Knobel & C. Lankshear, Eds.) (2017) Peter Lang. ISBN: 978-1-4331-3145-5, £44.00 (paperback). *Literacy, 53*(2), 112. https://doi.org/10.1111/lit.12160

Behera, M., Dash, M., Mohanty, A. K., & Das, S. (2019). Entrepreneurial ecosystem: A geographical upliftment. *Revista Espacios, 40*, 26–36. http://www.revistaespacios.com/a19v40n01/19400126.html

Dantas, T., & Soares, S. (2021). Systematic literature review on the application of life cycle sustainability assessment in the energy sector. *Environment, Development and Sustainability*. https://doi.org/10.1007/s10668-021-01559-x

Darun, M., Palm, D., Athinarayanan, R., Hummel, V., & von Leipzig, K. (2019). The learning factory—A new stimulus to enhance international collaboration. *Procedia Manufacturing, 31*, 290–295. https://doi.org/10.1016/j.promfg.2019.03.046

Das, S. (2020a). *Media impact of advertising on consumer buying behaviour a comparative study of different media.* Shiksha o Anusandhan University. http://hdl.handle.net/10603/273691

Das, S. (2020b). Innovations in digital banking service brand equity and millennial consumerism. In *Digital transformation and innovative services for business and learning* (pp. 62–79). IGI Global. https://doi.org/10.4018/978-1-7998-5175-2.ch004

Das, S. (2021a). *Digital entertainment: The next evolution in service sector*. Springer Nature. https://doi.org/10.1007/978-981-15-9724-4. Print ISBN978-981-15-9723-7. Online ISBN978-981-15-9724-4

Das, S. (2021b). *Search engine optimization and marketing: A recipe for success in digital marketing* (1st ed.). CRC Press. https://doi.org/10.1201/9780429298509

Das, S. (2021c) A systematic study of integrated marketing communication and content management system for millennial consumers. In *Innovations in digital branding and content marketing* (pp. 91–112). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch005

Das, S., & Mondal, S. (2016). *Yours digitally: Patanjali.* Available at SSRN 2737299.

Duman, Ü. O., & Das, S. (2021). The dynamic rise of digital brands' market mavens in digital entertainment: A complete know how for curious customers. In *Digital Entertainment* (pp. 147–172). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_8

Duy, N. T., Mondal, S. R., Van, N. T. T., Dzung, P. T., Minh, D. X. H., & Das, S. (2020). A study on the role of web 4.0 and 5.0 in the sustainable tourism ecosystem of Ho Chi Minh City, Vietnam. *Sustainability, 12*(17), 7140. https://doi.org/10.3390/su12177140

Gladys Khoase, R., Derera, E., McArthur, B., & Ndayizigamiye, P. (2020). Barriers to startup and sustainable growth of SMMEs: A comparative study between South Africa and Lesotho. *African Journal of Business and Economic Research, 15*(2), 137–157. https://doi.org/10.31920/1750-4562/2020/V15n2a7

Gupta, D. K., Jena, D., Samantaray, A. K., & Das, S. (2019). HRD climate in selected public sector banks in India. *Revista Espacios, 40*(11).

Hwang, W. S., & Kim, H. S. (2021). Does the adoption of emerging technologies improve technical efficiency? Evidence from Korean manufacturing SMEs. *Small Business Economics*. https://doi.org/10.1007/s11187-021-00554-w

Jain, S., Jain V., & Das, S. (2018). Relationship analysis between emotional intelligence and service quality with special evidences from Indian banking sector. *Revista Espacios, 39*(33).

Mohanty, P. C., Dash, M., Dash, M., & Das, S. (2019). A study on factors influencing training effectiveness. *Revista Espacios, 40*, 7–15. http://www.revistaespacios.com/a19v40n02/19400207.html

Mondal, S. R. (2020a). *Factors influencing store image loyalty and satisfaction from customer perspective an empirical study in retail sector*. Shiksha o Anusandhan University. http://hdl.handle.net/10603/273688

Mondal, S. R. (2020b). A systematic study for digital innovation in management education: An integrated approach towards problem-based learning in Vietnam. In *Digital innovations for customer*

engagement, management, and organizational improvement (pp. 104–120). IGI Global. https://doi.org/10.4018/978-1-7998-5171-4.ch006

Mondal, S. R. (2021) A systematic study of new age consumer engagement and exploration for digital entertainment for over-the-top platforms in various digital media. In *Innovations in digital branding and content marketing* (pp. 113–133). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch006

Mondal, S. R., & Das, S. (2021). Examining diabetic subjects on their correlation with TTH and CAD: A statistical approach on exploratory results. In *Machine learning and the internet of medical things in healthcare* (pp. 153–177). Academic Press. https://doi.org/10.1016/B978-0-12-821229-5.00007-0

Mondal, S. R., Das, S., Musunuru, K., & Dash, M. (2017). Study on the factors affecting customer purchase activity in retail stores by confirmatory factor analysis. *Revista Espacios, 38*(61).

Mondal, S. R., Virgilio, F. D., & Das, S. (2022). *H.R. analytics and digital H.R. practices*. Springer. https://doi.org/10.1007/978-981-16-7099-2

Nadanyiova, M., & Das, S. (2020). Millennials as a target segment of socially responsible communication within the business strategy. *Littera Scripta, 13*(1), 119–134. https://doi.org/10.36708/Littera_Scripta2020/1/8

Ravi, S., & Mondal, S. R. (2021). Digital entertainment based do it yourself content & advertisement as a factor of driving force for trust & customer patronage. In *Digital entertainment* (pp. 127–146). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_7

Renjen, P. (2020, December 2). *The journey of resilient leadership*. Deloitte Insights. Retrieved January 11, 2022, from https://www2.deloitte.com/global/en/insights/economy/covid-19/how-leaders-help-business-thrive-post-covid-and-beyond.html

Renjen, P. (2021, November 22). *Building the resilient organization*. Deloitte Insights. Retrieved January 11, 2022, from https://www2.deloitte.com/global/en/insights/topics/strategy/characteristics-resilient-organizations.html

Sallomi, P. (2020, March 25). *Connecting for a resilient world*. Deloitte. Retrieved January 11, 2022, from https://www2.deloitte.com/global/en/pages/about-deloitte/articles/connecting-for-a-resilient-world.html

Sharma, E., & Das, S. (2020). Measuring impact of Indian ports on environment and effectiveness of remedial measures towards environmental pollution. *International Journal of Environment and Waste Management, 25*(3), 356–380. https://doi.org/10.1504/IJEWM.2019.10021787

Sharma, E., & Das, S. (2021). Integrated model for women empowerment in rural India. *Journal of International Development*, 1–18. https://doi.org/10.1002/jid.3539

Sharma, E., Nigam, N., & Das, S. (2020). Measuring gap in expected and perceived quality of ICT enabled customer services: A systematic study of top ten retailers of India. *International Journal of Applied Systemic Studies, 9*(2), 159–184. https://doi.org/10.1504/ijass.2020.113260

Singh, L. B., Mondal, S. R., & Das, S. (2020). Human resource practices & their observed significance for Indian SMEs. *Revista Espacios, 41*(07). http://www.revistaespacios.com/a20v41n07/20410715.html

Singh, S., & Das, S. (2018). Impact of post-merger and acquisition activities on the financial performance of banks: A study of Indian private sector and public sector banks. *Revista Espacios Magazine, 39*(26), 25.

Siri, R., & Das, S. (2021). A study on processing of information storage & use of new age consumers in digital wellness sector through story telling & creating interest. In *Digital entertainment* (pp. 45–63). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_3

Siri, R., Mondal, S. R., & Das, S. (2020). Hydropower: A renewable energy resource for sustainability in terms of climate change and environmental protection. In *The handbook of environmental chemistry*. Springer. https://doi.org/10.1007/698_2020_635

Small and medium-sized enterprises: Engines of the digital revolution. (2019). *International Trade Forum*, *2019*(1), 12–13. https://doi.org/10.18356/15645304-2019-1-5

Syreyshchikova, N. V., Pimenov, D. Y., Mikolajczyk, T., & Moldovan, L. (2020). Automation of production activities of an industrial enterprise based on the ERP system. *Procedia Manufacturing, 46*, 525–532. https://doi.org/10.1016/j.promfg.2020.03.075

Tawaststjerna, T., & Olander, H. (2021). Managing digital transformation in digital business ecosystems. *International Journal of Innovation Management*. https://doi.org/10.1142/s136391962140003x

Tiwari, M., & Mondal, S. R. (2022). Technological dynamism of workforce management for effective education service delivery during and after COVID-19. In *H.R. analytics and digital H.R. practices* (pp. 199–215). Palgrave Macmillan. https://doi.org/10.1007/978-981-16-7099-2_8

Van, N. T. T., Vrana, V., Duy, N. T., Minh, D. X. H., Dzung, P. T., Mondal, S. R., & Das, S. (2020). The role of human-machine interactive devices for post-COVID-19 innovative sustainable tourism in Ho Chi Minh City, Vietnam. *Sustainability, 12*(22), 9523. https://doi.org/10.3390/su12229523

Yegen, C., & Mondal, S. R. (2021). Sharenting: A new paradigm of digital entertainment of new age parenting and social media. In *Digital entertainment* (pp. 213–231). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_11

Nguyen Ngoc-Vinh is working as Associate Professor in Institute of Development Economics Research, University of Economics, Viet Nam. His research interests lie with Sustainable living, financial inclusions of digital enterprises, and digital innovations.

Pham Tien-Dung is working as PhD Research Scholar**,** Institute of Development Economics Research, University of Economics, Viet Nam. His research areas are digitalization efficacy, digital transformation, managerial evolution, and digital innovations.

Subhankar Das (Academician, Researcher, Author, Writer, Blogger, Data Science trainer, Social Media Marketing Consultant) received his Ph.D. in Social Media Advertisement and Media Planning. He has 12+ years of teaching and research experience. He is currently associated as senior research fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam. He has published 20+ Research Papers in various International Referred Journals (Scopus, Thomson Reuters, SSCI, SCIE).

Chapter 2
Phases of Possible Recovery of Digital Enterprises in New Normal Business for Living with COVID-19 Times: Opportunities for a New Era in Sustainable Development Goals

PHAM Tien-Dung, Jana Majerova, and Subhankar Das

Introduction

The immediate response phase of business is almost overdue to COVID-19 and its effect on different enterprises, and it's time for companies to rethink and act in a new way (Mondal et al., 2022). The global recession caused by the COVID-19 pandemic has stalled the recovery of many companies (Tiwari & Mondal, 2022). It is widely believed that businesses will take a long time to recover. From March 2020 to September 2021, most countries' governments implemented social distancing measures designed to prevent citizens from working in establishments considered essential to the country's development (Mondal & Das, 2021, 2021a, 2021b, 2021c). So that the authorities can increase immunization against COVID-19, these regulations require manufacturing companies to arrange for their employees to stay at their facilities (Sharma & Das, 2021). They also had to put work accommodations online (Das, 2021a). Even after the pandemic officially ends, it's still possible for businesses to remain vulnerable to unforeseen events (Siri & Das, 2021). Therefore, firms need to adopt a more resilient strategy. "New Normal" solutions help organizations improve their resiliency and sustainability simultaneously with keeping an eye

P. Tien-Dung · S. Das (✉)
Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam
e-mail: subhankardas@idr.edu.vn

P. Tien-Dung
e-mail: dungpt@ueh.edu.vn

J. Majerova
Department of Economics and Management, AMBIS University, Lindnerova 575/1, Prague, Czech Republic
e-mail: jana.majerova@ambis.cz

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_2

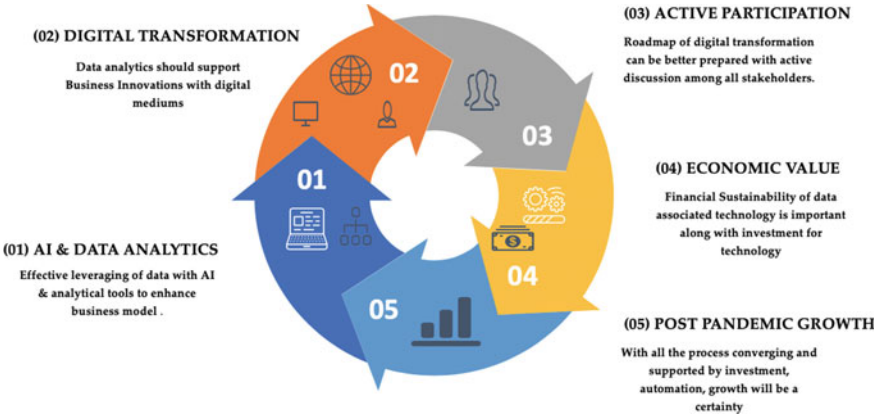

Fig. 2.1 Transformation process (*Source* Authors' conception)

on enhancing the economies around the world (Ravi & Mondal, 2021). The discussions of this chapter may help organizations develop and sustain their digital transformation strategies in the new era. The authors tried to explain the transformation process with five important parameters in Fig. 2.1.

Need of New Normal Strategies

Due to the emergence of digital transformation, businesses have been looking for ways to sustain themselves (Duman & Das, 2021, 2021a, 2021b, 2021c). At the same time, they are also looking for ways to improve their operations and minimize their expenses (Yegen & Mondal, 2021). Digital transformation has become a widely used concept in recent years. It has caused many companies to explore various ways of sustaining themselves. The New Normal Solutions encompass both digital and strategic solutions that help businesses adapt to the changes brought about by digital transformation (Das, 2021b). New Normal Solutions would help organizations achieve their goals by delivering measurable results focused on optimizing costs, increasing productivity, and reducing uncertainty (Sharma et al., 2020). The New Normal Solutions policies cover various aspects of an enterprise, such as strategy, process, rule, and customization for organization (Jain et al., 2018; Mondal, 2020a). These policies help enterprises implement strategies that help them maximize the benefits of the New Normal era. Each area will have a set of solutions that can be implemented separately or combined to help the organization achieve its goals (Das, 2020a; Mondal et al., 2017). For each of the main areas, the authors suggest various solutions to help organizations address their specific challenges in Fig. 2.2.

The New Normal Solutions merge into various activities within a business value chain. They can help organizations achieve goals and improve efficiency. In

Fig. 2.2 Challenge and Solutions for Digital enterprises affected by COVID-19 (*Source* Authors' conception)

Fig. 2.3, the authors tried to integrate all the prudent digital transformation activities and provide a much-needed competitive advantage for the organization. Since the outbreak of the COVID-19 pandemic, many companies have started to implement digital solutions to protect their employees and customers (Mondal, 2021). The rapid migration of digital technologies to address the pandemic will continue throughout the recovery period (Das, 2021c). One of the chief executives of a tech company stated that the rapid deployment of digital solutions had become a historical event. Some of the most important factors to consider when developing a New Normal strategy are Problem-solving mindsets for future uncertainties, attrition, or attraction

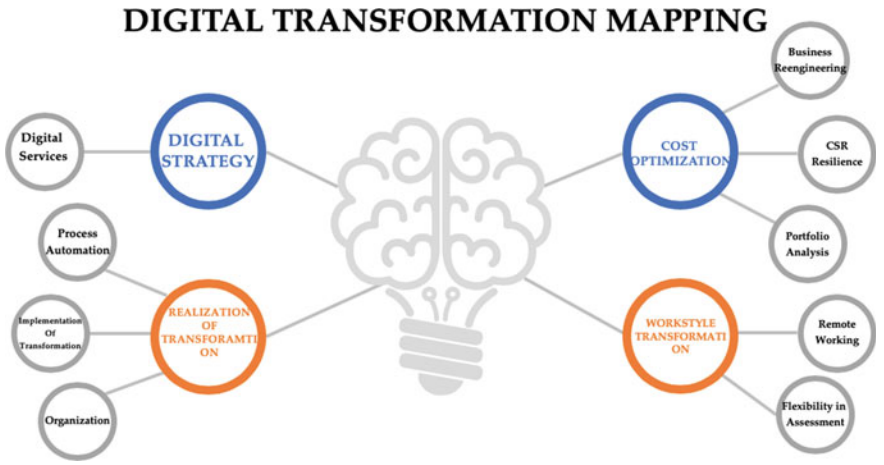

Fig. 2.3 Mapping of Digital Transformation (*Source* Authors' conception)

for stakeholders, business growth goal orientation, deployment of advanced analytics for business (Duy et al., 2020; Van et al., 2020).

Five years ago, digital adoption was still in its infancy (Singh et al., 2020; Siri et al., 2020). Today, it has vaulted to the forefront of mainstream business and consumer behavior (Sharma & Das, 2020). Banks have started moving to remote sales and service teams, and schools are now focusing on digital learning and teaching (Das & Mondal, 2016; Das, 2020b). Online ordering and delivery have become the primary business models for many grocery stores (Nadanyiova & Das, 2020). Online activities are now a norm of the digitalized lifestyle of all, where Schools have also shifted to digital classrooms. Doctors are now delivering telemedicine. Companies are also developing plans for supply chain transparency (Mohanty et al., 2019). As businesses around the world begin to reopen following the pandemic, they are faced with the challenge of transitioning back to a more stable environment (Behera et al., 2019; Gupta et al., 2019; Singh & Das, 2018).

Data and Digital Transformation

Three structural changes are shaping the way businesses operate. First, digital services have become more prevalent, and the rise of these is here to stay. About 75 percent of people who have never used digital channels said they would continue to do so when things return to normal. As digital platforms become more prevalent, companies must ensure that their channels are on par with their competitors. The digital laggards on using digital media will be severely affected by the changes coming their way. Companies that face the challenge of rightsizing their operations and capital are in a difficult situation as they try to manage an uneven recovery. As a result, many will rely on historic data and forecasts to make critical decisions. Due to the complexity of the rally, historical data and forecasts are not very useful in predicting where and how demand will emerge. In this aspect, new data will help predict new models that can provide new operational efficiency in decision-making. Today, many companies are adopting remote-working models to work seamlessly from anywhere. It allows them to respond to customer inquiries and organize their global workforce quickly. The rapid emergence and evolution of remote work have significantly impacted the way organizations perform their job. It is now considered a substantial change in business models.

Digital Recovery Model

Many companies have already migrated to digital, and employees work seamlessly from anywhere. Remote working allows companies to immediately hire and retain qualified individuals from anywhere in the world. They're also launching new initiatives such as artificial intelligence and analytics. Despite the changes that have already

occurred, most companies still have a long way to go before fully realizing their digital platforms' full potential. This digital recovery plan focuses on four key areas: accelerating digital investments, using new data and A.I., accelerating technology capabilities, and improving operational efficiency.

The Cynosure of Digital Reforms for Establishing Customer Satisfaction

Many companies are now accelerating their digital-first transformation. The e-commerce operation mixes various merchandising, marketing, and customer support. It delivered robust growth in its main market and improved its basket size by more than three times. Even with the rise of digital, companies still must consider other factors such as customer experience and safety. For instance, an automobile manufacturer can now offer various services and solutions to its customers, such as financing and servicing. In response, airlines are developing new methods and technologies to make the travel experience safer and more pleasant.

Implementation of Artificial Intelligence

Hundreds of decisions are made each day in an airline's operations. These decisions include which routes we should operate, how many meals we should order, and how many crew members we should have. Modern businesses have numerous forecasting and planning models that help guide their operations. These models will need to be reimplemented due to the massive changes caused by the pandemic. Like many companies, they had to rebuild their financial models after the 2008 financial crisis. The models will need to be reimplemented for various models, such as time-series, oil-price, and unemployment data.

As companies develop their predictive models, they must collaborate with other departments and organizations to create and implement new techniques and data sets. One example is a forecasting model that a car-parts supplier used to identify potential issues related to the logistics of its supplies. The model can then inform the supplier about the problems and find a solution. Aside from sales, other business areas can also benefit from developing more sophisticated models. For instance, a financial-services provider used A.I. to generate leads for its agents. The chief analytics officer should first map out the core models that support the company's operations. They should then prioritize these models based on their impact on the business. This assessment should be completed quickly to enable the team to implement changes immediately. After the situation stabilizes, business leaders should start developing next-generation models to handle the rapid changes brought about by the changing

environment. The more advanced organizations are already using machine-learning techniques to create new analytical models that can handle big data sets.

Digitalization of New Innovative Technologies

The program's complexity requires the ability to continuously improve development velocity and the capacity to rationalize I.T. cost structures. It can be done by freeing up resources and investing in new digital solutions. Some savings can be allocated to the software-development tooling and the technology stack. It can also be used to reduce the overall cost of operations. Combining these can help achieve about two-thirds of the program's potential. Some of these include reducing non-critical jobs and renegotiating vendor contracts. The right balance between rightsizing and investment capacity help in any scenario. One of the most critical features of modern technology environments is a cloud-based platform and an automated software-development pipeline (SDD). It can be quickly implemented and can help improve the velocity of development.

The first step in developing a plan is identifying the proper cost structure. Review the providers that are likely to provide the best value. Also, ensure that the teams are trained to operate in the new environment. It's time for companies to modernize their tech stack thoroughly. Most of them won't have the time or resources to implement a full-scale modernization project in 12 to 18 months. Instead, they can focus on implementing strategies that enable their agile teams to deliver better software. By focusing on the right tools and processes, leaders can double or even triple the development velocity of their teams in the shortest time frame. During the last sprint, it's essential to recruit more digital talent and accelerate the modernization of the entire organization. Cybersecurity is also an area that's on the minds of every organization.

Enhancement of Consortium and Their Efforts

The current crisis has caused organizations to adapt to new realities quickly, and it has opened eyes to new ways of working with their customers and suppliers. Many companies have already adopted agile methods, but few have successfully scaled them to the speed needed to drive the accelerated pace of the crisis. It is partly due to the time it took to develop a new product or service during the crisis. While many companies have agile teams in place, few have been able to scale them to the speed needed to handle the situation's complexity. The companies that have successfully adopted agile methods have shown that they can improve productivity and execution pace.

Standing up a digital factory is the best approach right now, as it allows organizations to quickly build and scale digital delivery. Many companies, such as banks and mining companies, have built digital factories to accelerate their digital delivery.

One of the global banks, for instance, has five such factories in the Americas. With remote working, organizations can move faster and access specialized expertise and labor pools. It also allows them to take advantage of new productivity opportunities. Mapping out the areas where digital execution velocity is needed and establishing plans for digital factories are the first steps in the strategy phase.

In parallel, identify the areas where remote work models could provide the most productivity benefits. Design the new models with the necessary changes to the operating model. In the third month, operationalize the latest designs. Banks, insurance companies, and pharmaceutical companies can easily do this step. Leaders committed to digital-led recovery must immediately reset their digital agendas and improve their decision-support systems to meet the demands of their customers. Chief level leaders (CEO, CFO, etc.) must set their digital targets and measure their progress against them. Getting there will require various digital obstacles, including parity or better across different digital channels.

Digital Transformation Action Plan for Sustainable Economies Post-Pandemic

Do traditional roles in the information technology (I.T.) function encourage innovation in the face of new forms of digital innovation? Through this study, the authors tried to understand how transformational I.T. leaders can bring about innovation in traditional and contemporary forms of I.T. The lack of formal I.T. governance practices can prevent leaders and transformational I.T. managers from innovating in both domains (Mahamat & Gurría, 2021). Stability cultures have a more substantial moderation effect than change cultures. This finding supports the distinction between digital innovation and traditional I.T. innovation. This chapter analyzes and presents policy messages that address the digital transformation, fostering inclusive and sustainable growth in the region. The coronavirus pandemic has severely asocioeconomic conditions globally (Apriliasari, 2021). It has highlighted the need for increased public services and institutions.

The global outbreak of the coronavirus has highlighted the need for regional development models to put the well-being of citizens at the center. The digital transformation offers new opportunities to address long-term development challenge. Digital disruption is a process that involves the reorganization of industries, the creation of new competitive conditions, and the redefinition of work (Isshiki, 2022). Through digital tools, enterprise their services, such as education and health. They can also help build a more credible and inclusive system. Countries must invest to realize the complete digital transformation of their economies. This transformation depends on the level of adoption of advanced technologies such as A.I., machine learning, use of IoT, and blockchain (Busso et al., 2021). A comprehensive and coordinated public policy effort is needed for topologies. These innovative applications help various national developmental schemes to come up with digital sustainable agendas

(Lázaro-Pérez et al., 2021). The coronavirus outbreak may have also strengthened the push for digital transformation reforms. Technologies have played a critical role in mitigating some of the impacts of the pandemic.

Effect of the Pandemic on Structural Upliftment

The coronavirus crisis has deeply affected the economies of many countries. It is expected to negatively affect the global economy in the next couple of years. The results of the coronavirus crisis on the global economy are severe and complex. They include a drop in commodity prices, a decline in tourism, and a decrease in remittances. The effects of the pandemic on the most vulnerable groups are severe and broad. Many of them are self-employed and are at risk of slipping into poverty. Before the outbreak, around 40% of the total workforce was not covered by any safety net. Since the beginning of the crisis, governments have worked on various measures to support the most vulnerable populations. These include providing unconditional cash transfers and establishing credit guarantees. Limited fiscal space constraints and the need for coordinated global actions constrain efforts to rebuild economies.

On the other hand, fiscal measures focused on improving public debt management are also needed. It can be done through various means, such as raising the public's tax transparency. The coronavirus outbreak has affected multiple countries in the region. As a result, they require policies that address their structural challenges.

The digital transformation has brought various opportunities and challenges to the world. While efforts are being made to seize these, implementing effective policies can help overcome COVID-19. The OECD's Going Digital project aims to create a digital economy that benefits society by enhancing access to digital technologies, strengthening their effectiveness, and devising quality jobs for all. Beyond a sectoral approach, efforts to go digital must also move beyond the traditional method. For the digital transformation to succeed, policymakers must also step up their efforts by developing effective instruments and procedures to support cross-border transactions.

Strategies to Increase Productivity Through Digital Transformation

The productivity gap between developed and developing nations has remained high throughout the last decades. Most countries' competitiveness is based on the abundance of natural resources or low-skilled labor. This structure produces goods with low added value and low export competitiveness. It is mainly due to the lack of technological and production diversification within the developed nations. Countries should start adopting policies that encourage digital transformation to improve their productivity. Some countries are even planning on introducing policies aimed

at developing artificial intelligence and advanced robots to enhance their productivity. Several countries have made efforts to promote the use of digital technologies. Despite the advantages of digital technologies, many businesses still have a hard time adopting them. This is because the process of digital entrepreneurship can be very challenging. Despite the potential of digital technology to improve productivity, the overall output has slowed down over the past decade. The impact of digital technologies on productivity is not automatic. It depends on various factors such as the availability and diffusion of digital technology, healthy business dynamism, and adequate competition in the digital economy.

The success of digital transformation strategies lies in having policies aligned with the needs of priority sectors. For instance, transport and skills are critical to developing digital skills. Adopting and adapting digital technologies require the proper skills and education for different roles and professions. One of the essential factors that digital transformation can do is improve the efficiency of transport networks. E-commerce platforms can help boost this process and make the logistics industry more competitive. Although digital technologies are not isolated from the operations of traditional businesses, their capabilities are also affected by the different characteristics of SMEs. Due to the varying factors of SMEs, the digital transformation could create productivity gaps that are limited to the size of the firm and other regions.

Despite the significant advances in recent years, the productivity gap between large and small businesses remains substantial. This gap can be attributed to the lack of fundamental technology adoption among SMEs. The crisis highlighted the lack of digitalization in industries. Despite this, digitalization is expected to play a vital role in the post-crisis economy as it will allow companies to improve decision-making processes and enhance business models. Aside from increasing the use of robots, industries should also improve the efficiency of their operations using artificial intelligence tools. The digital transformation is good for the business world as it allows companies to take advantage of the opportunities presented by this new environment. However, it is still necessary to ensure that the proper infrastructure and legal frameworks are in place to support the growth and development of the digital ecosystem. There is a massive potential for R&D and new business models to be developed as part of the digital transformation. Establishing policies that support this space can help foster this type of innovation.

The Digital Transformation Brings Holistic Development to Households

The digital transformation has a significant impact on how households live and work. It can help them improve their quality of life and employment opportunities. The digital transformation can also enhance the quality of jobs by making them more automated. It can also make them safer and more productive. The coronavirus

outbreak highlighted the importance of work-life balance. It allowed some individuals to work more freely and made workplaces safer. The COVID-19 induced crisis also highlighted the digital divide in the region, as many people are still not able to benefit from the digital economy. Those who cannot capitalize on digital tools are more susceptible to social, health, and economic issues. For instance, those with limited access to new technologies are more prone to experiencing long-term losses. Despite the progress made in terms of Internet access, digital gaps remain among households based on income. For instance, the percentage of homes that use the Internet in the wealthiest quintile is still higher than that of the poorest quintile.

The transition from declining industries to new job opportunities is crucial for workers. Updated social protection policies should help ensure better coverage for workers in non-standard employment, such as those in the gig economy. The coronavirus crisis highlighted the need for policies that support workers who risk losing their jobs due to the digital transformation. Many people are reluctant to learn new skills. Many people with low skills are unwilling to learn new skills due to their jobs being at risk of automation. Even well-educated workers face various barriers when it comes to training. Many of these obstacles are faced by informal workers. New forms of work may provide opportunities for casual work in the platform economy. However, proper tax and social protection policies must be in place to capitalize on these opportunities.

Digital Transformation for Rebuilding Trust to Develop Governance

The rise of the middle class has raised expectations for better public services. Despite improved shared governance, institutions are still failing to respond adequately. Discontent and distrust have been growing in most parts of the world, creating an institutional development trap. Public institutions have been under tremendous pressure and are expected to respond to the changes brought about by the digital transformation. These policies aim to help improve the governance and operations of public institutions by developing new rules and procedures designed to manage the digital transformation. The rapid emergence and evolution of digital technologies can transform public institutions into more effective, accountable, and innovative.

The governing of the digital transformation is a critical public policy issue that governments must address. They must ensure that it is done fairly and inclusively. The evolution of the digital economy presents new challenges, such as the need for regulatory frameworks that can accommodate the increasing number of players in the industry. A regulatory framework should help protect consumers. It should also give institutions the tools to enforce their decisions. The establishment of adequate safeguards to prevent digital security incidents is also key to maintaining the public's trust and the economy. Security breaches can cause various damage, such as the loss of critical infrastructures and the public's confidence. These issues can lead to lawsuits

and financial loss most of the time. Data has become an integral part of the healthcare industry and is also critical in times of coronavirus. Strong regulation is also needed to ensure the security of this information. Data protection frameworks have undergone significant changes in recent times. Most of them are based on international models. The increasing use of A.I. apps has raised various ethical concerns. Data on which algorithms are trained can be erroneous, biased, or not updated, affecting the integrity of their work. The rapidity with which misinformation spreads on social media platforms has affected the public's trust in government. It can also encourage unethical behavior.

With the rise of digital technology, governments can now improve their public governance using tools such as the Internet. The digital government ecosystem consists of various entities such as government agencies, non-government organizations, and individuals. This ecosystem supports the production and dissemination of data, services, and content. Without digital transformation, citizens tend to disengage from their civic duties and find it hard to participate in politics. The use of digital technologies can help prevent corruption. One example is creating a central purchasing body that enables citizens to identify and report financial transactions. Social media can help support citizen trust. During a crisis, such as COVID-19, gathering public opinion and informing them about the various measures taken to address the issue can be beneficial.

By improving the efficiency of public services, governments can save money and provide a better customer experience. Doing so can reduce costs and improve the quality of their services. The digital transformation of government can also improve the quality of public services by increasing the number of people involved in decision-making processes. Education is one of the fastest-growing sectors in terms of digital technologies. The digital transformation of government can help governments improve their public policies and services by generating massive amounts of data. This data can be used to develop effective and targeted public policies. Through the coronavirus pandemic, emergency medical services could reduce the number of people being sent to emergency rooms. In response to the coronavirus pandemic, many countries have started using geo-located and proximity data collected by smartphones to monitor the disease's spread and compliance with quarantine measures. This method of tracking the spread and evolution of the coronavirus allows authorities to identify and monitor the geographic distribution and compliance with quarantine measures.

International Partnership for Digital Transformation

As digitalization creates new opportunities and challenges, international cooperation and new partnerships are key factors to make the most of these opportunities. The coronavirus crisis has highlighted the importance of international cooperation. This phenomenon has shown the need for practical digital tools and services. Establishing

a coordinated global policy framework is essential in promoting digitalization for all.

Developing countries can benefit from international cooperation to build their domestic digital infrastructures and develop practical multidimensional approaches to address their development challenges. Regional integration can also help developing nations improve their communication infrastructures and expand their trade. Although many digital regulations are not harmonized, regional cooperation initiatives can help create common frameworks and procedures. It can also help strengthen national digital strategies and promote the region's voice on international platforms. The European Union's plan for digital cooperation provides a concrete example of establishing an integrated digital platform. International cooperation is also necessary to overcome the various challenges that arise from the digitalization of the economy. It can help developing nations develop effective and mutually beneficial solutions.

Conclusion

The burden of pandemics falls disproportionately on the poor and marginalized populations. The effects of the COVID-19 pandemic evidence it. As governments respond to the pandemic, they must build an inclusive public health response to safeguard the people affected by the virus's general health and economic interests. COVID-19 requires the rapid expansion of social protection systems. While countries can still modify their social protection systems in response to the pandemic, they cannot guarantee sustainability. Although the strength of national social protection systems is primarily determined by protecting their populations, they can still be modified and strengthened even beyond the pandemic. This chapter discusses how economies can best recover from the COVID-19 pandemic and enhance them to provide a more resilient tourism industry. Early responses to the COVID-19 pandemic included various measures to contain the outbreak. These include the establishment of quarantines, mass transit restrictions, and the implementation of lockdowns. The digital economy is needed to address the COVID-19 crisis and unlock society's full potential. The COVID-19 problem highlights the importance of the digital economy in mitigating future outbreaks. Following the COVID-19 crisis, start-up ecosystems have typically received increased support from investors and other support organizations.

References

Apriliasari, V. (2021). OECD/G20 pillar two: Is it a compatible and feasible solution? *Jurnal Pajak Indonesia (Indonesian Tax Review)*, *5*(2), 136–149. https://doi.org/10.31092/jpi.v5i2.1400

Behera, M., Dash, M., Ayasa Kanta Mohanty, A. K., & Das, S. (2019). Entrepreneurial ecosystem: A geographical upliftment. *Revista Espacios,* (40), 26–36. http://www.revistaespacios.com/a19v40n01/19400126.html

Busso, M., Camacho, J., Messina, J., & Montenegro, G. (2021). Social protection and informality in Latin America during the COVID-19 pandemic. *PLoS ONE, 16*(11), e0259050. https://doi.org/10.1371/journal.pone.0259050

Das, S. (2020a). *Media impact of advertising on consumer buying behaviour a comparative study of different media.* Shiksha o Anusandhan University. http://hdl.handle.net/10603/273691

Das, S. (2020b). Innovations in digital banking service brand equity and millennial consumerism. *Digital Transformation and Innovative Services for Business and Learning* (pp. 62–79). IGI Global. https://doi.org/10.4018/978-1-7998-5175-2.ch004

Das, S. (2021a). *Digital entertainment: The next evolution in service sector*. Springer Nature. https://doi.org/10.1007/978-981-15-9724-4. Print ISBN 978-981-15-9723-7. Online ISBN 978-981-15-9724-4.

Das, S. (2021b). Search engine optimization and marketing: A recipe for success in digital marketing (1st ed.). CRC Press. https://doi.org/10.1201/9780429298509

Das, S. (2021c). A systematic study of integrated marketing communication and content management system for millennial consumers. In *Innovations in Digital Branding and Content Marketing* (pp. 91–112). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch005

Das, S., & Mondal, S. (2016). Yours digitally: Patanjali. Available at SSRN 2737299.

Duman, Ü. O., & Das, S. (2021). The dynamic rise of digital brands' market mavens in digital entertainment: A complete know how for curious customers. In *Digital Entertainment* (pp. 147–172). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_8

Duy, N. T., Mondal, S. R., Van, N. T. T., Dzung, P. T., Minh, D. X. H., & Das, S. (2020). A study on the role of web 4.0 and 5.0 in the sustainable tourism ecosystem of Ho Chi Minh City, Vietnam. *Sustainability, 12*(17), 7140. https://doi.org/10.3390/su12177140

Gupta, D. K., Jena, D., Samantaray, A. K., & Das, S. (2019). HRD climate in selected public sector banks in India. *Revista ESPACIOS*, *40*(11).

Isshiki, K. (2022). Report on ITU-T SG2 standardization of telecommunication numbering. *NTT Technical Review, 20*(1), 96–101. https://doi.org/10.53829/ntr202201gls

Jain, S., Jain V., & Das, S. (2018). Relationship analysis between emotional intelligence and service quality with special evidences from Indian banking sector. *Revista ESPACIOS, 39*(33).

Lázaro-Pérez, C., Martínez López, J. N., Gómez Galán, J., & del Pino Espejo, M. J. (2021). Enfoque Comunicativo y Cultural de la Situación de los Profesionales de la Salud frente a la Pandemia de COVID-19. *Revista Latina De Comunicación Social, 79*, 357–380. https://doi.org/10.4185/rlcs-2021-1530

Mahamat, M. F., & Gurría, N. (2021). Africa's development dynamics 2021: Digital transformation for quality jobs (2021), de AU/OECD. AUC, Addis Ababa/OECD: Publishing, Paris. *Emprendimiento y Negocios Internacionales*, *6.1 (2021)*, 26–29. https://doi.org/10.20420/eni.2021.427

Mohanty, P. C., Dash, M., Dash, M., & Das, S. (2019). A study on factors influencing training effectiveness. *Revista Espacios,* (40), 7–15. http://www.revistaespacios.com/a19v40n02/19400207.html

Mondal, S. (2021) A systematic study of new age consumer engagement and exploration for digital entertainment for over-the-top platforms in various digital media. In *Innovations in Digital Branding and Content Marketing* (pp. 113–133). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch006

Mondal, S. R. (2020a). *Factors influencing store image loyalty and satisfaction from customer perspective an empirical study in retail sector*. Shiksha o Anusandhan University. http://hdl.handle.net/10603/273688

Mondal, S. R. (2020b). A systematic study for digital innovation in management education: An integrated approach towards problem-based learning in Vietnam. In *Digital Innovations for Customer Engagement, Management, and Organizational Improvement* (pp. 104–120). IGI Global. https://doi.org/10.4018/978-1-7998-5171-4.ch006

Mondal, S. R., & Das, S. (2021). Examining diabetic subjects on their correlation with TTH and CAD: A statistical approach on exploratory results. In *Machine Learning and the Internet of*

Medical Things in Healthcare (pp. 153–177). Academic Press. https://doi.org/10.1016/B978-0-12-821229-5.00007-0

Mondal, S. R., Virgilio, F. D., & Das, S. (2022). *H.R. analytics and digital H.R. practices*. Springer. https://doi.org/10.1007/978-981-16-7099-2

Mondal, S., Das, S., Musunuru, K., & Dash, M. (2017). Study on the factors affecting customer purchase activity in retail stores by confirmatory factor analysis. *Revista ESPACIOS, 38*(61).

Nadanyiova, M., & Das, S. (2020). Millennials as a target segment of socially responsible communication within the business strategy. *Littera Scripta,* 13(1), 119–134. https://doi.org/10.36708/Littera_Scripta2020/1/8

Ravi, S., & Mondal, S. R. (2021). Digital entertainment based do it yourself content & Advertisement as a Factor of Driving Force for Trust & customer patronage. In *Digital Entertainment* (pp. 127–146). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_7

Sharma, E., & Das, S. (2020). Measuring impact of Indian ports on environment and effectiveness of remedial measures towards environmental pollution. *International Journal of Environment and Waste Management, 25*(3), 356–380. https://doi.org/10.1504/IJEWM.2019.10021787

Sharma, E., & Das, S. (2021). Integrated model for women empowerment in rural India. *Journal of International Development, 1–18*,. https://doi.org/10.1002/jid.3539

Sharma, E., Nigam, N., & Das, S. (2020). Measuring gap in expected and perceived quality of ICT enabled customer services: A systematic study of top ten retailers of India. *International Journal of Applied Systemic Studies, 9*(2), 159–184. https://doi.org/10.1504/ijass.2020.113260

Singh, L. B., Mondal, S. R., & Das, S. (2020). Human resource practices & their observed significance for Indian SMEs. *Revista ESPACIOS, 41*(07). http://www.revistaespacios.com/a20v41n07/20410715.html

Singh, S., & Das, S. (2018). Impact of post-merger and acquisition activities on the financial performance of banks: A study of Indian private sector and public sector banks. *Revista Espacios Magazine, 39*(26), 25.

Siri R., Mondal S. R., & Das S. (2020). Hydropower: A renewable energy resource for sustainability in terms of climate change and environmental protection. *The Handbook of Environmental Chemistry*. Springer. https://doi.org/10.1007/698_2020_635

Siri, R., & Das, S. (2021). A study on processing of information storage & use of new age consumers in digital wellness sector through story telling & creating interest. In *Digital Entertainment* (pp. 45–63). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_3

Tiwari, M., & Mondal, S. R. (2022). Technological dynamism of workforce management for effective education service delivery during and after covid-19. In *H.R. Analytics and Digital H.R. Practices* (pp. 199–215). Palgrave Macmillan. https://doi.org/10.1007/978-981-16-7099-2_8

Van, N. T. T., Vrana, V., Duy, N. T., Minh, D. X. H., Dzung, P. T., Mondal, S. R., & Das, S. (2020). The role of human-machine interactive devices for post-COVID-19 innovative sustainable tourism in Ho Chi Minh City, Vietnam. *Sustainability, 12*(22), 9523. https://doi.org/10.3390/su12229523

Yegen, C., & Mondal, S. R. (2021). Sharenting: A new paradigm of digital entertainment of new age parenting and social media. In *Digital Entertainment* (pp. 213–231). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_11

PHAM Tien-Dung is working as PhD Research Scholar, Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam. His research areas are digitalization efficacy, digital transformation, managerial evolution, and digital innovations.

Jana Majerova, Ph.D., works as associate professor in department of economics and management at AMBIS University, (Prague, Czech Republic). Her professional and research activities are focused on the issue of the Sustainable brand management and bankruptcy law. She has authored more than 170 publications: 4 scientific monographs; 3 university textbooks; 1 script; 36 publications in journals registered in WoS or SCOPUS and more than 80 papers published in conference proceedings.

Subhankar Das (Academician, Researcher, Author, Writer, Blogger, Data Science trainer, Social Media Marketing Consultant) received his Ph.D. in Social Media Advertisement & Media Planning. He has 12+ years of teaching and research experience. He is currently associated as senior research fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Vietnam. He has published 20+ Research Papers in various International Referred Journals (Scopus, Thomson Reuters, SSCI, SCIE).

Chapter 3
Taking Steps to Help the Phoenix Rise from Ashes: A Roadmap for Digital Enterprises to Develop New Sustainable Goals

HO Minh-Nhat, Jana Majerova, and Subhankar Das

Introduction

Enterprises rely on technological inputs to fight against COVID-19. From drug development to forecasting its spread, the tools of A.I. were used to address the various aspects of the epidemic. This report catalogs the multiple uses of A.I. in the pandemic, and it identifies the ethical and human rights concerns raised by these applications. This chapter aims to inform the public about the various uses and policies related to these new-age techniques in future. This chapter describes the various new technology applications used during the fight against COVID-19. There is no consensus on the type of applications that were studied.

For the recovery of the global economy to be more productive, it must avoid getting back to pre-COVID-19 time and avoid taking on more environmental risks. Unchecked environmental emergencies could cause significant economic and social damages (Mondal et al., 2022). The recovery packages must be planned for recovery. Mere getting people back to work can help stop further economic damage (Tiwari & Mondal, 2022). The recovery policies should also trigger behavioral changes that will help prevent future shocks. A recovery package should also consider the various

HO Minh-Nhat
Department of Science and Technology, Ho Chi Minh City Government, Ho Chi Minh City, Viet Nam
e-mail: hmnhat.skhcn@tphcm.gov.vn

J. Majerova
Department of Economics and Management, AMBIS University, Lindnerova 575/1, Prague, Czech Republic
e-mail: jana.majerova@ambis.cz

S. Das (✉)
Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam
e-mail: subhankardas@idr.edu.vn

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_3

factors that affect people's well-being. These include climate impacts, sustainable development goals, and intelligent logistics (Mondal & Das, 2021). A thoughtfully planned recovery can help address these points particularly (Sharma & Das, 2021). It can stimulate the uptake of low-carbon mobility systems and improve the efficiency of electricity distribution.

The pandemic that hit the world at fag end of 2019 and early 2020 accelerated the digital transformation of society. During the pandemic, many people started working from home. They also began attending classes remotely. As the pandemic reached the global stage, various apps were developed to help track its development. A.I. was also utilized to study the virus. Immediately after the pandemic, Internet traffic increased in some countries. While the digital transformation has shown great potential, it has also highlighted the various remaining gaps. The increasing reliance on digital solutions has raised concerns around security and privacy. The pandemic has shown how digital technologies can augment the effectiveness of traditional medicine. It is also unlikely that society will return to its pre-COVID times. As the world becomes more dependent on digital technology, ensuring that its widespread and effective use can create a level playing field is critical. This chapter explores the various ways in which governments are increasingly focused on digital strategies. Following the pandemic, it is now time for countries to build comprehensive digital transformation plans that will help bridge the divide between the developed and underdeveloped regions. Figure 3.1 represents the new everyday sustainable development goals (SDGs) where technology use is paramount and proactive for the betterment of digital enterprises.

Widespread Use of Technology for Maintaining Connectivity During COVID-19

Pandemic has increased digital accessibility and engagement and the use of tech in dynamic ways (Das, 2021a). Although some people may choose to stay home while taking COVID-19 drugs, it is still expected to have a high impact on e-commerce and e-health. The rise of COVID-19 has also raised the pressure on firms to establish high-quality connectivity. As governments consider their responses to the increase of digitalization, they should keep in mind that it could create new digital segments worldwide. There was a significant increase of more than 95% of adults who used the Internet in 2020–2022 as comparable to 2018–2022 (OECD, 2020a). Despite the uptick in usage, the share of people aged 50–74 who use the Internet daily remained low compared to the average age of daily Internet users (OECD, 2020b).

There are still skills gaps in various countries and demographic groups when it comes to using the Internet. People with higher skills can exploit these gaps. The digital gender divide is still an essential issue for addressing (OECD, 2020c). Women are more likely to experience frequent stress due to exposure to computers (Siri & Das, 2021), while men are more skilled in digital-intensive sectors. Before COVID-19, the total e-commerce market was booming worldwide, but during the pandemic,

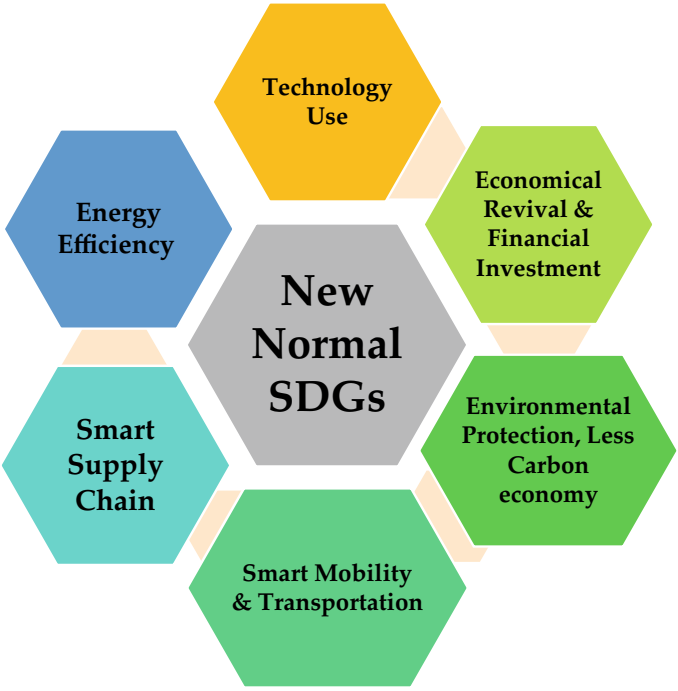

Fig. 3.1 New normal SDG and digital enterprises (*Source* Authors' conception)

e-commerce has developed a more significant gap between small and large enterprises operating in this domain (Ravi & Mondal, 2021). Digital technology and its diffusion are also widening due to COVID-19. For instance, e-commerce had become the primary mode of turnover for many firms in the OECD before the pandemic (OECD, 2020d). Despite the rise of big data, it remains a desirable scenario across different sectors and countries (Duman & Das, 2021).

Government Prioritizes Digital Transformation (DX) to Build a Sustainable Future

Before the COVID-19 pandemic, many governments have strengthened their digital transformation strategies. They are now focusing on using A.I. and 5G infrastructure to support the development of new applications and devices. Over 60 countries have a national A.I. strategy by mid-2020, and several OECD countries have issued 5G strategies in the last three years (OECD, 2020a, 2020b). Several countries, such as Australia, China, Germany, and Switzerland, have started developing blockchain

strategies. The virtuous circle between digital transformation and innovation is significant for countries struggling with COVID-19 (OECD, 2020c). Despite the potential risks posed by these technologies, many countries still believe that their use should not be limited to commercial interests. The signing of the OECD A.I. Principles encourages other countries to develop trustworthy technologies (OECD, 2020d).

The digital transformation trend is encouraging, but it may not be enough to ensure a more inclusive and resilient future (Yegen & Mondal, 2021). The COVID-19 crisis has reinforced the need for a coordinated whole-government approach to digital transformation (Das, 2021b). The framework aims to put a set of policies that will help shape a shared digital future. It features seven essential building blocks: access to digitalization, use of technology, digital innovation, trust in stakeholders, jobs, society, and an open market economy.

Access to digitalization: The rise of digital connectivity has become an essential part of businesses, schools, and society. It has reinforced the importance of having robust data governance and communications infrastructures.

Use of technology: As more people and firms adopt digital technology, governments must step up their efforts to ensure that everyone is equipped with the necessary skills to succeed in the digital economy (Sharma et al., 2020).

Digital innovation: It is a crucial driver of digital transformation. It can stimulate new business models and provide opportunities for public sector efficiency gains.

Trust on stakeholders: Following the rise of digital tools following the COVID-19 pandemic, more attention is needed to ensure that consumers and businesses trust the digital environment. Exploits targeting victims of the pandemic caused by the lack of trust in the digital realm became more prevalent.

Jobs: The rise of digital technology has already changed the way people work. It has raised concerns about what the future holds for employers. The pandemic has raised concerns about a lot of many jobs. It has also led to an increase in teleworking. As the economy continues to recover from the crisis, policymakers will need to look at the various regulations and structures that apply to the labor market.

Society: As people spend more time online, governments should step up their efforts to support well-being. They should also address the various social issues that arise from the digital transformation.

Open market Economy: The rise of tech companies has raised concerns about market fragmentation and its impact on SMEs and start-ups. The COVID-19 crisis highlighted the concerns about market consolidation, as tech companies have become more influential in our lives. As the number of companies offering online services decreases, governments must consider the impact on society.

After the global pandemic spreads its fangs across the globe, governments started implementing emergency measures designed to support recovery efforts. As the pandemic began to abate, they shifted their attention to preparing stimulus plans to stimulate the economy (Environmental Health and Strengthening Resilience to Pandemics, 2020; Fraccascia et al., 2019). This chapter aims to determine how these stimulus packages can help build a stronger and more resilient recovery to future shocks. It also addresses the various factors that will help improve our long-term stability. This approach aims to create a more inclusive and resilient society by

transitioning to a low-carbon economy. This chapter focuses on sustainable development after COVID-19. Data analytics enabled us to analyze the environmental sustainability of various projects.

A robust, strong economy aligns sustainable processes adopted across various regions and sectors. In this section, we will discuss some of the most critical issues that will affect the development of a sustainable digital economy.

COVID-19 Effect on Job Sector and Economy

The COVID-19 pandemic has highlighted various threats to our economies and societies. For decades, interconnectedness has helped create various social and economic benefits (Mondal, 2020a). However, it also led to the rapid spread of the pandemic (Das, 2020a). The depth and speed of the global economic crisis revealed the importance of focusing on short-term economic growth over long-term resilience (Agba et al., 2020; Das, 2021c). The massive loss of employment highlighted the rise of social inequality. It is estimated that over 300 million jobs could be at risk. Despite the crisis, the public's awareness of the various frailties has been raised.

The global economy's vulnerability is most alarming when viewed in light of the existential threat posed by climate change. Numerous factors such as climate change, air pollution, and biodiversity loss (Mondal, 2021) have already affected the global economy. Climate change is already causing physical and economic impacts globally. In some regions, such as Bangladesh, Philippines extreme weather events have already occurred at the same time as efforts to address COVID-19 (U.N., 2020). Without structural changes, the accumulation of greenhouse gases in the atmosphere will lead to more catastrophic impacts (Duy et al., 2020). Although the government's shutdown has led to positive environmental improvements, these will have a long-term effect (Le Quéré et al., 2020; Van et al., 2020). If the economy begins to recover from the global financial crisis, it will likely disappear quickly. This is evidenced by the uptick in greenhouse gas emissions (OECD, 2020a). The interrelated environmental concerns could have catastrophic impacts on society. It is believed that the loss of biodiversity and the destruction of the ocean's health could lead to the development of zoonotic viruses that can infect humans (García et al., 2020). Air and water pollution can affect the well-being of people and communities.

Not being able to sustain a long-term economic recovery will affect individuals and businesses and contribute to inequality and improve well-being. As governments and businesses begin implementing massive stimulus packages, it is also essential that we step back and reflect on the factors that caused the current crisis. Despite the encouraging signs, recovery plans have mostly fallen short. For instance, in 2020, the G20 Finance Ministers committed to supporting an inclusive and sustainable recovery (Siri et al., 2020). A poll conducted in 2020 indicated that most citizens believe that environmental issues are still a top priority after the global pandemic that affected developing and developed nations (4th G20 Finance Ministers and Central Bank Governors Meeting, 2021; Singh et al., 2020).

The rising concerns about the environment also became a political issue. In 2019, millions of people marched in the streets in support of climate action, which led to numerous governments declaring a climate emergency (Stainback et al., 2020). Climate change and biodiversity loss became the main factors considered by the World Economic Forum in 2020 (Smirnov, 2020). Despite this, the organization still believes that a resilient and sustainable recovery is best to address these issues. There is also widespread support for green technologies and industries, but this is affected by new normal industrialization that can absorb and lock greenhouse gas efflux (Chen et al., 2020).

Revival of the Economy like the Phoenix from Doldrums of COVID-19

The "building back better" is used to describe the recovery from COVID-19. The concept of building back better emerged from the context of disaster recovery (Brown, 2021). Its goal was to improve the resiliency of communities and reduce the costs of future disasters (Sharma & Das, 2020). The challenge of rebuilding the global economy after COVID-19 is different from that of a physical disaster (Draper et al., 2021). Despite the economic crisis, the risks associated with a more sustainable recovery are still significant. Even at the global level, efforts to prevent disasters are still focused on prevention. The changes that were made during the crisis can help minimize future risks.

For building back better, enterprises should consider recovery measures. Doing so can expose areas where competing stimulus plans may provide similar near-term benefits but have different long-term goals. For instance, assessing the long-term goals of other stimulus plans can reveal areas where different policies may offer additional near-term benefits but have different long-term goals. A reconciliation phase of recovery that focuses on well-being and inclusivity is needed to improve the conditions of society. Policies should also address other elements of well-being, such as education and employment, to improve the public's confidence in the recovery. A stimulus package that focuses on people's well-being is also crucial to achieving environmental goals (Gruère & Brooks, 2021). Policymakers should adopt progressive taxation and subsidies to ensure that environmental policies are socially inclusive (Palmer et al., 2020).

The relative importance of various dimensions to different country contexts will vary depending on their development priorities and social circumstances. These dimensions are discussed as follows.

a. Supporting recovery measures designed to reduce greenhouse gas emissions is essential in addressing climate change. Doing so should avoid the worst impacts of climate change. The long-term effects of infrastructure projects supported by stimulus packages are expected to have implications for decades. This

chapter focuses on the long-term structural and near-term impacts of supporting economic activities that receive liquidity support.

b. Climate change resilience is a crucial aspect of addressing the impacts of climate change. Enterprises use infrastructure investment as a vital component of these efforts to stimulate recovery efforts. However, it is essential that these projects are climate-resilient and do not increase vulnerability (Das, 2020b). Climate change will significantly impact society, especially in terms of infrastructure networks. New infrastructure investments need to consider their climate risk management strategies. This strategy aims to reduce the direct economic damages caused by climate change disasters (Mondal, 2020b) and minimize the indirect costs (Nadanyiova & Das, 2020), caused by their effects.
c. The fight against biodiversity loss is an integral part of human health and the economy. Land-use change and deforestation are threatening the stability of ecosystems. Investment in reforestation and other natural infrastructure projects can help improve the resilience of ecosystems to climate impacts. Stimulus packages should integrate the value of biodiversity and ecosystem services into their decisions. There are also crucial steps that governments can take to improve the management of their support for biodiversity. It can help improve the resilience of various environmental health dimensions.
d. Fostering innovation is a critical component of achieving sustainable development goals. It builds on the momentum of previous actions and helps develop new processes and technologies. The COVID-19 pandemic has raised concerns about the impact of cultural norms and behavior changes. It should be considered when formulating stimulus packages. For instance, addressing the reluctance to use public transport can help minimize crowding and improve the cleanliness of streets. It can also encourage people to use other transport modes such as remote working.
e. The pandemic has raised concerns about the resilience of global supply chains. It has also prompted a renewed interest in using shorter and more diversified supply chains. Although the environmental impacts of this shift are not yet clear, policies should be put in place to support local supply chains in improving their environmental performance.

The U.N.'s Sustainable Development Goals are a set of goals that aim to promote social development and well-being. Through stimulus packages, these actions can help improve the resilience of communities and put in place policies that will promote recovery. Doing so can help avoid repeating the mistakes of the past, which often lead to the development of ineffective stimulus measures. Although greenhouse gas emissions have increased, the effects of climate policies are still relevant. There's also a need to improve the circularity of materials used. There are also vital lessons that can be learned from implementing environmental measures in response to the 2008 financial crisis (Avelé, 2021).

Recovery Phase and Environmental Protection Policies for Different Digital Enterprises

This section highlights various opportunities for public stimulus spending to improve the efficiency of multiple sectors. These examples are relevant to where the stimulus program can catalyze systemic change in the economy and provide employment. This section is also applicable to situations where the stimulus program can trigger changes in the economy that are needed to support long-term resilience outcomes.

a. Biodiversity enhancement and environment protection.

   Forests and other natural infrastructures such as parks and marinas are integral to millions of people's economic activities. Unfortunately, most of the natural capital is not being used to its fullest potential and is only valued as a commodity. The unpriced natural capital of various primary processing sectors, such as forestry, mining, and steel, was valued at over USD 10 trillion in 2019. Although some policies have been introduced to value biodiversity, most existing approaches to value natural capital loss (Mohanty et al., 2019) are still limited. Recovery packages can help governments and private investors increase personal finance for nature-based solutions. They can also encourage financial instruments to measure and manage biodiversity impacts.

b. While the concept of building back better doesn't seem to have many concrete solutions, governments can implement some key recommendations to improve their infrastructure. The digital enterprise and its functionaries must.

   Restrict and screen all elements of the stimulus packages for their longer-term implications. The leaders of enterprises can,

   1. Negotiating stimulus packages that are both beneficial and resilient can help avoid locking-in emissions from infrastructure and systems.
   2. The stimulus packages can be quickly implemented, especially for digital enterprises.
   3. Cross-government initiatives can help avoid duplication and provide long-term systemic benefits.

c. Build a pipeline of sustainable infrastructure projects ready to be implemented quickly. Quickly implemented tasks can help avoid using up resources and make new emissions-intensive activities happen.

d. Ensure that policies and investments are aligned with long-term environmental objectives. It includes ensuring that policies and investments are aligned with the goals and conditions of the stimulus packages.

   1. Doing so will provide short-term relief, while the short-term economic benefits outweigh the long-term costs.
   2. Support for specific industries that improve their environmental performance is conditional on achieving these goals.
   3. Coordinate the phasing out of fossil-fuel subsidies (Behera et al., 2019) and the building of carbon pricing to create a coherent energy pricing system.

e. Reinforce the importance of green finance in supporting digital enterprises' resilience and financial decisions.

   1. Measuring the consistency of financing and climate change mitigation for businesses will help build resilience and minimize risk (Buchholz & Rübbelke, 2020).
   2. We are establishing robust and transparent standards for green finance (Gupta et al., 2019).
   3. It will help guide investment decisions.
   4. Public finance can help stimulate private investment by increasing the number of public finance institutions that can co-invest.
   5. This strategy aims to improve the capacity of financial institutions to manage and disclose climate change-related risks.

f. Design processes that promote low-carbon procurement and resilience. For example, consider the costs associated with climate change when bidding for assets. Support industries are experiencing immediate crises and long-term decarbonization (Farooque, 2021).

g. The food sector is a vital part of the economy, and its supply is essential for the survival and growth of communities. A secure food supply is also critical to economic stability and well-being. Food security is also likely a top priority for governments as the crisis proceeds. During the recovery, food security is expected to be a top government priority (Singh, 2020).

h. The agriculture sector faces various threats such as climate change and the spread of diseases. Land-use change is considered one of the main factors that contribute to deforestation. It is also responsible for the excessive use of fertilizer. The intensification of agriculture can also contribute to the spread of pathogens across species. It can also cause biodiversity losses and increase the risk of human diseases. Expanding agricultural areas near wilderness areas can also increase the chances of zoonotic transmission of pathogens (López-Lozano & Baruth, 2019).

i. In 2019, farmers in 53 countries received support from their governments. These policies were focused on supporting rural businesses and ensuring that they could maintain their profitability and minimize supply disruptions. As the climate change impacts intensify, there is a need to reform the most harmful and distortive policies, such as production and environmental regulation. These regulations could prevent food systems from transitioning to sustainable practices. Through training and investments, farmers can transition to a sustainable agriculture practice (Gholipour, 2019).

j. While it is possible to get enough protein without increasing greenhouse gas emissions, policies that promote low-carbon food choices can also help. Patterns of food consumption can help achieve climate mitigation goals and improve health and well-being. A variety of measures can be used to achieve these goals, such as education and public communication campaigns. Food stamps and increased subsidies can also improve access to healthy food for low-income individuals (Soonsawad et al., 2022).

The Financial Investment for Low-Carbon Emission and Resilience for Energy Conservation

The stimulus package can help accelerate the transition to a climate-resilient electricity supply system while creating jobs (Singh & Das, 2018). While widespread solar and wind energy deployment is necessary, other forms of energy efficiency are also needed (Ohene-Asare et al., 2020). The energy stimulus measures proposed to boost energy consumption will have to consider all these changes while establishing a robust global energy system. The low oil and gas prices have caused energy efficiency and renewable incentives to decline (Ratner, 2020). This decline in financial influx for the energy sector is expected to accelerate and force less money invested in the renewable energy domain. The stimulus measures needed to boost energy efficiency and renewable energy are critical to a sustainable recovery. Aside from reducing greenhouse gas emissions, these stimulus packages can also help boost the decarbonization of the energy system (Simons, 2019). Aside from reducing greenhouse gas emissions, these programs can also benefit communities by increasing electricity access and reducing dependence on fossil fuels.

Energy efficiency is a vital component of a green recovery package, as it often requires the involvement of millions of people. In the U.S. and Europe, it is employed by over 3.3 million individuals. Having the right resources and structures in place can help improve the power system's resilience and deliver various well-being benefits. Beyond power, energy efficiency is also a key target for the building sector. Aside from reducing greenhouse gas emissions, energy efficiency can also help lower the cost of energy and boost the economy (Ratner, 2020). While it may seem like a win–win situation for the environment, the potential impact of electric vehicle electrification on greenhouse gas emissions is still unknown.

Challenges to scaling up distributed energy resources and energy conservation during the recovery are often small-scale projects with potential liquidity constraints. Governments could leverage their existing resources and create a pipeline of shovel-ready projects that can be scaled up in the short term through existing programs. Aside from infrastructure projects, stimulus packages can also include training to improve people's skills in the power and energy sectors (Xie & Zhou, 2021). This can consist of the deployment of smart grids and electric storage technologies. These could help improve the coordination of the various components of the energy supply chain. New technologies such as carbon capture and storage are also needed to reduce greenhouse gas emissions.

Energy Efficiency and Resiliency for Sustainable Cities

The COVID-19 crisis highlighted various shortcomings in the housing sector and the social inequality it has caused. Situations where housing quality makes it more

challenging to live comfortably, have become more visible. Buildings are responsible for 30% of global greenhouse gas emissions. Facilities are responsible for more than 30% of global greenhouse gas emissions. They use energy inefficiently and are often built to last (Ruiz Estrada, 2021). There is a strong need for both new and existing buildings to be energy efficient to meet the Paris Agreement's goals. Despite the benefits of building efficiency, many barriers remain. According to the International Finance Corporation, the cost of green buildings is equivalent to USD 1 trillion annually. While different country contexts may require different types of investments, policies and financing models are often key factors that hold back accelerated investment (Shamsuddin, 2020). The stimulus packages could help accelerate the deployment of massive retrofits to reduce greenhouse gas emissions from buildings. Various measures include tax breaks for energy efficiency and the scrapping of inefficient household appliances. The experience gained from the 2008 financial crisis has shown that these types of policies can stimulate private sector investment.

The COVID-19 pandemic could also contribute to the rise of demand for more minor dense communities as people avoid living in more densely populated areas. The surge in demand for less dense housing could also affect efforts to reduce greenhouse gas emissions (Jain et al., 2018). For instance, people may live in areas with higher infection risk. Urbanization strategies that target areas that people want to live in can help mitigate this trend and lower inequality (Mondal et al., 2017). Urban renewal can help cities improve their resiliency to climate change impacts. Urban renewal efforts should promote mixed-use development and enhance walking and cycling accommodations.

Catalyzing the Smart Accessibility-Based Mobility

For the passenger transport sector, stimulus packages should promote the transition to a low-carbon economy and investments in mobility. As governments consider long-term support for the car industry, they should ensure that their approval is contingent on the environmental improvements needed to make vehicles more energy efficient (Bichara et al., 2021). While supporting the recovery of the car industry, governments should also encourage the development of mobility systems that are designed to accommodate people with limited mobility. One system that should be scrapped is the lock-in of private vehicle ownership. This system would prevent people from using low-occupancy vehicles and limit the transport sector's emissions reduction potential.

Despite the number of people who work in the car industry, investing in public transport is still essential for mobility and jobs. However, governments need to address new challenges, such as people who are reluctant to use mass transit. As for the long term, governments can help improve public transport capacity and reduce crowding by investing in infrastructure. Some cities, such as Los Angeles and Reno, have already benefited from the drop in traffic during public transport projects. Governments could also encourage more collaboration between businesses

and public transport providers to make the most available transport capacity. While electric vehicle charging is a crucial component for the development of public transportation, it also comes with various costs.

As the economy begins to recover, it's time to move beyond traditional modes of transport and develop new ones that will create jobs and improve air quality. Around 150 cities have already started implementing emergency measures to create spaces for more active transportation. These measures could help make the changes permanent and promote more sustainable modes of transportation. Operational transportation modes, such as bikes and electric scooters, are essential to prevent a significant shift from public transport to cars. R&D support should develop new technologies that make these transportation options more sustainable. Road configurations should also accommodate the increasing number of freight movements in urban areas (Calvo-Poyo et al., 2019). Doing so could help minimize air pollution and make the transition to cleaner fleets easier (Das & Mondal, 2016). Supporting public and active transport modes will also help improve the efficiency of implementing policies that support the phasing out of fossil-fuel subsidies.

The Role of Digital Enterprises in Addressing the Challenges of Smart Supply Chains Will Help Accelerate the Circular Economy

The COVID-19 crisis highlighted the increasing complexity and global reach of value chains. As firms seek to improve resilience, they should avoid making changes that could inadvertently increase their environmental impacts. Recovery policies can help firms improve resource efficiency (Geng, 2021). A vital part of global economic activity is the production and shipping of raw materials and finished goods, a significant source of greenhouse gas emissions. Due to current trends, materials management is expected to account for over 50% of global greenhouse gas emissions by 2060. Despite widespread efforts to promote recycling, the rate of recycled materials worldwide has remained low.

The complexity of supply chains can create risks of disruption due to their dependence on leanness and efficiency. The concentration of upstream actors can also contribute to the risk of disruption. Reducing greenhouse gas emissions was also beneficial for developed nations as it shifted some of these emissions to other countries (Laubinger et al., 2020).

The complexity of supply chains also makes it hard to evaluate the risk of potential disruption. If firms are planning on improving resilience by reducing their supply chains, they should avoid increasing their environmental impacts. For instance, in the OECD area, offshoring has led to reducing greenhouse gas emissions.

The recovery measures announced by governments can help improve the efficiency of supply chains and reduce greenhouse gas emissions. In circular value chains, waste is diverted from landfills and used for remanufacturing recycling, and

reuse. It can result in numerous benefits. The availability of remanufacturing and recycling materials can also lead to expanding supply chains. The circular value chains can also help minimize greenhouse gas emissions ("Response to the Call: Has This Close Call Been a Wake-Up Call?", 2021). They can also provide opportunities to shift consumption away from primary materials. Governments can stimulate the uptake of the circular value chain through green procurement. It can involve removing trade barriers, establishing a tender procedure, and removing landfill fees.

An increase in digital technology for supply chain management can help minimize risks and improve resilience. It can also help companies identify and evaluate opportunities for reducing greenhouse gas emissions. The recovery from COVID-19 provides governments with an opportunity to align their policies with environmental objectives and disclose climate-related risks. Large firms can best utilize this approach to avoid hampering their activities through administrative burden. On the other hand, the digitalization of industrial processes can help improve production efficiency. Governments can help accelerate the uptake of digital technology by providing incentives and regulations. However, as automation becomes more prevalent, it could require more active labor market management to maximize the benefits.

Conclusion

Regardless of how the crisis or its aftermath plays out, the rise of digital technology will continue to transform how we live and work. The increase of 5G and the Internet of Things will create new opportunities to produce big data while also pushing the envelope in terms of security and privacy. As firms consider the benefits of increasing automation, they will also need to consider the impact on their operations and the resiliency of their data flows. Following the COVID-19 crisis, governments will have to re-evaluate their digital policies. They will also have to coordinate with their international partners.

References

4th G20 Finance Ministers and Central Bank Governors Meeting. (2021, October 13). MEF. Retrieved January 22, 2022, from https://www.mef.gov.it/en/inevidenza/4th-G20-Finance-Ministers-and-Central-Bank-Governors-Meeting-00001/

Agba, A. M. O., Ocheni, S. I., & Agba, M. S. (2020). COVID-19 and the world of work dynamics: A critical review. *Journal of Educational and Social Research, 10*(5), 119. https://doi.org/10.36941/jesr-2020-0093

Avelé, D. (2021). The financial crises of 1929 and 2008: What lessons learned from the COVID-19 health crisis? *Journal of Contemporary Research in Business Administration and Economic Sciences*. https://doi.org/10.52856/jcr311280113

Behera, M., Dash, M., Ayasa Kanta Mohanty, A. K., & Das, S. (2019). Entrepreneurial ecosystem: A geographical upliftment. *Revista Espacios, 40*, 26–36. http://www.revistaespacios.com/a19v40n01/19400126.html

Bichara, D. B., Dagher, Z. R., & Fang, H. (2021). What do COVID-19 tweets reveal about public engagement with nature of science? *Science & Education.* https://doi.org/10.1007/s11191-021-00233-y

Brown, R. (2021). How to save jobs and build back better: Employee ownership transitions as a key to an equitable economic recovery. *Maine Policy Review, 30*(2). https://doi.org/10.53558/hoze8462

Buchholz, W., & Rübbelke, D. (2020). Overstraining international climate finance: When conflicts of objectives threaten its success. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3726032

Calvo-Poyo, F., Medialdea, A., & Ferri-García, R. (2019). Citizens' opinion about investment in public transport projects in cities. *International Journal of Sustainable Transportation, 14*(10), 806–818. https://doi.org/10.1080/15568318.2019.1630529

Chen, Z., Marin, G., Popp, D., & Vona, F. (2020). Green stimulus in a post-pandemic recovery: The role of skills for a resilient recovery. *Environmental and Resource Economics, 76*(4), 901–911. https://doi.org/10.1007/s10640-020-00464-7

Das, S. (2020a). *Media impact of advertising on consumer buying behaviour a comparative study of different media.* Shiksha o Anusandhan University. http://hdl.handle.net/10603/273691

Das, S. (2020b). Innovations in digital banking service brand equity and millennial consumerism. *Digital Transformation and Innovative Services for Business and Learning* (pp. 62–79). IGI Global. https://doi.org/10.4018/978-1-7998-5175-2.ch004

Das, S. (2021a). *Digital Entertainment: The Next Evolution in Service Sector*. Springer Nature. https://doi.org/10.1007/978-981-15-9724-4. Print ISBN978-981-15-9723-7. Online ISBN978-981-15-9724-4.

Das, S. (2021b). *Search engine optimization and marketing: A recipe for success in digital marketing* (1st ed.). CRC Press. https://doi.org/10.1201/9780429298509

Das, S. (2021c). A systematic study of integrated marketing communication and content management system for millennial consumers. In *Innovations in digital branding and content marketing* (pp. 91–112). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch005

Das, S., & Mondal, S. (2016). *Yours digitally: Patanjali.* Available at SSRN 2737299.

Draper, C. E., Milton, K., & Schipperijn, J. (2021). COVID-19 and physical activity: How can we build back better? *Journal of Physical Activity and Health, 18*(2), 149–150. https://doi.org/10.1123/jpah.2021-0037

Duman, Ü. O., & Das, S. (2021). The dynamic rise of digital brands' market mavens in digital entertainment: A complete know how for curious customers. *Digital Entertainment* (pp. 147–172). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_8

Duy, N. T., Mondal, S. R., Van, N. T. T., Dzung, P. T., Minh, D. X. H., & Das, S. (2020). A Study on the Role of Web 4.0 and 5.0 in the Sustainable Tourism Ecosystem of Ho Chi Minh City, Vietnam. *Sustainability, 12*(17), 7140. https://doi.org/10.3390/su12177140

Environmental Health and Strengthening Resilience to Pandemics. (2020, April 21). OECD. Retrieved January 22, 2022, from https://www.oecd.org/coronavirus/policy-responses/environmental-health-and-strengthening-resilience-to-pandemics-73784e04/

Farooque, O. A. (2021). Agency-linked risk management with ownership and board sub-committee governance: Evidence from an OECD economy. *Journal of Risk and Financial Management, 14*(10), 472. https://doi.org/10.3390/jrfm14100472

Fraccascia, L., Giannoccaro, I., Agarwal, A., & Hansen, E. G. (2019). Business models for the circular economy: Opportunities and challenges. *Business Strategy and the Environment, 28*(2), 430–432. https://doi.org/10.1002/bse.2285

García, V. R., Gaspart, F., Kastner, T., & Meyfroidt, P. (2020). Agricultural intensification and land use change: Assessing country-level induced intensification, land sparing and rebound effect. *Environmental Research Letters, 15*(8), 085007. https://doi.org/10.1088/1748-9326/ab8b14

Geng, C. (2021). CURRENT STATE, TRENDS AND CHALLENGES OF CHINA'S DIGITAL TRADE. *International Trade and Trade Policy, 7*(2), 62–79. https://doi.org/10.21686/2410-7395-2021-2-62-79

Gholipour, H. F. (2019). The effects of economic policy and political uncertainties on economic activities. *Research in International Business and Finance, 48*, 210–218. https://doi.org/10.1016/j.ribaf.2019.01.004

Gruère, G., & Brooks, J. (2021). Viewpoint: Characterising early agricultural and food policy responses to the outbreak of COVID-19. *Food Policy, 100*, 102017. https://doi.org/10.1016/j.foodpol.2020.102017

Gupta, D. K., Jena, D., Samantaray, A. K., & Das, S. (2019). HRD climate in selected public sector banks in India. *Revista ESPACIOS, 40*(11).

Jain, S., Jain V., & Das, S. (2018). Relationship analysis between emotional intelligence and service quality with special evidences from Indian banking sector. *Revista ESPACIOS, 39*(33).

Laubinger, F., Lanzi, E., & Chateau, J. (2020). Labour market consequences of a transition to a circular economy: A review paper. *International Review of Environmental and Resource Economics, 14*(4), 381–416. https://doi.org/10.1561/101.00000120

Le Quéré, C., Jackson, R. B., Jones, M. W., Smith, A. J. P., Abernethy, S., Andrew, R. M., De-Gol, A. J., Willis, D. R., Shan, Y., Canadell, J. G., Friedlingstein, P., Creutzig, F., & Peters, G. P. (2020). Temporary reduction in daily global CO_2 emissions during the COVID-19 forced confinement. *Nature Climate Change, 10*(7), 647–653. https://doi.org/10.1038/s41558-020-0797-x

López-Lozano, R., & Baruth, B. (2019). An evaluation framework to build a cost-efficient crop monitoring system. Experiences from the extension of the European crop monitoring system. *Agricultural Systems, 168*, 231–246. https://doi.org/10.1016/j.agsy.2018.04.002

Mohanty, P. C., Dash, M., Dash, M., & Das, S. (2019). A study on factors influencing training effectiveness. *Revista Espacios, 40*, 7–15. http://www.revistaespacios.com/a19v40n02/19400207.html

Mondal, S. (2021). A systematic study of new age consumer engagement and exploration for digital entertainment for over-the-top platforms in various digital media. In *Innovations in digital branding and content marketing* (pp. 113–133). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch006

Mondal, S. R. (2020a). *Factors influencing store image loyalty and satisfaction from customer perspective an empirical study in retail sector*. Shiksha o Anusandhan University. http://hdl.handle.net/10603/273688

Mondal, S. R. (2020b). A systematic study for digital innovation in management education: An integrated approach towards problem-based learning in vietnam. In *Digital innovations for customer engagement, management, and organizational improvement* (pp. 104–120). IGI Global. https://doi.org/10.4018/978-1-7998-5171-4.ch006

Mondal, S. R., & Das, S. (2021). Examining diabetic subjects on their correlation with TTH and CAD: A statistical approach on exploratory results. In *Machine learning and the internet of medical things in healthcare* (pp. 153–177). Academic Press. https://doi.org/10.1016/B978-0-12-821229-5.00007-0

Mondal, S. R., Virgilio, F. D., & Das, S. (2022). *H.R. analytics and digital H.R. practices*. Springer. https://doi.org/10.1007/978-981-16-7099-2

Mondal, S., Das, S., Musunuru, K., & Dash, M. (2017). Study on the factors affecting customer purchase activity in retail stores by confirmatory factor analysis. *Revista ESPACIOS, 38*(61).

Nadanyiova, M., & Das, S. (2020). Millennials as a target segment of socially responsible communication within the business strategy. *Littera Scripta, 13*(1), 119–134. https://doi.org/10.36708/Littera_Scripta2020/1/8

OECD. (2020a). *OECD-digital economy*. OECD iLibrary. Retrieved January 24, 2022, from https://www.oecd-ilibrary.org/sites/b7410bab-en/index.html?itemId=/content/component/b7410bab-en

OECD. (2020b). *Keeping the Internet up and running in times of crisis*. OECD. Retrieved January 20, 2022, from https://www.oecd.org/coronavirus/policy-responses/keeping-the-internet-up-and-running-in-times-of-crisis-4017c4c9/

OECD. (2020c). *OECD iLibrary*. Retrieved January 22, 2022, from https://www.oecd-ilibrary.org/science-and-technology/oecd-digital-economy-outlook-2020_bb167041-en

OECD. (2020d). *ICT access and usage by households and individuals*. Â© OECD. Retrieved January 24, 2022, from https://stats.oecd.org/Index.aspx?DataSetCode=ICT_HH2

Ohene-Asare, K., Tetteh, E. N., & Asuah, E. L. (2020). Total factor energy efficiency and economic development in Africa. *Energy Efficiency, 13*(6), 1177–1194. https://doi.org/10.1007/s12053-020-09877-1

Palmer, A., Atoloye, A., Bassarab, K., Calancie, L., Santo, R., & Cooksey Stowers, K. (2020). COVID-19 responses: Food policy councils are "stepping in, stepping up, and stepping back". *Journal of Agriculture, Food Systems, and Community Development*, 1–4. https://doi.org/10.5304/jafscd.2020.101.013

Ratner, S. R. (2020). International investment law and domestic investment rules: Tracing the upstream and downstream flows. *The Journal of World Investment & Trade, 21*(1), 7–33. https://doi.org/10.1163/22119000-12340166

Ravi, S., & Mondal, S. R. (2021). Digital entertainment based do it yourself content & advertisement as a factor of driving force for trust & customer patronage. In *Digital entertainment* (pp. 127–146). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_7

Response to the Call: Has This Close Call Been a Wake Up Call? (2021). *American Journal of Management, 21*(6). https://doi.org/10.33423/ajm.v21i6.4854

Ruiz Estrada, M. A. (2021). How much the COVID-19 vaccination campaign can help in the economic recovery? The case of Chile. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3873182

Shamsuddin, S. (2020). Resilience resistance: The challenges and implications of urban resilience implementation. *Cities, 103*, 102763. https://doi.org/10.1016/j.cities.2020.102763

Sharma, E., & Das, S. (2020). Measuring impact of Indian ports on environment and effectiveness of remedial measures towards environmental pollution. *International Journal of Environment and Waste Management, 25*(3), 356–380. https://doi.org/10.1504/IJEWM.2019.10021787

Sharma, E., & Das, S. (2021). Integrated model for women empowerment in rural India. *Journal of International Development*, 1–18. https://doi.org/10.1002/jid.3539

Sharma, E., Nigam, N., & Das, S. (2020). Measuring gap in expected and perceived quality of ICT enabled customer services: A systematic study of top ten retailers of India. *International Journal of Applied Systemic Studies, 9*(2), 159–184. https://doi.org/10.1504/ijass.2020.113260

Simons, P. (2019). IEA perspectives on the global energy landscape. *The APPEA Journal, 59*(3). https://doi.org/10.1071/aj18298

Singh, L. B., Mondal, S. R., & Das, S. (2020). Human resource practices & their observed significance for Indian SMEs. *Revista ESPACIOS, 41*(07). http://www.revistaespacios.com/a20v41n07/20410715.html

Singh, N. (2020). Developing business risk resilience through risk management infrastructure: The moderating role of Big Data analytics. *Information Systems Management, 39*(1), 34–52. https://doi.org/10.1080/10580530.2020.1833386

Singh, S., & Das, S. (2018). Impact of post-merger and acquisition activities on the financial performance of banks: A study of Indian private sector and public sector banks. *Revista Espacios Magazine, 39*(26), 25.

Siri, R., Mondal, S.R., & Das S. (2020) Hydropower: A renewable energy resource for sustainability in terms of climate change and environmental protection. In *The handbook of environmental chemistry*. Springer. https://doi.org/10.1007/698_2020_635

Siri, R., & Das, S. (2021). A study on processing of information storage & use of new age consumers in digital wellness sector through story telling & creating interest. In *Digital entertainment* (pp. 45–63). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_3

Smirnov, E. (2020). Global recession risks and challenges to economic regulation. *Mezhdunarodnaja Jekonomika (The World Economics), 3*, 37–46. https://doi.org/10.33920/vne-04-2003-04

Soonsawad, N., Martinez, R. M., & Schandl, H. (2022). Material demand, and environmental and climate implications of Australia's building stock: Current status and outlook to 2060. *Resources, Conservation and Recycling, 180*, 106143. https://doi.org/10.1016/j.resconrec.2021.106143

Stainback, K., Hearne, B. N., & Trieu, M. M. (2020). COVID-19 and the 24/7 news cycle: Does COVID-19 news exposure affect mental health? *Socius: Sociological Research for a Dynamic World, 6*, 237802312096933. https://doi.org/10.1177/2378023120969339

Tiwari, M., & Mondal, S. R. (2022). Technological dynamism of workforce management for effective education service delivery during and after Covid-19. In *H.R. analytics and digital H.R. practices* (pp. 199–215). Palgrave Macmillan. https://doi.org/10.1007/978-981-16-7099-2_8

U.N. (2020, August 21). *Philippines typhoon recovery, complicated by coronavirus concerns.* U.N. News. https://news.un.org/en/story/2020/05/1064202

Van, N. T. T., Vrana, V., Duy, N. T., Minh, D. X. H., Dzung, P. T., Mondal, S. R., & Das, S. (2020). The role of human-machine interactive devices for post-COVID-19 innovative sustainable tourism in Ho Chi Minh City, Vietnam. *Sustainability, 12*(22), 9523. https://doi.org/10.3390/su12229523

Xie, L., & Zhou, O. (2021). What improves subjective welfare during energy transition? Evidence from the clean heating program in china. *Energy and Buildings, 253*, 111500. https://doi.org/10.1016/j.enbuild.2021.111500

Xu, L., Zhang, Q., & Shi, X. (2019). Stakeholders strategies in poverty alleviation and clean energy access: A case study of China's P.V. poverty alleviation program. *Energy Policy, 135*, 111011. https://doi.org/10.1016/j.enpol.2019.111011

Yegen, C., & Mondal, S. R. (2021). Sharenting: A new paradigm of digital entertainment of new age parenting and social media. In *Digital entertainment* (pp. 213–231). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_11

HO Minh-Nhat, Ph.D., is working in the Department of Science and Technology, Ho Chi Minh City Government. His specialization areas are sustainable development goals, digital enterprise and their evolution, and various managerial innovation.

Jana Majerova, Ph.D., works as associate professor in department of economics and management at AMBIS University, (Prague, Czech Republic). Her professional and research activities are focused on the issue of the Sustainable brand management and bankruptcy law. She has authored more than 170 publications: 4 scientific monographs; 3 university textbooks; 1 script; 36 publications in journals registered in WoS or SCOPUS; and more than 80 papers published in conference proceedings.

Subhankar Das (Academician, Researcher, Author, Writer, Blogger, Data Science trainer, Social Media Marketing Consultant) received his Ph.D. in Social Media Advertisement & Media Planning. He has 12+ years of teaching and research experience. He is currently associated as Senior Research Fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Vietnam. He has published 20+ Research Papers in various International Referred Journals (Scopus, Thomson Reuters, SSCI, SCIE).

Chapter 4
Digital Transformation of Enterprises and Post-Pandemic Sustainable Developmental Goals

Eva Nahalkova Tesarova, Anna Krizanova, Anna Kubjatkova, and Jakub Michulek

Introduction

The foreground is increasingly receiving a very current and discussed topic of digital transformation businesses. We can say with certainty that this is one of the most important priority areas of business with an emphasis on the benefits and added value that it brings. The last decade that we have witnessed has been marked by a web boom, or rather an enormous number of websites and the subsequent advent of e-commerce, organizations must fit in with the changes that digitalization brings. The digitalization strategy that every company build is unique. It is the pandemic situation associated with COVID-19 that has shown us the barriers arising from business activities on a global economic scale, which is characterized by its variability. The situation caused by the global pandemic has had a significant impact on businesses. Measures to reduce the mobility of the population (appeal to social distances, regulation of the number of customers at the point of sale, but also the collapse of supply chains) to prevent the spread of COVID-19 have resulted in businesses being forced to transform their activities and start implementing into their business new business and operational models, which are characterized by a higher degree of flexibility and digitality. Today's consumption has changed as a result of the COVID-19 crisis and its course, which was also related to a change in his shopping behavior. The digital economy is already part of a large number of world markets. Trends in technology are subject to a permanently dynamic transformation. Changes are affecting every sphere and the business environment and companies are changing along with technology. It is essential to be able to adapt to an environment of change and to be able to function promptly. Modern times highlight two major trends that are accelerating this change within businesses. In the first case, we are talking about digital automation, which is behind the personalization of the product and thus the product is characterized

E. N. Tesarova (✉) · A. Krizanova · A. Kubjatkova · J. Michulek
University of Zilina, Univerzitna 1, 010 26 Zilina, Slovakia
e-mail: eva.tesarova@stud.uniza.sk

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_4

by its uniqueness. The second aspect that supports the development of the digital age is regionalization of production, or rather a business model where the manufacturing company tries to get as close to the customer as possible and thus eliminate distance as possible and optimize its cost component. The digital transformation is not only a requirement for the success of any company, any industry in future, but also a stimulating path that benefits us all. The European Union is also working to raise awareness of digital transformation through various programs, such as Digital Europe. This program is the first "of its kind" to provide funding exclusively to support the transformation of European digitalization. At the European level, the European Commission is working on the digital transformation of businesses, which it sees as a huge contribution. In 2020, the Slovak Republic achieved 22nd place, if we take a closer look, for example, the indicator that speaks of the percentage of internet users who shop via the internet, in 2020 about 71% of the population of the Slovak Republic made their purchases online. This is the same percentage as the European Union average.

Literature Review

Many authors and researchers are working on digitalization. This can be included in the Industry 4.0 revolution, the main pillar of which is to transform the way products are manufactured, but of course, there is also consideration of their streamlining and distribution to the end customer (Leipzig et al., 2017). The impact of this revolutionary form of digitization was discussed in detail in a paper by Sima et al. (2020), which sees it as a contribution of certain positive aspects to the present life. It also describes the use of mobile devices to make purchases, which ultimately serves retail entities that collect customer data (age structure, gender, etc.). With the help of this input data, it is possible to create databases that help to make better use of the marketing mix. According to Říha et al. (2017), the term digital transformation is a whole that includes the reorganization of a company. The foundation is the optimization of systems operating in terms of information and software. These two groups are behind the unification and creation of an environment whose main feature is full integration. In a broader sense, it can be defined as a shift with the characteristics of radicality and complexity in the process of using technological innovations to increase the performance of individual organizations (Indristuti, M., & Faud) in processes related to organization and business, the basic pillar of which (Knezevic, 2018). A large percentage of companies perceive it as a chance and thanks to it is possible to bring competitive advantages to the markets and intelligence (Ignat, 2017). Calp (2020) speaks of one concept of digitization, namely the processing of materials from print into digital form using a computer and the other concept as a strategy that examines its implementation. It influences and has an impact on business operations and is one of the fundamental social and economic events of the contemporary world (Ziólkowska, 2021). For the two authors Goerzig & Bauernhansl, who focused on small and medium-sized enterprises in the engineering sector in their study, this is an

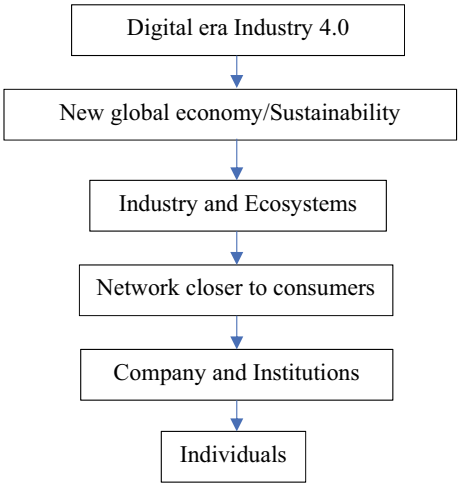

Fig. 4.1 Digital transformation and its elements (*Source* Own processing)

essential change through which enterprises are re-emerging. In other words, transformation involves a change in the context in which a company manifests its activity. In this case, the company radically redirects its relationships with key components such as the customer component, but also the employee component. The content aspects of "digital transformation" were discussed and elaborated in detail in their study by Matt et al. (2015). There are four key elementary components: technology and its use, value changes in their creation, changes in structure, and the aspect of the financial component. Another group of authors, Reis et al., (2018) divided aspects into 3 groups, namely: elements related to technology; elements related to the organization, and elements related to the social environment of man as a member of society. Ismail et al. (2017) present various perspectives of digital transformation, which are shown in the following Fig. 4.1. The area of digital transformation represents a major change in the world of man and community. This important pillar forms a new direction of the global world economy, which has characteristic features such as dynamism, adaptation, increasing the intensity of competitiveness. All these features have their basis in the knowledge, technology, and innovation component, which are invested in the production of products and the provision of services. The advent of the new global economy is also accompanied by sustainability in individual sectors, the so-called circular economy in the order to increase economic prosperity while improving the environment (Kirchherr et al., 2017). It also occurs in the industry by creating smart factories, a networking area where the dynamics of an organization's networks change so that they are accessible to digitally savvy customers and together they create an ecosystem of digital environments. Transformational needs are the essence of not only the business environment but also the environment of individualists.

The explosion caused by the COVID-19 pandemic in various parts of the world has had a major impact not only on the health of the population but also on the functioning of economic systems and to a large extent on trade at the national and international

level, the investment sector and tourism. The digital approach will work well if SMEs try to undergo a digital transformation as much as possible so that they can compete vigorously with other competitors in the same sector. The strategy supports the transition from offline shopping to online shopping for security and convenience. The strategy supports the transition from offline shopping to online shopping for security and convenience. During the current pandemic situation, SMEs can intensify the promotion of sales and logistics through online applications. As SMEs are part of the digital skills transformation and innovation needs to be introduced so that business sustainability can take place now and in future (Indriastuti & Faud). The modern retail sector is also transforming under the pressure of new trends and tendencies that affect the daily global survival of the population. Krymov et al. (2019) in their study discusses the essential trends of digitizing companies: the trend of new technologies, the trend of new competitors in the market, the trend of new buyers who are well-informed and tend to change their preferences quickly. In the retail sector, the digital transformation focuses on creating a business and presenting innovative experiences for the final link in the distribution channel and thus the consumer component. As in other business sectors, it focuses on positively grading competitiveness through the digitization of purchasing processes and means of making payments (Rodrigues et al., 2020), greater supply chain automation, advanced distribution processes, switching from products to services, or creating different types of platforms (Öhlin, 2019). Hauser et al. (2019) stated in their publication that in an environment of competition, not only the pricing policy of products and services puts pressure on retailers, but also innovative decisions in digitization. For up to 92% of retail businesses, digital innovation is a significant tool with tremendous power, enabling them to identify needs, expectations, and customer behavior. An important transformation in retail is the omni-channel (Cakir et al., 2021), which represents the change of a retailer from an offline platform to a multi-channel environment (online platforms). The comparison of multi-channel and omni-channel was performed by Verhoef et al. (2015), who found differences mainly in the focus of multi-channel and omni-channel channels, their scope, separation, focus on the relationship with the customer group, but also goals. These types of retail are also of great interest to marketing researchers, who argue that the topic of multi-channel and omni-channel is so complex that there is still room to expand knowledge about the issue (Thaichon et al., 2020). From a retail point of view, we consider the digitization of the final link in the distribution chain, or the consumer, to be essential, as more and more people today are demonstrably skilled in the use of digital services and even expect these services. To some extent, the reason is generational stratification. Within generational groups, younger generations such as millennials have encountered technology since childhood, and digital processes are close to them. Accepting new technologies and the benefits that flow from them is a routine matter for them. However, digital change is enormous, and its effects are very far-reaching. Older generations have also to some extent adopted the Internet and mobile devices, which can help them gather information and at the same time share it, using social networks and media to communicate with others. However, we can also see some different consumer behavior. Members of the Millennium Group are characterized by the fact that they first view the product, research it, find various

information about it in the online space and only then come to the store or shopping center and make a purchase. Therefore, their shopping behavior cannot be described as impulsive (Lewis, 2014).

Methods

In this paper, we will focus on the retail sector, which we will analyze more comprehensively. In addition to the analysis, we also use the method of synthesis, comparison, generalization, induction, and deduction. Based on a questionnaire survey, it was found out how consumers perceive digitization in retail. We will also focus on fast fashion and the impact of the COVID-19 pandemic on this area. Questionnaires were created through Google Forms and distributed electronically during the first quarter of 2021. Most participants were contacted through social networks and other communication channels. We determined the sample size based on the sample size calculator. To determine the size of the population, we used the data of the Statistical Office of the Slovak Republic as of 01.07.2020. The surveyed object was the inhabitants of the Slovak Republic in the productive age from 15 to 64 years, and their number was 3,674,221. Deviation, respectively, we set the confidence interval to the level of 5% and the confidence level, or the probability that indicates how much certainty should be attributed to the specified confidence interval is 95%. From this, a sample size of 384 respondents was calculated. The survey involved 511 respondents in the case of the first questionnaire and 500 in the case of the second questionnaire. In terms of the variability of the answers, closed alternative questions were used in the questionnaire when the respondent chose one of the alternatives.

Results

The acceleration of the digital transformation is mainly due to a change in consumer preferences and behavior, which has resulted in a widespread global pandemic. Consumer preferences are currently characterized by dynamism and radicalism in the changes in the preferential choice of customers affected by this crisis. The situation is due to measures issued by consuls of experts and national governments, which seek to prevent the mobility of people and thus prevent the spread of COVID-19. Therefore, in many cases, customers were forced to communicate and purchase products in the online domain and area, because even operations that did not offer essential products or services were closed due to some restrictions. As a result, some companies had to close. The COVID-19 crisis affected all sectors of industrial production and services, including logistics, as the situation escalated to the point where freight transport collapsed, endless traffic jams of lorries, and the inhabitants of some cities could not even reach basic foodstuffs. In the banking sector, digital transformation represents the use of cloud services, in the food sector it is mainly a focus on online

orders and delivery, in the school environment, it is a transition from full-time to distance form of education. We can assume that progress in the field of digitization will continue and persist even after the end of the pandemic situation because it is characterized by security and brings with it a more intensive influx of profits. An important area is marketing, the digitization of which streamlines the company's business. Artificial intelligence (AI) and at the same time marketing automation makes it possible to create a bridge between the creativity of marketing efforts and the real needs of customers.

DESI Indicator

The mentioned DESI indicator is an index monitoring factors such as: the progress and development of the competitiveness of European states and the European population in the field of digitization. The frequency of monitoring the digital economy and society by the European Commission is on an annual basis. This index consists of a combination of 44 indicators, which are divided into 5 basic measurable areas. The first area that the index examines is the rate of internet connection and thus internet availability. The second area of the survey is the population's digital skills. The third part deals with the research of services within the Internet and their usability. Another area is the technological unity of digitization, and the last aspect of the DESI index is digital public services. This index represents the overall level of the digital society of a particular European country that is part of the European Union. Within the 5 main, basic groups, the indicators are divided into individual sub-dimensional groups and sub-indicators. The index aims to identify, as far as possible, problem areas to which individual member states should pay increased attention, or try to use such methods and procedures that would have a positive effect on individual indicators. A partial goal of the DESI index survey is also to make a comparison of member countries with each other (Fig. 4.2).

According to the report and research of the above-mentioned index, the Slovak Republic ranked 22nd in the previous year 2020. Even though Internet services and

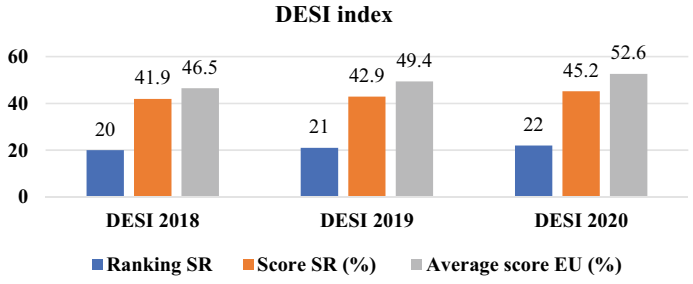

Fig. 4.2 Index DESI (*Source* own processing)

their use by Slovak users are systematically growing, in comparison with other EU countries, Slovak Republic lags behind them.

Consumer Behavior in the Digital Transformation of Businesses

We found the data available to the Statistical Office of the Slovak Republic that the general retail sector decreased by 14.30% from February to April 2020. During this period, not only Europe but also the global environment of consumer markets were paralyzed. The decline in retail sales was because governments adopted a list representing measures to eliminate population mobility to reduce the spread of the COVID-19 pandemic. From May 2020, restrictions began to be gradually relaxed or lifted, which also meant the reopening of retail outlets and the positive growth trend of retail sales, which lasted until September 2020. This is a period in which the first wave and the second wave of the COVID-19 pandemic are slowly approaching. The decrease in sales in the following 10th, 11th, and the 12th month (October, November, December) was not so enormous, mainly due to less stringent restrictions and the partial operation of retail outlets. Much tougher measures came at the turn of 2020 and 2021 due to the unfavorable increase in the number of patients, which caused the re-closing of retail stores and a decrease in sales by 16.80% in January 2021. In February, we record a decrease in sales of 14.70%. With a brief analysis of the development of retail during the pandemic, we move on to the evaluation of the questionnaire survey. Respondents' answers to the question of whether they buy in retail and whether they buy products via the internet were as follows: only 1% of respondents do not buy in traditional retail, which represented 4 participants. The higher percentage of negative answers was in the case of online purchases, namely 2.94%, main people from the Baby Boomers generation. As part of the researched issue, we conducted a questionnaire survey, through which we determined the perception of e-commerce by Slovak consumers. The structure of respondents by gender represented almost 73.14% of the female population. Men made up 26.86% of respondents. According to generational stratification, the largest share was made up of Generation Z and zoomers, respectively, 62.75%, followed by Generation Y, millennials with a share of 27.84%, Generation X was represented by 5.88%, and the smallest share was held by respondents of the baby boomers group. Many studies perform a detailed analysis of consumer differences in purchasing behavior by customer generation (Gajanová et al., 2020). Each generation has a certain characteristic, but it can be observed that consumer attitudes and behavior are subject to change with age. It should also be noted that people of a certain generation and age may have different attitudes and shopping behaviors (Nadanyiová et al., 2020). Respondents from the city represent 57.84% of respondents. From the countryside, it was 42.16%. From the economic point of view, the respondents were divided into 6 groups as follows: employed (26.47%), students (61.18%), domestic (3.92%), entrepreneurs (3.73%),

unemployed (3.13%)), and pensioners (1.57%). Of the 511 respondents, only 2.94% did not shop online, of which 8 were men and 7 women. They were mostly members of the generation of baby boomers living in the city who were retired. When asked how often Slovak consumers shop, 1.76% of respondents answered daily, 48.04% per month, 9.80% half-yearly, 25.49% quarterly, 12.94% per week, and 2.94% of respondents did not shop electronically at all. In the questionnaire, we also assessed the importance of selected e-commerce factors and answered the questions as follows: the most important aspect is considered to be the credibility of the seller to 66.34% (339); price 53.03% (271); customer reviews 50.68% (259); detailed product description 50.10% (256); delivery rate 49.51% (253); personal data protection 45.99% (235); ease of searching 42.47% (217); ordering goods outside opening hours 36.20% (185); assortment width 36.01% (184). Less important was the appearance of the website with a share of 31.70% (162). Respondents had a neutral attitude to the aspect of comparing several products 29.16% (149) and promoting goods 39.73% (203). We then determined the retail format preferences based on the type of consumer goods. When buying food, most respondents preferred a classic retail store of 97.85% (500). 46.97% (240) of the majority of respondents shop for books, music, and similar items via the internet and in the classic store 38.94% of respondents (199). The majority of clothes are bought by 64.77% (331) in the classic store. 25.83% (132) of respondents buy clothes online and through the catalog, 5.28% (27) are the least popular. Respondents buy cosmetics and drugstores the most in the retail store 54.40% (278), followed by catalog sales with a share of 25.83% and the minority sells via the Internet 12.92% (66). Electronics and home appliances are mostly purchased by a sample of survey participants online 54.40% (278); some buy in the classic store 31.51% (161) and through the catalog, it is only 7.83% (40). The form of purchase related to the furniture assortment is realized mainly in the retail store 59.30% (303). 21.53% of respondents (110) make online purchases and 7.24% of participants (37) prefer catalog purchases of furniture (Table 4.1).

In the case of the fashion industry, consumer behavior is also changing. People are becoming more and more insecure, many have reduced their predatory desires for constant shopping, but the fact remains that a large percentage of people have stayed true to the brands they know and are familiar with, and who inspire them. Under the influence, customers had to transform their shopping habits, even though online shopping was not their favorite activity, and preferred to shop in brick-and-mortar stores where they could see or try the product but had no choice in this case (Granskog et al., 2020). According to Lord Simon Wolfson's research, more than half of consumers spend less in the fashion industry. This is mainly because national governments have agreed to introduce measures for their nationals to reduce the risk of disease transmission by reducing mobility, forcing citizens, i.e., consumers, to stay at home (Thomann, 2020). Fashion is one area of the industry that is currently estimated at $ 2.4 trillion and employs about 60 million people worldwide but about $ 500 billion is lost annually from this estimated value due to lack of sustainability such as wasted insufficient worn clothing, and we can also see a problem in clothing recycling that is insufficient (Casey, 2021). According to the ILO (International Labor Organization), the global clothing industry essentially collapsed in the first half of

Table 4.1 Preferences of purchasing goods

Sorts of goods	Retail		Catalog/teleshopping		Internet		I don't know		∑	
	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%
Food, beverages	500	97,85	1	0,20	3	0,59	7	1,37	511	100
Books, CD's, DVD's	199	38,94	38	7,44	240	46,97	34	6,65	511	100
Clothes	331	64,77	27	5,28	132	25,83	21	4,11	511	100
Cosmetics	278	54,40	132	25,83	66	12,92	35	6,85	511	100
Electronics	161	31,51	40	7,83	278	54,40	32	6,26	511	100
Household appliances	161	31,51	40	7,83	278	54,40	32	6,26	511	100
Furniture	303	59,30	37	7,24	110	21,53	61	11,94	511	100

Source Own resources

2020 due to the COVID-19 pandemic. The main ways in which COVID-19 affected fashion supply chains were in particular the closure of factories, the disruption of clothing production, and the emergence of bottlenecks in the manufacturer-supplier-customer relationship. As many fast fashion supply chains use one country to produce raw materials and another to produce clothing, countries that do not produce their textile raw materials have been hit even harder due to bottlenecks at the beginning of the entire production system (Jackson et al., 2020).

A questionnaire focused on this area of clothing retailing was conducted in the first quarter of 2021. As can be seen at first glance in Fig. 4.3, up to 85.6% (428

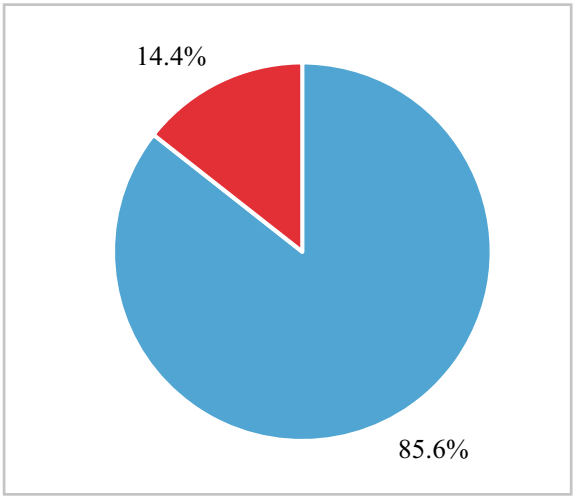

Fig. 4.3 Place of purchase of clothes (*Source* Own resources)

respondents) prefer buying in brick-and-mortar stores even in this digital age. As a result, only the remaining 14.4% (72 respondents) prefer to buy clothes online via the Internet. By a more detailed analysis of the question concerning the age of the respondents, we cannot be surprised that most online purchases are made by young people. Young people under the age of 25 and from 26 to 44 are represented in the same proportion (1:1). Given the current situation affected by the COVID-19 pandemic which affected the lives of all people without exception and also had a significant impact on all sectors, we asked respondents whether this pandemic affected their shopping behavior. Regarding the answers to the above question where as many as 428 respondents (85.6%) said that they preferred to buy in brick-and-mortar stores which are closed for a long time, many of them were forced to change their shopping habits. In connection with financial uncertainty due to job loss and fear of illness, it follows that more than two-thirds of respondents 67.6% (338 respondents) of coronary crisis have changed their shopping behavior in the field of clothing. The consumer behavior of the remaining 32.4% (162 respondents) did not change at all. In a detailed analysis of the answers, we found that 36 of the total number of 64 men interviewed fall into this group which represents 56.3%.

The last question in the question was opened and directly linked to the previous answers. We found out how the pandemic affected the purchase of clothes by our respondents who were positive about the previous question. Of the 338 responses obtained, 13 (3.8%) were unusable. The first group with the largest representation is the expression "I buy less." In this group, 196 respondents (58%) stated as reasons: "I only buy the necessary pieces of clothing," "I do not like online shopping," "shops are closed and I can not try things or touch quality,"" I'm not going anywhere," and "I'm reaching for the clothes I already have in my closet." As many as 105 respondents (31.1%) used the answer "I don't buy at all." The reasons given were: "financial distress," "I'm not going anywhere," "I'm using the clothes I have." The third group consists of respondents whose pandemic, on the other hand, encouraged more clothing. Of the 24 respondents (7.1%), we received only two more detailed reasons why they buy more, namely: "I'm bored" and "I am currently using social media to an increased extent." Combining the first two answers, we confirmed from the theoretical part that more than half of consumers spend less on clothes than before the pandemic.

Discussion

Fu (2020) assumes that the post-pandemic situation will accelerate automation and digital processes even further in the business sphere by forcing companies to build production systems that are characterized by their resilience as well as strong supply chains. Digitization in a broader sense also represents a higher demand for capital and technology and a lower level of utilization of the workforce. Engineers can even control the production process remotely. As a result, this process can be considered less contact-intensive and therefore has less impact on social distances or restrictions

on population mobility. Therefore, the digital transformation also includes smart manufacturing, smart services, e-public administration, and a digitized green transformation supported by 5G, BG, cloud technology services, the Internet of things, and blockchain technology. All these components of DT are transforming or even revolutionizing the process of producing and providing private/public services. One of the aspects that can be considered critical is to improve production and consumption in such a way that it becomes sustainable. Research shows the possibility of creating the so-called platform for multi-institutionalism as part of the support for small and medium-sized enterprises toward digitization technologies, to focus in particular on the environmental and social performance of these enterprises (Bai et al., 2021).

Recommendations for fast fashion retailers according to Casey (2021) are:

1. It is important to provide transparency and sustainability information through:
    a. evaluation systems that measure the degree of sustainability through the award of points,
    b. labeling of products for sustainability monitoring,
    c. classification of products based on their sustainable properties,
    d. providing information about sustainability after the purchase process.
2. The second step that is important for fast fashion retailers is to integrate circulating or circular business models.

Retail is an important part of the supply chain and sustainability in the fashion industry has received a lot of attention in the last decade. Fundamental trends in the field of sustainability and retail research are:

- an analysis of the conditions that bring positive results under the Sustainability Initiative,
- examining and monitoring the impact of sustainability measures on different brands,
- implementation of analyzes at the international and intercultural level (Gazzola et al., 2020).

The pandemic has enabled the fashion and FF industry to re-establish and update the value supply chain in a sustainable environment. Rao et al. (2021) argue that the issue and attitude to sustainability and social responsibility will be very strict critical instruments for the younger generations of zoomers and millennials, whose ever-increasing awareness of environmental degradation and devastation as a result of the extreme use of natural resources is the result of extreme exploitative consumerism. The creation of credibility, which fundamentally affects the behavioral intent of the purchasing process, has never been accompanied by such intensity and criticality for the customer-retailer relationship as it is today. In future, the customer can be expected to procure a larger number of ECO products, fashionable clothing that will be sustainable, and accessories whose features will also be accompanied by a sign of sustainability. About customers' value system, transparency, and product quality assurance after COVID-19, retailers will need to reassess natural resource

sourcing practices and improve the producer-supplier-customer relationship. Retail is the penultimate link in the distribution chain, which can change the configuration philosophy and modeling of business relationships through sustainable and environmentally friendly ways, thus reaching the consumer of the future. Innovative potential for eliminating corporate inventories, satisfying trends in the concept of sustainability, cyclicality of old seasonal inventories to the new season through intelligent fabric modifications and design, a simplified fashion calendar to reduce supply chain inefficiencies are mandatory for the future after COVID-19. According to a study by Shabir and AlBishri (2021), Zara, part of the Inditex retail chain, has been implementing a digital strategy since 2010, mainly by setting up a website and making the business available to Chinese and American customers. They are key to its sales. Digital transformation is considered to be one of the most powerful tools that can help Inditex with the impact of a pandemic and reduce it to the most acceptable level. The group's online sales grew by 76% in the third quarter of 2020, and online purchases exceeded 3.4 billion in the first three quarters of 2020, an increase of 44% year-on-year. The group of companies, of which ZARA is a part, forecasts its sales through the online space, and its forecasts of the purchase through the online platform by the end of 2022 should be made up of more than 25% of the total sales. The company has also pledged to meet its 2025 commitment to sustainability goals, the most important of which are the elimination or removal of plastic bags by Zara and the Inditex group, as well as consumers and the use of recycled raw materials to produce fashion products. The Inditex (Zara) group uses organic cotton in the production of clothing and is one of the first four users in the world to use this raw material. Until the same year, Inditex's sustainability policy is aimed at producing such garments, the primary raw material of which will have to be the use of sustainable recycled organic cotton, as well as flax or polyester. Among other things, the group of companies is making a significant effort to protect biodiversity, help with climate change and reduce water and energy consumption. In 2011, Zara faced the problem of actively engaging in child labor in Brazil, which also led to accusations. These allegations consisted of creating a hostile work environment and using child labor in the production of clothing and other products of the company to eliminate production costs. According to the report, Zara was to force employees to work 16–19 h every day and, in addition, they were forced to live in a factory (building without windows). Workers were not allowed to leave the building. The conditions of work were marked as inhumane, without signs of hygiene. The premises were cramped and dangerous to the very health and life of the company's employees. Remuneration for work was very low (Dumas, 2011). The benefits that sustainability offers for society, nature, and ecosystems are manifold. Sustainable practices are attracting to the generation of zoomers with their attractiveness. The members of this generation group are representatives whose interest in product sustainability is great. Retailers should keep these preferential views in mind. This is also evidenced by their determination to invest in environmentally responsible products. At present, there are no global standards that can define sustainability in the clothing industry in detail. This means that more work needs to be done to standardize metrics for sustainable mode (Shabir & AlBishri, 2021).

Conclusion

COVID-19 also changed the shopping behavior of Slovaks. Shopping has moved more to online space. Only time will show us whether the change in consumers' shopping behavior will be permanent or only temporary. However, one thing is certain: we will see the consequences of the crisis for many more months to come, and rapid adaptation to change is the key to managing the situation successfully. For retailers to survive the disruption, they need to accept change and respond quickly. Modern business architecture is one of the powerful tools that help business leaders to manage the changes they need to make to operate in a rapidly evolving digital world driven by customer experience and intuition. Digital technologies have a profound impact on our personal lives. Retail is disrupted by changing expectations from customers and competitors who have accepted new digital business models and solutions. In addition, as digital disruption is borderless, it brings a global dimension to the challenges facing retailers. To stay relevant and successful, retailers need to respond and find ways to quickly build the new experiences that customers seek and appreciate. This may include new channels, new service offerings (e.g., delivery methods), new products, or a combination of all these options to achieve the greatest impact and relevance. From business observations in many industries, it is clear that digital transformation is key to responding to changing customer needs and desires. Unfortunately, there is no effective standard for performing a digital transformation. Organizations must individually implement the design and set out a plan for their journey into the new digital future. The complex and enormous implementation of digital transformation is a challenge for any business, regardless of its business area. Many obstacles, barriers, and limitations prevent the implementation of changes that would make sense, and sometimes teams may not be able to make effective forward action. Of course, there is also the question How to start? We do not always know the answer to this question, and it is not always obvious how to start implementing digital business change. Organizations need to rethink strategy, learn to manage the uncertainties associated with making change, accept it, and adapt to new approaches to planning and implementation. The speed of delivery of products or services, their innovative side, fast iteration, continuous or permanent feedback, adaptability, and, last but not least, attitudes to uncertainty and "failure" are key attributes of this new global economic system.

References

Bai, H., McColl, J., & Moore, C. (2021). Motives behind retailers' post-entry expansion-Evidence from the Chinese luxury fashion market. *Journal of Retailing and Consumer Services, 59*, 102400.

Cakir, G., Iftikhar, R., Bielozorov, A., Pourzolfaghar, Z., & Helfert, M. (2021). Omnichannel retailing: Digital transformation of a medium-sized retailer. *Journal of Information Technology Teaching Cases*, 2043886920959803.

Calp, M. H. (2020). The role of artificial intelligence within the scope of digital transformation in enterprises. In *Advanced MIS and digital transformation for increased creativity and innovation in business* (pp. 122–146). IGI Global.

Casey, S. F. (2021). *How COVID-19 has Accelerated the Shift towards a More Sustainable Fashion Industry*.

Digital Economy and Society Index (DESI) 2020 Slovakia. Available: https://digital-strategy.ec.europa.eu/en/policies/desi-slovakia

Dumas, D. (2011). *Zara accused of employing children as young as 14 in "slave labour" factories in Brazil*.

Fu, X. (2020). Digital transformation of global value chains and sustainable post-pandemic recovery. *Transnational Corporations Journal, 27*(2).

Gajanova, L., Nadanyiova, M., & Lazaroiu, G. (2020). Specifics in brand value sources of customers in the banking industry from the psychographic point of view. *Central European Business Review, 9*(2)

Gazzola, P., Pavione, E., Pezzetti, R., & Grechi, D. (2020). Trends in the fashion industry. The perception of sustainability and circular economy: A gender/generation quantitative approach. *Sustainability, 12*(7), 2809.

Goerzig, D., & Bauernhansl, T. (2018). Enterprise architectures for the digital transformation in small and medium-sized enterprises. *Procedia Cirp, 67*, 540–545.

Granskog, A., Lee, L., Magnus, K. H., & Sawers, C. (2020). *Survey: Consumer sentiment on sustainability in fashion* (p. 17). McKinsey & Company.

Hauser, M., Günther, S. A., Flath, C. M., & Thiesse, F. (2019). Towards digital transformation in fashion retailing: A design-oriented IS research study of automated checkout systems. *Business & Information Systems Engineering, 61*(1), 51–66.

Ignat, V. (2017, August). Digitalization and the global technology trends. In *IOP Conference Series: Materials Science and Engineering* (Vol. 227, No. 1, p. 012062). IOP Publishing.

Indriastuti, M., & Fuad, K. (2020, July). Impact of covid-19 on digital transformation and sustainability in small and medium enterprises (smes): A conceptual framework. In *Conference on complex, intelligent, and software intensive systems* (pp. 471–476). Springer.

Ismail, M. H., Khater, M., & Zaki, M. (2017). Digital business transformation and strategy: What do we know so far. *Cambridge Service Alliance, 10*, 1–35.

Jackson, J. L., Judd, J., & Viegelahn, C. (2020). *The supply chain ripple effect: How COVID-19 is affecting garment workers and factories in Asia and the Pacific*. Research Brief, International Labor Organization, Better Work and Cornell University.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling, 127*, 221–232.

Knežević, B. (2018). *Challenges of digital transformation and information overload in retail industry.* Theory and Applications in the Knowledge Economy, 536.

Krymov, S., Kolgan, M., Suvorova, S., & Martynenko, O. (2019, March). Digital technologies and transformation of modern retail. In *IOP Conference Series: Materials Science and Engineering* (Vol. 497, No. 1, p. 012126). IOP Publishing.

Lewis, B. (2014). *Raising children in a digital age: Enjoying the best, avoiding the worst*. Lion Books.

Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering, 57*(5), 339–343.

Nadanyiova, M., Gajanova, L., & Majerova, J. (2020). Green marketing as a part of the socially responsible brand's communication from the aspect of generational stratification. *Sustainability, 12*(17), 7118.

Öhlin, J. (2019). *Retail business model change in the era of digital transformation: A case study from the perspective of a business model canvas.*

Rao, P. H. N., Vihari, N. S., & Jabeen, S. S. (2021). Reimagining the fashion retail industry through the implications of COVID-19 in the Gulf Cooperation Council (GCC) countries. *FIIB Business Review*, 23197145211039580.

Reis, J., Amorim, M., Melão, N., & Matos, P. (2018, March). Digital transformation: a literature review and guidelines for future research. In *World conference on information systems and technologies* (pp. 411–421). Springer.

Rodrigues, J. F., Ferreira, F. A., Pereira, L. F., Carayannis, E. G., & Ferreira, J. J. (2020). Banking digitalization: (Re) thinking strategies and trends using problem structuring methods. *IEEE Transactions on Engineering Management*.

Říha, I., Danková, L., & Naščáková, J. (2017). Digitálna ekonomika a digitálna transformácia. *Transfer Inovácií, 36*, 033–037.

Shabir, S., & AlBishri, N. A. (2021). Sustainable retailing performance of Zara during COVID-19 pandemic. *Open Journal of Business and Management, 9*(03), 1013.

Sima, V., Gheorghe, I. G., Subić, J., & Nancu, D. (2020). Influences of the industry 4.0 revolution on the human capital development and consumer behavior: A systematic review. *Sustainability, 12*(10), 4035.

Thaichon, P., Phau, I., & Weaven, S. (2020). Moving from multi-channel to Omni-channel retailing: Special issue introduction. *Journal of Retailing and Consumer Services*, 102311.

Thomann, Z. (2020). *COVID-19: There is hope for fashion yet* [online]. [citated 7 November 2021]. Available: www.retailcustomerexperience.com/blogs/covid-19-there-is-hope-for-fashion-yet/

Verhoef, P. C., Kannan, P. K., & Inman, J. J. (2015). From multi-channel retailing to omni-channel retailing: Introduction to the special issue on multi-channel retailing. *Journal of Retailing, 91*(2), 174–181.

Von Leipzig, T., Gamp, M., Manz, D., Schöttle, K., Ohlhausen, P., Oosthuizen, G., … & von Leipzig, K. (2017). Initialising customer-orientated digital transformation in enterprises. *Procedia Manufacturing, 8*, 517–524.

Ziółkowska, M. J. (2021). Digital transformation and marketing activities in small and medium-sized enterprises. *Sustainability, 13*(5), 2512.

Eva Nahalkova Tesarova is a graduate of the Department of Economics at the University of Žilina in Žilina in the field of economics and business management. She is currently working as an internal doctoral student in the Department of Economics under the guidance of prof. Ing. Anna Križanova, CSc. Her research is focused on consumer behavior.

Anna Krizanova is a Professor and works at the Faculty of Operation and Economics of Transport and Communications of the University of Žilina. She currently holds the position of Vice-Dean for Education of the appointed faculty; in the past, she also worked as a dean. Her field of activity is mainly devoted to marketing and management, while she holds the position of the head of the Marketing and Social Sciences Department of the Department of Economics.

Anna Kubjatkova is a graduate of the Department of Economics at the University of Žilina in Žilina in the field of economics and business management. She is currently working as an internal doctoral student in the Department of Economics under the guidance of prof. Ing. Anna Križanova, CSc. Her research is focused on pricing policy and marketing strategy.

Jakub Michulek is a graduate of the Department of Economics at the University of Žilina in Žilina in the field of economics and business management. He currently works as an internal doctoral student in the Department of Economics under the leadership of prof. Ing. Anna Križanova, CSc. His research is focused on the field of pathological relationships in the workplace.

Chapter 5
Digital Entrepreunerial Transformation (DET) Powered by New Normal Sustainable Developmental Goals (n-SDGs): Elixir for Growth of Country's Economy

Tran Dieu My Nguyen, Subhra R Mondal, and Subhankar Das

Introduction

Theglobal community is currently dealing with the effects of the coronavirus pandemic, which has affected people's daily lives (Mondal et al., 2022). The pandemic has also affected the business world. Understanding the impact of COVID-19 on businesses and industries is a vital aspect of developing a sustainable development strategy (Tiwari & Mondal, 2022). This topic is often used to describe the various ways in which technology can influence business activities. While the literature has focused on the supply side's actions toward sustainable development, there is a substantial gap in our understanding of the demand side's reaction to the same. Some of the most notable examples of how technology can affect sustainable development are artificial intelligence, Big Data, and the Internet of Things (Mondal & Das, 2021). We will explore the various applications and services of technology to determine their potential impact on society.

The pandemic that affected the world in 1918 was one of the most significant events in recent history. It disrupted the normal activities of society and caused many people to flee the country (Sharma & Das, 2021). The effects of the pandemic healed and transformed the environment for the non-human population. Following

T. D. M. Nguyen
Association of Vietnamese Scientists and Experts, Ho Chi Minh City, Viet Nam
e-mail: trandieumy.nguyen@avseglobal.org

S. R. Mondal · S. Das (✉)
Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam
e-mail: subhankardas@idr.edu.vn

S. R. Mondal
e-mail: subhrarmondal@idr.edu.vn

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_5

the pandemic, people became more aware of how their actions and business objectives affect the planet (Das, 2021a). It has led to the rise of the importance of sustainable business. With increasing consumers pressuring enterprises to improve their environmental performance, sustainable business has become a strategic priority (Siri & Das, 2021). Due to the increasing number of companies reporting their environmental, social governance (ESG) initiatives have become the norm (Ravi & Mondal, 2021). Today, the concept of sustainability has broadened to include various aspects of human capital development and business models. The cognitive enterprise and its virtual operations are now the new norms for the business world. Consumers have become more demanding in the retail space when choosing sustainable products and services. According to a study conducted by the IBM Institute of Business Value, around 55% of consumers consider sustainable and environment-friendly brands when making purchases.

Levitating Enterprises and Their Sustainability Look Out Through Global Capability Centers (GCC)

A Global Capability Center is an integral part of many large organizations. It provides a variety of beyond cost benefits while also driving the parent organization's sustainability goals. From the point of view of GCC, cognitive sustainability has the following essential features.

1. ***Digital innovation and transformation:*** GCCs play a critical role in driving an organization's digital transformation. They are equipped with the necessary capabilities to deliver the best possible customer experience and business processes. As organizations become more conscious about their sustainable sourcing practices, they are increasingly looking at GCCs to help them innovate and deliver these goals. In 2019, 59% of the new investments in Indian startups were made by global MNCs, equivalent to $ 1.5 billion.
2. ***Unrelenting Developmental Activity***: After the pandemic, GCCs faced various challenges maintaining business continuity and productivity. The concept of self-driven teams became more prevalent. As organizations return to the workplace, they create a sustainable, productive work model and cost-efficient (Duman & Das, 2021).
3. ***Continuous human capital development***: With the increasing number of employees working from home, virtual talent management is becoming an integral part of any organization's strategy. It includes identifying and developing the right skills and expertise across various platforms such as online learning.
4. ***Environmental and Social Protection***: With the increasing number of organizations measuring and improving their environmental impacts, this area is becoming a key strategy component. Currently, less than 1/3rd of the companies in the compression petroleum gas (CPG) Grand Retail sectors have defined a sustainable progress metric (Yegen & Mondal, 2021).

Mercedes-Benz is a global company that believes in the importance of social mobility. The Mercedes-Benz Research and Development Institute is a leading research and development organization that works on developing various components and systems for the company (Das, 2021b). Walmart Global Technology is responsible for leading the development of A.I., Blockchain, and IoT initiatives. Over a billion devices send out messages about their temperature, energy consumption, and daily operating functions (Sharma et al., 2020). To manage this massive volume, the team at Walmart Global Tech developed proprietary software that can detect abnormal events. The company's solution, Demand Response, can help retailers reduce their energy consumption. Through Demand Response, retailers can reduce their energy consumption without affecting the customer experience. In addition, it allows them to manage their energy consumption in response to peak demand. Often, the GCCs are integrated into the parent company's sustainability agenda.

In response to the COVID-19 pandemic, the United Nations developmental program (UNDP) warned that the deprivation experienced by many people during the mid-1980s is now comparable to the mid-1980s. The pandemic has highlighted the importance of technology in developing economies. The 2030 Agenda aims to build a more inclusive, resilient, and green economy (Mondal, 2020a). In 2019, the enterprises had not achieved their goals. As a result, we have identified key emerging trends to help them achieve a green economy. Modern technologies have made it possible for developing nations to collect and use geospatial data. In the Maldives, for instance, the UNDP uses drones to monitor disaster risks. In Peru, the UNDP uses spatial data to identify areas to improve forest management.

Fintech is emerging to improve the lives of rural communities. A mobile app and satellite-based data can help minimize the impact of weather-related crop loss on farmers. It can provide them with automated payouts (Das, 2020a). Data collected by satellites can be used to develop microinsurance plans for farmers. A consortium of insurers uses this technology to create the World Food Program plans (Das, 2021c). One example is the GCash Forest Platform, which the UNDP manages. People can collect points for various sustainable activities through an app, such as walking and buying organic produce.

The rise of the internet of things has created new opportunities for managing resources and environmental data. Sensors have gained widespread acceptance from smart cities to intelligent agriculture (Das, 2021c). Smart meters and demand-side monitoring are critical components of the internet that allow developers to connect to other applications. Despite the numerous advantages of technology, most developing nations still lack reliable and affordable connectivity (Mondal, 2021). To break the paradigm of global north developing nations, we need to provide training and skills-building so that people in developing countries can use the technology locally. We should also find ways to finance the expensive technology, such as satellite imagery, often used for machine learning. During a hackathon in Rwanda, several teams of young engineers came up with a simple and cost-effective way to transmit data from remote regions without internet connectivity (Duy et al., 2020). Another idea was to collect meteorological data at manual weather stations.

Many companies have made commitments to sustainability, but are they really for branding or addressing climate change? Doing business as usual is not enough to meet the goals of the Sustainable Development Goals. Change must be systemic across all the organization's operations. Companies need to work with various partners across various sectors to promote sustainability effectively (Van et al., 2020). This will enable them to implement best practices and avoid making unrecognizable changes.

In 2015, the global community adopted the 17 Sustainable Development Goals. These goals, also known as Agenda 2030, set out goals and targets for developing nations. The plans are built on the various advancements made in sustainable development over the past three decades (Siri et al., 2020). They are also built on the achievements of the previous global goals, which were implemented from 2000 to 2015. Through adopting these goals, the U.N. recognized the importance of local authorities in addressing the various challenges posed by sustainable development. Localizing the SDGs is a process that involves assessing and adjusting strategies to support the implementation of the goals and objectives of the Sustainable Development System (Singh et al., 2020). The 2030 Agenda is one of the system's goals, which aims to apply to all communities. The localization of global goals and efforts has been a vital part of sustainable development since it allows local communities to participate in the decisions affecting their local economies (Sharma & Das, 2020). Over the years, technology has played an essential role in global efforts to improve sustainable development.

The rise of extensive databases has created new forms of wealth powered by data. While oil is driven by scarcity, data can provide value (Das, 2020b). Countries should start acquiring the data to develop effective and efficient use. The Fourth Industrial Revolution has brought about various changes in how the world works (Mondal, 2020b). One of these is the emergence of a new paradigm of digital transformation. Due to the emergence of digital technology, we expect the various economic sectors to be changed entirely globally (Nadanyiova & Das, 2020). The skills needed to use the data collected will create a competitive advantage. Developing nations should also prepare themselves for the changes brought about by the new economy (Mohanty et al., 2019). Doing so will allow them to take advantage of the opportunities presented by the new environment (Behera et al., 2019). Data-driven governance is a critical component of the 2030 Agenda for Sustainable Development. E-governance can help improve the delivery of services to citizens, enhance the interactions with industry, and lower corruption (Das & Mondal, 2016; Singh & Das, 2018). Digital transformation is a process that involves the complete transformation of an organization or a group of people's activities, methods, and models (Jain et al., 2018; Mondal et al., 2017). It is focused on accelerating the impact of digital technologies on society (Gupta et al., 2019). The scope of digital transformation is explored in a study that aims to identify the role of Big Data and e-government in localizing SDGs.

The digital transformation of society presents a potential opportunity to support the goals of the Sustainable Development System (SDGs). Big data is a massive volume of collected data that can be used to identify patterns and improve decision-making. It can be accessed through various sources such as email, web searches, and mobile banking transactions (Chaudhry & Amir, 2020). The analysis of collected data

can provide policymakers with valuable information on the status of their programs and projects. Using digital technology, local governments can benefit from the data collected by collecting and analyzing it, which can help build resilient and sustainable communities. Local governments can use several best practices to measure the impact of digital transformation (Hervé et al., 2020). This chapter aims to analyze the impact of digital transformation in different countries. One of the main advantages of localization is that it allows local governments to implement and manage their local development programs and projects effectively. It also allows them to provide a better service to their local communities. Using technology, local governments can now effectively implement and manage their local development programs and projects, which can help them achieve the goals of the SDGs (Nandi et al., 2020). Aside from raising sustainable revenue streams, local governments also need to ensure that their programs and projects are aligned with the needs of their local communities (Orji et al., 2020).

Sustainable Objectives with Practical Implementation

The end of the millennium development goals (MDGs) marked the beginning of the 2030 Agenda, which included 17 plans to achieve sustainable development. From 2000 to 2015, the global campaign against poverty was launched based on the goals of the MDGs. However, many countries failed to meet their targets. During the last three years of the millennium, efforts were focused on accelerating progress on the remaining goals. Lessons were learned from implementing the Pacific Islands sub-regions acceleration efforts. The SDGs were developed following the lessons learned from the previous millennium development goals. They dealt with various issues, such as the importance of local governance and effective service delivery. The new set of goals, known as the SDGs, replaced the old ones (Papadopoulos et al., 2020). They provide a universal approach to development. The new Sustainable Development Goals (SDGs) goals are more ambitious than those set by the previous MDGs (Pillai & Sivathanu, 2020). They also reflect the importance of addressing environmental and social issues. During the SDGs, it is essential to acknowledge the advantages of the center (Ramírez et al., 2013).

Over the years, experts have rejected the idea of centralization as it could lead to development. Instead, it has been suggested that we move away from a centralized approach and toward a localized one (Rana et al., 2019). A political imperative argues that local communities should have the autonomy to make decisions. It allows them to have a stronger voice in shaping policies and solutions. The economic imperative argues that by reducing the government's role, SMEs will capitalize on new opportunities and develop new products and services (Sarkis et al., 2021). The economic imperative argues that by reducing governments' roles, SMEs will capitalize on new opportunities and develop new products and services. The service delivery imperative also contends that local institutions can offer better public service by being more competent to understand the needs of their local communities (Singh et al., 2019).

Decentralization also brings about improved accountability and transparency at the central level. Despite the advantages of centralization, localization still ensures the continuity of local development strategies and national security. Aside from keeping the development strategies and programs consistent, decentralized governance also allows local communities to develop their local development plans. Localization also helps communities get involved and contribute to the development process, enabling them to shape their own development goals and strategies.

According to Therborn, a localized concept allows decision-makers to understand the local context and issues, and this can help them make informed decisions. Developing and delivering services will enable communities to learn from their experiences and needs. It can help them overcome crises and create resilient communities. It can also enhance the local culture and traditions. Localization also allows local actors to scale up their efforts and prevent local marginalization. It can also improve the efficiency and effectiveness of international development programs. It also ensures that the development programs are not duplicated and waste less. Figure 5.1 explains that the four inputs such as community, effective sustainability, environmental protection, and innovation will help achieve the SDGs and MDGs.

Different countries have different policies when it comes to communities. In most cases, the role of communities has been neglected. Instead of focusing on the needs of individual communities, governments and markets have become the main drivers of addressing these issues. Local institutions are vital to ensuring that markets and governments behave properly. They can help bring back power to the people. For instance, local authorities can play a critical role in addressing education, transportation, and waste management issues. This idea of empowering communities is rooted in the belief that members of these communities will remain loyal to them.

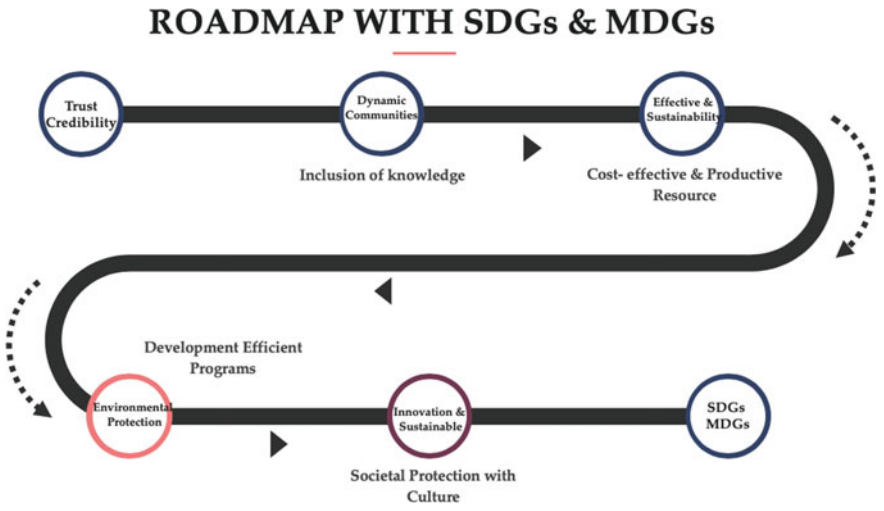

Fig. 5.1 Roadmap with SDGs and MDGs (*Source* Authors' creation)

This belief can help them develop their own capabilities and build their confidence in society. When communities are given more power over education, it can help them develop their own talents and build their own citizenship. The goal is to rebuild local autonomy and responsibility.

Instead of placing the local level at the periphery (Chou, 2020) proposed having local authorities as leaders who share the responsibilities of co-producing the economy. Cities can also benefit from having local authorities as they can provide a variety of services and solutions to address the needs of their communities. They can also raise private and public capital. Local authorities can also benefit from financing their local projects and initiatives through national and global instruments.

Digital Transformation for Small and Micro Enterprises Aimed at SDGs and MDGs

The scope of digital transformation has been the subject of much research effort over the last two decades. Various studies have examined how it can be done and its multiple enablers. Over the years, numerous companies started adopting transformative technology, such as implementing an enterprise resource planning system or a customer relationship management system. Before, these were typically focused on improving processes and reducing costs. Companies have widely adopted cross-border technologies such as social media and e-commerce in the last couple of years. These technologies have enabled them to transform their businesses by taking advantage of the opportunities presented by the rapid emergence and adoption of digital platforms. Despite its complexity, digital transformation is still a managerial issue that businesses need to address. Aside from implementing technology, successful digital transformation also requires addressing various administrative problems such as improving processes and training employees. Firms need to redesign their businesses by adopting technology to improve efficiency and minimize costs to achieve digital transformation.

The goal of digital transformation is to improve the efficiency of businesses by adopting technology-based solutions. Although digital transformation is a technical issue, it's also managerial. Successful digital transformation involves acquiring and deploying technical expertise and implementing organizational processes designed to improve efficiency and minimize risk. This process can be achieved using data-based models. The successful digital transformation of MSEs depends on the joint efforts of the government and enterprises. The first step involves the establishment of a framework that enables the digital processing of MSE. The government can also play a leading role by raising awareness about digital transformation and improving the workforce's skills. Digital transformation for MSEs, their implementation is still challenging due to the lack of infrastructure. Digitization can help MSEs achieve their goals, but the exact demands of the organization may vary depending on its size and culture. This process can also lead to changes in the way the organization

operates. A variety of factors can affect the adoption of technology in an organization. Unfortunately, many organizations are still not fully prepared to implement digital transformation due to resources and capital. For instance, many of them still have no website. The classical business model has been replaced by an instant evolving and versatile model that responds to the needs of today's customers in real-time. This paradigm shift is known as the COVID-19 era.

Entrepreneurial Insight for Digital Enterprises During and Post-pandemic Times

Given the increasing number of threats and the need for more effective risk management, many MSEs will likely adopt digital technology in the next couple of years. Despite the advantages of digital technology, many developing countries still face challenges in adopting it. This paper outlines some of the factors that can prevent the adoption of digital technology in these countries. Digitization can help improve the survival rate of MSEs by allowing them to meet their social and environmental commitments. This paper focuses on the use of digital technology in urban enterprises. Mobile money is becoming a critical digital transformation priority for MSEs. This paper shows that small businesses widely adopt it in developing countries.

In most countries, mobile money is more prevalent than banks. The unbanked customers of MSEs are the main customers of these firms. Most of the time, owners of MSEs leave their establishments unattended, resulting in them losing sales. Physical distancing measures are also likely to be implemented in a post-COVID-19 world. However, online services such as payment services are still expected to remain prevalent. MSEs are expected to evolve in response to the changes brought about by the economic situation. One example of this is mobile money, which will allow them to collect and process payments directly from their customers. MSEs can use various communication platforms to educate their customers about mobile money transactions. They should also be aware of the risks associated with these transactions. These risks have adverse effects on the profitability and operations of service providers. Conducting frequent dialogue with regulators and service providers is also essential to minimize these risks.

Most informal MSEs are not eligible for stimulus financing due to documentation. Having a digital identity and records would enable them to be more inclusive and contribute to a more sustainable economy.

Digitization technology can help improve the employment prospects of MSEs and lower poverty and enable people to become more involved in sustainable development. Using digital technology, MSEs can be integrated into the circular economy and improve their environmental performance. Due to the vulnerability of MSEs, it is up to the supply chain partners to cooperate in developing digital tools and integrating them into their organizations. Governmental efforts can also support this process by introducing new digital address systems and mobile money interoperability. Most

MSEs have limited funds and do not have enough reserves to cover emergencies. It means that formal organizations should start integrating MSEs into their supply chains to improve efficiency and effectiveness.

Digitization can also leverage supply-sustainability practices. It can be part of a company's strategic plan to compete successfully in the long term. A positive relationship between information technology and corporate social responsibility has been found. Digitization can help organizations improve their transparency and connect their impacts to other sources. Although digitalization has been associated with positive environmental sustainability, some studies have found that intelligent technologies do not directly affect social and ecological sustainability. The literature has limited the interactions between digital development and ecological sustainability. The lack of awareness about digital transformation hinders organizations' efforts to sustain and grow their green and resilient digital maturity. Therefore many MSEs have to improve their internal capabilities and operations to implement digital transformation effectively. MSE decision-makers often miss an opportunity to entirely understand the various interests associated with digital transformation. The findings of this study revealed that both external and institutional capabilities play critical roles in managing the volatility of digital change. Deploying digital resources across various business processes can help minimize uncertainty and enable MSEs to be more resilient during a pandemic era. Although many enterprises have adopted various resilience measures to improve their response to the pandemic, the motivations behind these measures are usually internal. For instance, in response to the COVID-19 pandemic, Indonesia started to digitize its MSEs even before the global outbreak. There are three kinds of pressure in which new MSEs operate during COVID-19, which are as follows.

The Pressure of Peer Group Institutionalization & Digitalization on New Enterprises

According to institutional theory, a firm is organized and informed by its standards and practices when operating efficiently. This concept can be used to justify the digitization of MSEs. The institutional theory can study how MSEs respond to various pressures during and after the COVID-19 period. Researchers can then divide isomorphism into three phases: coercive, normative, and mimetic. This concept is also used to explain the effect of political and commercial pressure on the firms' ecological performance. In developing nations, international buyers and investors exert pressure on local MSEs to safeguard the environment. Non-profit organizations and regulators also exert pressure on the firms. The pressure exerted by investors and buyers can lead to the formation of environmental regulations and standards that are mandatory for MSEs. Authorities usually enforce these regulations and penalties even during the pandemic. They also promote digital transformation and make it easier for MSEs

to operate efficiently. The digital divide can also serve as a deterrent to prevent MSEs from participating in digital transformation. However, this can also help them gain government support.

Normative Pressure of Institutionalization & Digitalization on New Enterprises

The normative pressure from various sources is usually from trade unions, consumers, and other social organizations. Trade unions and other groups are known to create regulatory forces which affect expectations and behaviors. The goal of the regulatory pressure is to ensure that consumers and vendors use goods in socially responsible ways. The culture and profitability of businesses play a huge role in influencing trade union members. Through digital transformation, MSEs can use various tools to manage their public opinion on various environmental issues. Not driving public opinion can affect the credibility and image of MSEs. It can also lead to financial losses and damage their competitive advantage.

Reflective Pressure on New Enterprises for Keeping the Pressure of Digitalization

The digital transformation of MSEs allows them to react to mimetic pressure and gain a competitive advantage. It will enable them to adapt to the behaviors and actions of their competitors. The intense mimetic pressure that MSEs face will influence government and stakeholder decisions on implementing digital technologies. It will allow them to gain economic benefits by adopting certain practices. MSEs that can successfully implement digital transformation will most likely assume it due to its perceived advantages. The institutional theory investigates how MSEs monitor and manage their various resources and compete with their rivals through mimetic processes.

Resource-Based Competitive Advantage for New Enterprises

Resource-based competitive advantage refers to an organization's ability to acquire or develop a competitive advantage. This concept explains how intra-organizational relationships can help an organization overcome its competitive disadvantage. The resource-based competitive theory argues that an entity has intangible and physical resources that can be used to compete. The presence of these assets can help firms

establish a competitive advantage. Knowledge capability can help build an organization's intangible resources and develop and sustain a competitive advantage. This concept is why many studies focus on the relationship between firms' resources and their supply chain resilience. In 2020, researchers discovered that firms could develop a competitive advantage by acquiring or using blockchain technology-related resources. It has been stated that digitalization is an example of an organization's resource-based competitive advantage. This concept can support various aspects of an organization's operations, including strategy, goals, and resources. Dynamic capabilities theory can explain how MSEs can sustain their competitive advantage in a constantly changing environment.

The Dynamism of Enterprises That Will Enhance Their Sustainability

The dynamic capabilities of firms are often used in the literature to explain how firms respond to changes in the market and technology. They can create, extend, and modify a firm's resource base. According to Teece and colleagues, organizations can develop dynamic capabilities by building three broad clusters: sensing opportunities, seizing opportunities, and transforming the organization's business model. These capabilities help firms design and implement a strategy that competes effectively and gains a competitive advantage. According to the literature, managing the complexity of digital transformation requires MSEs to develop new capabilities and solutions that can help them overcome the challenges of adopting new technologies. The ability to see and interact with new digital opportunities can also imply changes in the way people behave and resources are used. This theory explains why MSEs change their resource configurations and strategies to respond to a constantly changing environment. Creating a competitive advantage comes with the right set of capabilities. Having these capabilities can help firms maintain business continuity in an unpredictable environment. MSEs must have sensing capabilities to monitor and analyze the external environment for threats and trends that can disrupt their activities. This capability can be used at all levels of the organization to provide actionable insight to the top management team.

Studies show that MSEs are increasingly focused on developing sensing capabilities to gather information from various sources—including devices, channels, and emerging user behaviors. Despite the advantages of having these capabilities, MSEs often face challenges in predicting the latest trends and implementing effective strategies to manage them. Building on this knowledge and using it for developing generative sensing capabilities is also necessary to prevent systemic failures. To address the various threats and opportunities presented by the COVID-19 era, MSEs must also create capabilities that can allow them to experiment with new business models and digital platforms. Despite the advantages of having to sense and seizing powers, firms are still required to develop transformative capabilities to realize the

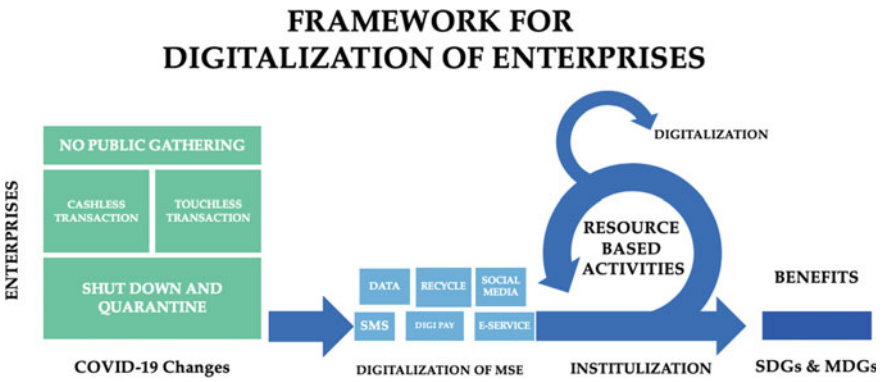

Fig. 5.2 Framework of digitalization (*Source* Authors' conception)

full potential of their digital strategy. The development of transformative capabilities supports the continuous renewal of organizational structures and assets to enable MSEs to respond to the changes brought about by the COVID-19 era.

Understanding how MSEs can create digital transformation capabilities is critical strategic question enterprises need to ask themselves. It is easier for large enterprises to become ambidextrous due to their more diversified resources. An ambidexterity capability can enable MSEs to address COVID-19 issues. This capability is being studied to see how it can build joint capabilities across various social, environmental, and economic factors. Figure 5.2 summarizes the framework for digital enterprises for developing COVID-19 recovery.

Implications of This Framework for Digital Enterprises

One of the most critical factors that supply chain organizations have to consider is the impact of digital transformation on their operations. It can be done by implementing robust and sustainable supply chain infrastructure. This infrastructure supports the practical process of businesses and enables them to integrate. For instance, policymakers can help develop a multi-agency platform to support MSEs in accessing digital technologies. They can also help SMEs develop and implement strategies and procedures related to digital transactions and financing. These developments can help improve the economic well-being of SMEs by reducing waste and improving the efficiency of their operations. However, they also require the involvement of MSEs in developing effective business continuity plans and strategies. Due to the complexity of the COVID-19 scenario, MSEs had to face more significant challenges and uncertainties. Through the lessons learned from this experience, they can develop effective strategies and procedures to address these issues.

Although the lessons learned from COVID-19 can be used for the long-term benefit of MSEs, many of them may not be able to address these issues immediately. As a result, the decisions made by MSEs are often affected by outside parties' concerns. One strategy that MSEs can implement is the stakeholder approach, which involves carefully analyzing the impact of the various problems on different stakeholder groups. The pandemic crisis highlighted the importance of having multi-dimensional stakeholder relationships.

Digitization can help people and organizations stay connected during extreme disruptions, but it can also lead to potential privacy infringements. The impact of digital transformation on social and environmental issues is complex. Various factors need to be considered before thoroughly assessing their impact. Some examples of social sustainability involve managing safety and health issues more effectively. However, this can be done without taking away from the rights of workers who might be exploited. During the COVID-19 disruption, the roles of technology and social responsibility shifted. The choice of technology was also related to the company's existing equipment and digital competencies.

Lack of resources and expertise in using more advanced technology solutions could also play a role. This issue should be considered when formulating new policies related to MSEs support measures. Challenges posed by the emergence of new digital technologies such as artificial intelligence (A.I.) can have ethical, social, and economic implications. Creating sustainable business models that can support service consumption opportunities can help MSEs improve their profitability. The impact of COVID-19 has caused MSEs to re-evaluate their core competencies and explore new options. Doing so can help them achieve faster and more intense growth. Developing new skills and taking advantage of new technologies can help MSEs endure the disruptions brought about by COVID-19 and remain competitive.

Conclusion

This chapter presents a case study on building resilient and sustainable supply chains following COVID-19. Lessons learned from successful digitization projects can help develop local MSEs in developing countries. Not only can digitization help establish sustainable supply chains, but it can also help improve the efficiency and profitability of MSEs. This paper provides theoretical frameworks that can support the development of sustainable digital transformation processes. Although digital transformation can help improve the efficiency and profitability of MSEs, it can also create challenges due to the lack of support from external stakeholders. Second, the roles of various institutions and stakeholder groups are complex. It is difficult to determine if consent should be provided through public or private means. Third, varying industrial requirements can also limit the spread of digital transformation across industries. Most of the time, barriers to the widespread adoption of digital technologies are created by those with limited or no access to these technologies. Some of these concerns were identified as areas of research that can help improve the success of

digital transformation in MSEs. This paper believes that the environment and context will allow MSEs to become more sustainable and environmentally responsible over the next couple of years.

References

Behera, M., Dash, M., Ayasa Kanta Mohanty, A. K., & Das, S. (2019). Entrepreneurial ecosystem: A geographical upliftment. *Revista Espacios*, 40, 26–36. http://www.revistaespacios.com/a19v40n01/19400126.html

Chaudhry, N. I., & Amir, M. (2020). From institutional pressure to the sustainable development of firm: Role of environmental management accounting implementation and environmental proactivity. *Business Strategy and the Environment, 29*(8), 3542–3554. https://doi.org/10.1002/bse.2595

Chou, M. (2020). Populism and localism: A new research agenda. *Democratization, 27*(6), 1102–1109. https://doi.org/10.1080/13510347.2020.1755265

Das, S. (2020a). *Media impact of advertising on consumer buying behaviour a comparative study of different media.* Shiksha o Anusandhan University. http://hdl.handle.net/10603/273691

Das, S. (2020b). Innovations in digital banking service brand equity and millennial consumerism. In *Digital transformation and innovative services for business and learning* (pp. 62–79). IGI Global. https://doi.org/10.4018/978-1-7998-5175-2.ch004

Das, S. (2021a). Digital entertainment: The next evolution in service sector. *Springer Nature.* https://doi.org/10.1007/978-981-15-9724-4.PrintISBN978-981-15-9723-7.OnlineISBN978-981-15-9724-4

Das, S. (2021b). *Search engine optimization and marketing: A recipe for success in digital marketing* (1st ed.). CRC Press. https://doi.org/10.1201/9780429298509

Das, S. (2021c) A systematic study of integrated marketing communication and content management system for millennial consumers. In *Innovations in digital branding and content marketing* (pp. 91–112). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch005

Das, S., & Mondal, S. (2016). *Yours digitally: Patanjali.* Available at SSRN 2737299.

Duman, Ü. O., & Das, S. (2021). The dynamic rise of digital brands' market mavens in digital entertainment: A complete know how for curious customers. In *Digital entertainment* (pp. 147–172). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_8

Duy, N. T., Mondal, S. R., Van, N. T. T., Dzung, P. T., Minh, D. X. H., & Das, S. (2020). A study on the role of web 4.0 and 5.0 in the sustainable tourism ecosystem of Ho Chi Minh City, Vietnam. *Sustainability*, *12*(17), 7140. https://doi.org/10.3390/su12177140

Gupta, D. K., Jena, D., Samantaray, A. K., & Das, S. (2019). HRD climate in selected public sector banks in India. *Revista ESPACIOS*, *40*(11).

Hervé, A., Schmitt, C., & Baldegger, R. (2020). Digitalization, entrepreneurial orientation & internationalization of micro-, small-, and medium-sized enterprises. *Technology Innovation Management Review*, *10*(4), 5–17. https://doi.org/10.22215/timreview/1343

Jain, S., Jain V., & Das, S. (2018). Relationship analysis between emotional intelligence and service quality with special evidences from Indian banking sector. *Revista ESPACIOS*, *39*(33).

Mohanty, P. C., Dash, M., Dash, M., & Das, S. (2019). A study on factors influencing training effectiveness. *Revista Espacios*, 40, 7–15. http://www.revistaespacios.com/a19v40n02/19400207.html

Mondal, S. R. (2020a). *Factors influencing store image loyalty and satisfaction from customer perspective an empirical study in retail sector*. Shiksha o Anusandhan University. http://hdl.handle.net/10603/273688

Mondal, S. R. (2020b). A systematic study for digital innovation in management education: An integrated approach towards problem-based learning in Vietnam. In *Digital innovations for customer*

engagement, management, and organizational improvement (pp. 104–120). IGI Global. https://doi.org/10.4018/978-1-7998-5171-4.ch006

Mondal, S. (2021). A systematic study of new age consumer engagement and exploration for digital entertainment for over-the-top platforms in various digital media. In *Innovations in digital branding and content marketing* (pp. 113–133). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch006

Mondal, S., Das, S., Musunuru, K., & Dash, M. (2017). Study on the factors affecting customer purchase activity in retail stores by confirmatory factor analysis. *Revista ESPACIOS*, *38*(61).

Mondal, S. R., & Das, S. (2021). Examining diabetic subjects on their correlation with TTH and CAD: A statistical approach on exploratory results. In *Machine learning and the internet of medical things in healthcare* (pp. 153–177). Academic Press. https://doi.org/10.1016/B978-0-12-821229-5.00007-0

Mondal, S. R., Virgilio, F. D., & Das, S. (2022). *H.R. analytics and digital H.R. practices*. Springer. https://doi.org/10.1007/978-981-16-7099-2

Nadanyiova, M., & Das, S. (2020). Millennials as a target segment of socially responsible communication within the business strategy. *Littera Scripta*, *13*(1), 119–134. https://doi.org/10.36708/Littera_Scripta2020/1/8

Nandi, S., Sarkis, J., Hervani, A., & Helms, M. (2020). Do blockchain and circular economy practices improve post COVID-19 supply chains? A resource-based and resource dependence perspective. *Industrial Management & Data Systems, 121*(2), 333–363. https://doi.org/10.1108/imds-09-2020-0560

Orji, I. J., Kusi-Sarpong, S., Huang, S., & Vazquez-Brust, D. (2020). Evaluating the factors that influence blockchain adoption in the freight logistics industry. *Transportation Research Part E: Logistics and Transportation Review, 141*, 102025. https://doi.org/10.1016/j.tre.2020.102025

Papadopoulos, T., Baltas, K. N., & Balta, M. E. (2020). The use of digital technologies by small and medium enterprises during COVID-19: Implications for theory and practice. *International Journal of Information Management, 55*, 102192. https://doi.org/10.1016/j.ijinfomgt.2020.102192

Pillai, R., & Sivathanu, B. (2020). Adoption of AI-based chatbots for hospitality and tourism. *International Journal of Contemporary Hospitality Management, 32*(10), 3199–3226. https://doi.org/10.1108/ijchm-04-2020-0259

Ramírez, R., Österman, R., & Grönquist, D. (2013). Scenarios and early warnings as dynamic capabilities to frame managerial attention. *Technological Forecasting and Social Change, 80*(4), 825–838. https://doi.org/10.1016/j.techfore.2012.10.029

Rana, N. P., Barnard, D. J., Baabdullah, A. M., Rees, D., & Roderick, S. (2019). Exploring barriers of m-commerce adoption in SMEs in the U.K.: Developing a framework using ISM. *International Journal of Information Management, 44*, 141–153. https://doi.org/10.1016/j.ijinfomgt.2018.10.009

Ravi, S., & Mondal, S. R. (2021). Digital entertainment based do it yourself content & advertisement as a factor of driving force for trust & customer patronage. In *Digital entertainment* (pp. 127–146). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_7

Sarkis, J., Dewick, P., Hofstetter, J. S., & Schröder, P. (2021). Changing of the guard: A paradigm shift for more sustainable supply chains. *Resources, Conservation and Recycling, 170*, 105587. https://doi.org/10.1016/j.resconrec.2021.105587

Sharma, E., & Das, S. (2020). Measuring impact of Indian ports on environment and effectiveness of remedial measures towards environmental pollution. *International Journal of Environment and Waste Management, 25*(3), 356–380. https://doi.org/10.1504/IJEWM.2019.10021787

Sharma, E., & Das, S. (2021). Integrated model for women empowerment in rural India. *Journal of International Development,* 1–18. https://doi.org/10.1002/jid.3539

Sharma, E., Nigam, N., & Das, S. (2020). Measuring gap in expected and perceived quality of ICT enabled customer services: A systematic study of top ten retailers of India. *International Journal of Applied Systemic Studies, 9*(2), 159–184. https://doi.org/10.1504/ijass.2020.113260

Singh, L. B., Mondal, S. R., & Das, S. (2020). Human resource practices & their observed significance for Indian SMEs. *Revista ESPACIOS*, *41*(07). http://www.revistaespacios.com/a20v41n07/20410715.html

Singh, R. K., Luthra, S., Mangla, S. K., & Uniyal, S. (2019). Applications of information and communication technology for sustainable growth of SMEs in India food industry. *Resources, Conservation and Recycling, 147*, 10–18. https://doi.org/10.1016/j.resconrec.2019.04.014

Singh, S., & Das, S. (2018). Impact of post-merger and acquisition activities on the financial performance of banks: A study of Indian private sector and public sector banks. *Revista Espacios Magazine, 39*(26), 25.

Siri, R., & Das, S. (2021). A study on processing of information storage & use of new age consumers in digital wellness sector through story telling & creating interest. In *Digital entertainment* (pp. 45–63). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_3

Siri, R., Mondal, S. R., & Das, S. (2020). Hydropower: A renewable energy resource for sustainability in terms of climate change and environmental protection. In *The handbook of environmental chemistry*. Springer. https://doi.org/10.1007/698_2020_635

Tiwari, M., & Mondal, S. R. (2022). Technological dynamism of workforce management for effective education service delivery during and after Covid-19. In *H.R. Analytics and Digital H.R. Practices* (pp. 199–215). Palgrave Macmillan. https://doi.org/10.1007/978-981-16-7099-2_8

Van, N. T. T., Vrana, V., Duy, N. T., Minh, D. X. H., Dzung, P. T., Mondal, S. R., & Das, S. (2020). The role of human–machine interactive devices for post-COVID-19 innovative sustainable tourism in Ho Chi Minh City, Vietnam. *Sustainability, 12*(22), 9523. https://doi.org/10.3390/su12229523

Yegen, C., & Mondal, S. R. (2021). Sharenting: A new paradigm of digital entertainment of new age parenting and social media. In *Digital entertainment* (pp. 213–231). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_11

Tran Dieu My Nguyen is a Master of Law works with Association of Vietnamese Scientists and Experts. The research areas are mostly concerned with legal aspects of sustainable practices for digital enterprises.

Subhra R Mondal, Ph.D., is working as senior research fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Vietnam. Her research interests are brand management, brand equity with innovative tools, smart tourism, destination marketing, social media marketing, AI & Web 5.0, and digital recruitment. She has published 25 publications indexed with WoS and Scopus along with 2 books and 12 scientific monographs. She has over 12+ years of experience in research and teaching. She is associated with different collaborative projects in European and Vietnamese organizations.

Subhankar Das (Academician, Researcher, Author, Writer, Blogger, Data Science trainer, Social Media Marketing Consultant) received his Ph.D. in Social Media Advertisement & Media Planning. He has 12+ years of teaching and research experience. He is currently associated as senior research fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Vietnam. He has published 20+ Research Papers in various International Referred Journals (Scopus, Thomson Reuters, SSCI, SCIE).

Chapter 6
Digital Transformation for New Sustainable Goals with Human Element for Digital Service Enterprises: An Exploration of Factors

HO Minh-Nhat, Huu-Long Nguyen, and Subhra R Mondal

Introduction

Digital transformation is transforming an organization, industry, or ecosystem. It involves the use of technology to improve processes and enhance efficiency. Digital transformation is about creating value for all its stakeholders, and it uses technology to enable them to adapt to changing conditions (Mondal et al., 2022). Technology and disruption are not the only factors determining digital transformation's success. It involves people and processes optimizing themselves using information and technology. While digital transformation is commonly used in a business context, it can also be applied to address societal challenges such as air pollution and aging populations (Tiwari & Mondal, 2022). In some countries, digital transformation is already being used to improve the quality of life. For instance, Japan has launched an initiative known as Society 5.0, which aims to improve the lives of its citizens (Mondal and Das, 2021a, 2021b, 2021c). Digital transformation is the process of transforming an organization's activities and techniques to take advantage of the opportunities presented by the rapid emergence and evolution of digital technologies (Sharma & Das, 2021). Developing new competencies involves being more agile,

HO Minh-Nhat
Department of Science and Technology, Ho Chi Minh City Government, Ho Chi Minh City, Viet Nam
e-mail: hmnhat.skhcn@tphcm.gov.vn

H.-L. Nguyen
National Startup Support Center, Science and Technology Business and Market Development, Ministry of Science and Technology, Ho Chi Minh City, Viet Nam
e-mail: longnh@most.gov.vn

S. R. Mondal (✉)
Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam
e-mail: subhrarmondal@idr.edu.vn

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_6

innovative, and customer centric. This process can help an organization obtain the advantage of new, often untapped, data sources and opportunities. A comprehensive and deep dive into the various digital initiatives and changes across multiple departments is a must for successful digital transformation (Das, 2021a). The scope of digital transformation can be affected by various factors such as the economy's current state, customers' expectations, and changing societal conditions. In practice, optimizing the end-to-end customer experience is a crucial driver of digital transformation. Further, developing new revenue sources and value ecosystems are also vital factors that will help drive digital transformation.

Digital transformation is a journey that involves multiple goals and multiple intermediary goals. While achieving ubiquitous optimization across various processes and divisions is key to success, building suitable bridges between the numerous parties involved is also key to achieving that journey (Siri & Das, 2021). The human element is vital in any digital transformation journey. It is because people value face-to-face interactions and are not interested in digital technology for everything. Yet, in non-digital transactions, digital transformation can also be a part of the solution to empowering those who interact with them (Ravi & Mondal, 2021). A strategy for digital transformation aims to create capabilities that are fully capable of taking advantage of the opportunities presented by new technologies. A successful digital transformation journey should have a straightforward and staged approach that involves various stakeholder groups (Duman and Das, 2021a, 2021b, 2021c).

Digital Enterprise Transformation for Holistic Development of Business

Digital business transformation is a process that involves the use of technology in various ways, and it has changed the face of business (Mondal, 2020a). Although digital transformation is often used to describe the multiple realities of the industry, it is also used to refer to changes in the way society and the economy operate (Yegen & Mondal, 2021). For instance, digital transformation is often used to describe changes in government regulations and economic conditions (Das, 2021b). Society's shifts can have significant impacts on organizations. No company, industry, or community area is immune from these changes (Sharma et al., 2020). To properly understand the scope of digital transformation, it is essential always to recognize its various facets.

Competitive Advantage on Digitalized Core Competency for Different Enterprises

Digital transformation refers to a wide range of processes and actions that transform an organization (Mondal, 2021). Doing so involves identifying and managing

various factors, such as internal and external factors (Das, 2021c). There are huge differences between different regions and industries when implementing digital transformation. For instance, some areas have various regulations and goals (Das, 2020a). This chapter is mainly focused on digital business transformation. It refers to the shifts in the way organizations think about the human element associated with customers, as it is a critical component in the digital transformation process (Duy et al., 2020). The evolution of technologies and various new digital platforms such as the Internet of Things, cloud computing, and big data have enabled companies to transform themselves through digital transformation (Van et al., 2020). However, despite the various advantages of these new platforms, they are only part of the overall process of transforming an organization.

Digital Transformation and Holistic Connection: Highlight the Peripheral Aspect of Enterprises

The last mile of a digital transformation journey often happens at the edges and is key to successful execution. Sometimes, digital transformation is only focused on the customer experience (Siri et al., 2020). This can be a mistake, leaving out other aspects of the project. The end goals of the business and the customers are the driving factors for the digital transformation agenda (Singh et al., 2020). The organization's role is to connect the dots and bridge the silos to achieve these goals. Despite the focus on the edges, the core capabilities are still being realized at a cultural level. The movement toward the edges is influenced by various factors, such as the evolution of computing paradigms and the decentralization of work models (Sharma and Das, 2020). In terms of data management and analysis are moving toward the edge as cloud computing grows and the need for more robust analysis and reporting grows (Das, 2020b).

Despite the apparent shift toward the peripheral factors of enterprises, digital transformation is still not limited to an organization with new organizational models. It requires a leader who can oversee the entire process regardless of how it is organized (Mondal, 2020b). In practice, we often see projects already on the way to a more enterprise-wide approach being carried out in an ad hoc or bottom-up fashion (Nadanyiova & Das, 2020). Doing so could put the organization at risk for long-term success. Digital transformation is not an end. It can be a way to meet other strategic goals such as business growth and innovation and a more agile operating model (Mohanty et al., 2019; Behera et al., 2019). Figure 6.1 represents digital transformation and its core areas which enterprises can focus to get competitive advantage in post-COVID-19 times.

Fig. 6.1 Digital transformation core advantages (*Source* Authors' creation)

Digital Transformation and their Scope Covering Different Areas

a. Digital transformation refers to transforming various aspects of a business, including its operations and human resources departments.
b. A successful digital transformation strategy involves optimizing a business process, a combination of various operations and tasks connected to a specific business goal. This process is often achieved using various tools and techniques.
c. A successful digital transformation strategy involves working with a variety of business models. These models help the company transform its core business while exploring other revenue sources and methods.
d. The various ecosystems that a successful digital transformation strategy involves include the relationships between multiple parties involved. These ecosystems are often built upon the foundations of digital transformation.
e. Business asset management is a process that involves identifying and managing non-tangible assets such as customers and information. This process is vital for achieving a successful digital transformation project.
f. A thriving culture involves establishing a set of core competencies aligned with the organization's customer-centricity goal. This culture can also be created by acquiring critical expertise in various areas such as digital maturity and leadership. The development and operations teams must work together seamlessly to bring new applications to market fast. It is where the culture and processes come into play.
g. The customer, worker, and partner-centricity of a digital transformation project are critically evaluated. This is because the expectations of all stakeholder groups are crucial to the project's success. The rise of cooperative and collaborative models is expected to create new revenue streams and business models. Technology can also be an enabler for addressing the various human aspects of

a digital transformation project, such as employee satisfaction and customer experience enhancement.

h. Digital transformation is not just about disrupting or improving technology alone. It also involves working with various parties to create new business models and revenue streams.

Digital Transformation and Related Disruption of Business Sectors

Digital disruption is a concept that refers to the disruption of an industry or ecosystem due to the emergence of new digital businesses that are disrupting the way people do business (Gupta et al., 2019). These new players have successfully mastered the digital skills needed to compete in the fast-changing world. Disruption is about more than just the disruptive tactics of an existing player (Singh & Das, 2018). It also refers to the shifts in power and relationships when people and businesses are disrupted. Digital disruption is a human phenomenon caused by various factors, such as how people use technology and their expectations for their future (Jain et al., 2018). Although multiple factors can cause digital disruption, they can also be triggered by changes in expectations and behavior. Disruption usually occurs at the last mile of a customer's experience (Mondal et al., 2017). For him, it's essential to keep in mind that the disruption effect can have a broad impact and that digital transformation advice should be considered in context (Das & Mondal, 2016). The idea that digital transformation is focused on the edges seems obvious when we consider the increasing expectations of the customers and the people around them. Figure 6.2 represents the peripheral and centric factors affecting digital disruption.

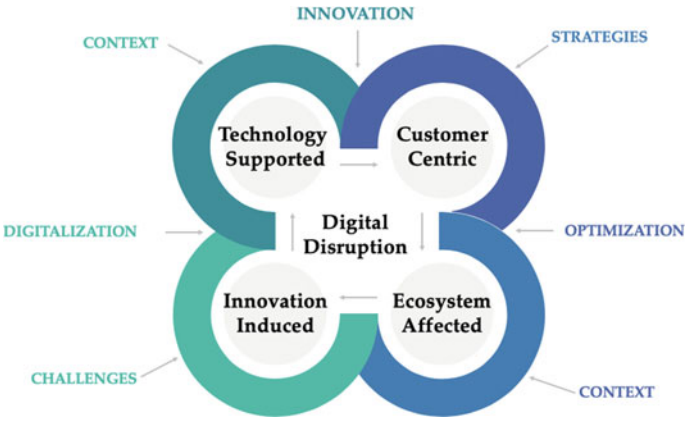

Fig. 6.2 Digital disruption (*Source* Authors' conception)

Digital Disruption and Technological Changes for Enterprises

Although some technologies are not disruptive, some of these have led to more disruption than others. For instance, social media has led to the rise of mobile computing. The evolution of the Internet of Services and its various components has become a crucial part of digital transformation. Big data analytics is also key to the success of many of these technologies.

The Internet of Things refers to the next generation, but its early days are still very much in their infancy. As such, the Internet of Things concept is not meaningful anymore. The Internet of Things will still be the glue that will enable most transformational evolutions. Despite its shortcomings in consumer applications, the Industrial Internet of Things is already driving industrial transformation. The former is due to the emergence of new technologies that are already disrupting the status quo. For now, we are going to remain fully hybrid. We will eventually integrate digital technologies into our lives.

Digital transformation is a process that involves not only managing the existing business but also building for the future. The biggest disruptive technologies of the next generation will be the Internet of Things, AI, Big Data, and cognitive/A.I. In the meanwhile, the hybrid stage is already here, where the Industrial Internet and Industry 4.0 are both essential components.

The digital disruption happened in different technological aspects, which are discussed below.

a. Technology-induced innovation is the latest trend that can disrupt and transform the way people work and live—some of the technologies that can disrupt artificial intelligence, the Internet of Things, and blockchain.
b. The convergence of various technologies such as AI, Big Data, and the Internet of Things can create new applications.
c. Contrary to popular belief, technology-induced disruption and customer-focused transformation are unrelated to new technologies. Instead, it is the result of various factors such as the demands of customers and the need for more effective and straightforward solutions.
d. When the Internet wasn't there, digital transformation was catching up with the times. As a result, businesses didn't have another option to provide better and more effective customer support.
e. Induced innovation and innovation-induced disruption are two different disruptive technologies that can occur when applied to the human body and mind. For instance, the development of new medicines and technologies to treat diseases can be disruptive.
f. Induced ecosystem-induced change refers to the various changes in the world's ecosystems, which are often triggered by multiple factors such as natural disasters, political upheavals, and regulatory changes. These can create opportunities for businesses to transform their operations and improve customer service.

This concept of the ecosystem brings us back to the importance of thinking holistically about everything that we consume and create. Everything that an organization

does is interconnected, with all its activities and models being linked to one another. Imagine how all its business activities are interrelated and how events and changes in the marketplace impact those activities.

Comprehensive Digital Transformation for Enterprises

Interconnectedness and the various accelerations that require deep enterprise-wide change, digital transformation is often seen as a challenging but necessary step to enable organizations to achieve their core business competencies. This transformation is also expected to trigger various changes in how they operate, such as the need for faster response times to deal with the increasing number of customer and partner demands. While digital transformation is an integral part of any business, it is also essential to get a comprehensive view of the whole picture.

Technological Transformation in Digital Language

a. Even if digital marketing is not an integral part of business activities, it can be used in the context of digital transformation.
b. Despite digital customer behavior's role in the business, it is not yet clear how it will play a disruptive role in the future.
c. The concept of paper as an information resource is no longer a requirement.
d. As digital transformation becomes more prevalent, it is only a matter of time before the distinction between physical and digital worlds is blurred.

Digital Transformation Should not be Exaggerated for Enterprises

Digital transformation can affect every aspect of an organization. It can create various changes in the way processes and activities are conducted.

a. Contrary to popular belief, digital transformation is not limited to technology companies or even tech startups. It can also be applied to various industries and sectors.
b. It is also a mistake to look at all the tech companies constantly showing off their digital transformation efforts. While some are disrupting the status quo, most of them are doing very challenging and exciting things.
c. The hype around disruptive companies such as Uber and other tech startups is not without danger. Instead, digital transformation is an integral part of any organization's strategy, and it starts with identifying the right goals and challenges.

d. Despite the speed at which digital transformation is happening, many industries are still transitioning and experimenting with different strategies and methods. As for disruptive companies, they can still be disrupted by any potential evolution.

Digital Transformation and Customer-Centric Approach

The digital customer experience is a critical element of any digital transformation. Its combination of various digital platforms and processes can help organizations improve their offerings and reduce costs. Distribution, marketing, and sales are among the earliest areas often considered when it comes to digital transformation.

Digital Optimization and Transformation of Different Sectors with Risk Optimization

a. A modern information management system is focused on delivering a better customer experience. It includes processes and information that feed into them.
b. Human resources, education, and procurement are critical areas that will be examined in this session.
c. To successfully implement the digital transformation, enterprises must connect all the various aspects of a business. Not only do they have to be interconnected, but they also must be people-oriented.

Misconception and Realities of Comprehensive Digital Transformation.

Digital transformation is becoming more prevalent in many organizations. However, to reap the benefits of this transformative process, organizations should first focus on the real business challenges they face.

Transformation Realities are Discussed as Follows

a. The relationship between IT and business is critical, as it will play a crucial role in the digital transformation journey.
b. Regardless of the industry, your customers, partners, and competitors will wait for business to catch up.

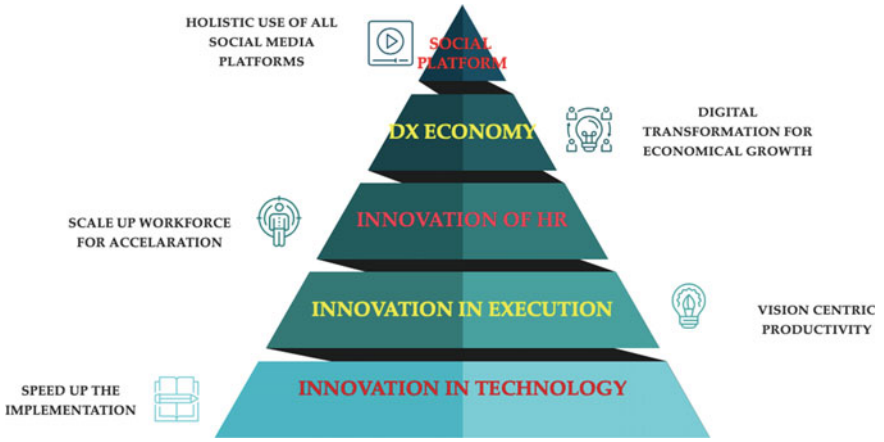

Fig. 6.3 DX economy and social platform (*Source* Authors' conception)

c. Digital transformation is usually led from the top, and it involves all the stakeholder parties. It's usually led by the CEO, the Chief Digital Officer, or the CIO.

Digital Transformation Economy by the Enterprises in the Social Platform

The rapid emergence and evolution of social platform technology profoundly affect society. With a clear focus on the customer experience and optimizing costs, digital transformation is expected to become the cornerstone of any digital economy. The emergence and evolution of social Platform technologies are expected to accelerate the pace of innovation and accelerate the process of transformation. It will lead to a digital economy but make no mistake: digital transformation is still about the customer experience and the human dimension despite all the hype. Figure 6.3 represents digital transformation stages with respect to social platforms.

Five Stages of Digital Transformation for Enterprises

In this chapter, the authors will talk about the various facets of the digital transformation economy. This concept refers to different digital technologies to transform multiple sectors.

Stage 1: Social and technological platforms for business enterprises: In 2007, the social platform was introduced, including the following four pillars: cloud, big data, mobility, and social media. It was called the Nexus of Forces, and it refers

to the various technologies driving social media analytics and cloud technology (Benbrahim et al., 2021). In terms of their adoption, they are transforming the way businesses operate.

Stage 2: Innovativeness for transformation: The social platform was an offshoot of the client–server model era and the mainframe. Several technologies are still predominantly technological but also focus more on business and customer innovation (Degl'Innocenti et al., 2020).

Stage 3: Digital transformation implementation: As companies start implementing initiatives focused on continuous improvement, they become more focused on creating new business models, developing ecosystems, and building new revenue streams, rather than just reacting to existing ones (Fan & Xie, 2021). The various factors that influence a company's decision-making process, including the customer experience, digital marketing, and innovation, are driving the next generation of digital transformation (KK, 2021).

Stage 4: Expediting innovativeness: The next few years will see the evolution of disruptive business models and the speed at which they can be implemented. This stage of change will propel enterprises to transform themselves and become more competitive (Liao et al., 2020).

Stage 5: Digital transformation propels the economy in post-COVID-19: The digital industrial revolution is about to happen, and it will have a considerable impact on all industries. The innovations that this phenomenon will enable include the Internet of Things, cognitive computing, and the social platform (Patel & Kore, 2020).

Digital Transformation as the Core of Economy and Role of Enterprises

The impact of digital technology has always been significant. In today's world, it is widely believed that the changes brought about by the rapid emergence and evolution of tech have created exponential growth (Paul et al., 2021). This speed is often felt differently in different industries. The various characteristics of a given industry and the various types of customers and stakeholder types influence it. In most cases, not fast organizations can still get left behind (Scekic et al., 2019). An organization can always expect to experience exponential growth due to changes in its environment (Srinivasa Rao & Vazquez, 2020). Doing so helps prepare for the inevitable changes and positions it for success.

Expediting the Innovation for Digital Transformation

While various technologies have accelerated the pace of change, they are just a fraction of the changes that are yet to come. The actual acceleration of digital transformation is when the changes happen so that the expectations of the people who are leading organizations are also surpassed (Wong et al., 2019). It is what analysts refer to as the digital transformation economy.

Proactive Response and Adaption for the Futuristic Transformation of Enterprises.

Agility and continuous adaptation are not enough to meet the demands of a rapidly changing environment (Zhang et al., 2020). This concept proposes a strategy that encourages forward-thinking ideas and techniques, which can be applied in various ways (Zou et al., 2020). This strategy must involve various processes and technologies to achieve its goals to be successful.

Digitalization Transformation and Critical Implementation of Resources

Converting document into digital information is a process that is commonly needed in digital transformation. Digitization has also been utilized in other ways, such as recycling paper into digital formats. Digitization is an integral part of digital transformation projects, and it requires various elements to succeed. Change for transformation should be managed by the top leaders holistically by considering every workforce hierarchy. Cosmetic changes can not be the solution in the long term. Changes from the grassroots level to top brass and their mindset for digitalization must be implemented.

Many changes affect various aspects of an organization, and many of these require change management. Knowing the importance of data and analytics to digital transformation is an opportunity to look back at the options created. It is an opportunity to look at what can be done better and identify what should be done differently. It is not new: as web analytics became widespread, many companies started to see the need for digital transformation in their operations. If we fail to consider the concerns and conditions of the individuals we address, this can lead to failure. The first step in any digital transformation journey is having people on board. Without this, an organization cannot realize a truly transformative digital transformation. If people are not considered, the changes may not be as fast as they should.

Urgency and Change in Intent for Digitalization

There are many types of roadmaps for digital transformation projects. They are intended to serve as guiding principles for the various phases of a project, and they are often focused on specific goals and needs. There is never a one-size-fits-all approach for digital transformation projects, as multiple factors and plans can change along the way. Having a prioritized list is also key to ensuring that the goals are aligned with the overall strategy. It's also important to avoid thinking that organizations are already prepared for digital transformation.

Although digital transformation is an integral part of any organization's strategy, it doesn't equal digital transformation. Instead, it's about combining data and processes to achieve business goals. There are still many gaps in digitizing our existing operations and procedures related to paper carriers. There are also huge gaps between the front and back-office processes. It is an example of why digital transformation is not equal to business goals and why many people still feel that there is still a lot of work to be done in society and business.

Digital transformation is about working across silos. In many cases, it involves reworking an organization's structures to enable people to collaborate and remove specific silos. The debate about who is responsible for digital transformation in an organization is archaic. Even if the CEO or other CXOs play a role, the context still matters. It is also vital that CXOs are digital savvy and have the necessary skills and experience to succeed in digital transformation. It is because there are no one-size-fits-all solutions.

Digital Maturity for Enterprises to Implement Transformational Changes

A successful digital transformation strategy should involve a strategic approach. Even though it seems impossible to develop one, it is necessary to understand the various components and processes involved in the project. Getting the correct answers requires a lot of questions. Each business has its unique characteristics, so it is important to start with a strategy that fits its needs.

In digital transformation, it is essential to remember the basics. Complex and challenging questions can be challenging to answer using frameworks and easy answers. Benchmarks and digital maturity frameworks have value. They help organizations develop capabilities that can enable them to implement digital transformation in a strategic and prioritized way. Digital transformation is not simply about a specific project or process. It involves many incremental steps, requiring a team of experts to implement it. The various stages and phases of digital transformation can have multiple goals, and they should fit within the project's overall purpose.

The goal of digital transformation is to prepare for the changes that will occur in the following years due to new technologies and market conditions. A digital

transformation strategy is constantly updated, and it considers all the uncertainties and risks involved in the various stages of the project. It ensures that the process can continuously improve and alter its course.

Policies for Digital Enterprises

a. The basic steps of digital transformation are also discussed in this article. However, they also need to be recognized as separate and distinct. Some people see digital transformation as a series of projects related to one another. In other cases, it can be considered a particular project. Others, like us, see digital transformation as an all-encompassing process that involves the use of various digital technologies. This transformation aims to enable businesses to fully utilize the transformative capabilities of these new platforms and technologies. This process can be done incrementally and requires a series of steps.
b. Futuristic looks to recover from the pandemic is critical. The rise of digital transformation was widely acknowledged in 2020 due to the COVID-19 pandemic. It presented various opportunities for organizations and societies to improve their digital capabilities. The sheer number of people who started using digital channels for multiple purposes. The inevitable shift from traditional work environments to remote work and hybrid work.
c. COVID-19 impacts the various measures taken by governments and organizations globally, which is very visible in the global economy. One of the most critical consequences of COVID-19 is that organizations start to invest in digital experiences and ecosystems. Even if COVID-19 is only focused on climate change, digital transformation is also becoming more significant. With the increasing number of organizations implementing digital transformation programs, it is expected that these will look at all aspects of business and society.

According to researchers' predictions, by 2023, over 75% of organizations will have a comprehensive digital transformation (DX) implementation plan. It will enable them to transform their businesses and society. Despite the various digital transformation initiatives already being implemented, it is still clear that digital transformation is still accelerating overall. The importance of a holistic approach has become more apparent in the past years due to the various changes brought about by COVID-19. It may seem like a bit of a step too far for many companies. But, for small organizations, this can be a huge opportunity to transform themselves and become more effective in addressing some of the most critical issues of our time. In 2021, at least 30% of companies will accelerate digital transformation programs to improve their businesses.

DX and Customer-Centric Approach for Enhancing the Experience: The New Standard Marketing

Most digital transformation projects are focused on the user experience and the customer experience. However, both are equally important and require different approaches. The customer experience doesn't belong to one department or another. It should be approached in a transformational manner involving all the stakeholders. While technologies have affected the customer experience, on the one hand, they have also enabled businesses to transform on the other. It requires a comprehensive and holistic approach to enhance the customer experience. The people dimension is probably the most critical area for businesses regarding the customer experience. A customer-centric approach is the most crucial factor of marketing.

The customer experience is at the core of digital marketing transformation. It is driven by the changing expectations of customers and the need to align digital marketing with other divisions such as customer service and IT. It is also why marketing has no choice but to work together with other divisions. The evolution of the marketing function and the role of the CMO are responsible for the success of digital marketing transformation. The goal of digital transformation is to have a comprehensive approach to customer-centric marketing optimization. It is an area that has been neglected due to the silos and separate ways marketing works. In an increasingly complex and connected environment, digital marketing is no longer possible. Instead, it must be done in a truly holistic way, encompassing all the elements necessary to improve the customer experience in a way that's never been done before. This process-oriented approach is often linked with optimizing the customer experience. It can be achieved through automation and cost efficiencies.

Digital Transformation and Data Information About Customer and Market

Even if digital transformation is at the center of information management, the link between this and other elements of digital transformation is not often made enough. Regardless of the type of information you need, it must be used to make the most of it. It is because it provides insight and helps in making decisions. Information chaos is a lot more than just a problem. It can also be an enabler. Information management is a strategic component that supports digital transformation. It plays a vital role in the success of digital initiatives by helping organizations achieve their goals. Information and knowledge management are also critical components of the three-step process: people, technology, and tools.

Intelligent Ways of Managing Information for Digital Transformation

Managing and securing all the necessary information in today's digital environment is not enough. The key is to provide actionable intelligence and actions to drive business results. With the rise of the Internet of Things and artificial intelligence, intelligent information activation has become more prevalent. Therefore, we talk about it. With increasing organizations adopting information-based strategies, intelligent information management has entered the boardroom. The increasing complexity of the data landscape and the need for actionable insights are critical factors that enterprises should consider when implementing intelligent information management. It isn't just about managing information anymore. It also involves connecting various systems and data sets. The increasing complexity of the data landscape and the need to unlock it faster are factors that enterprises should consider when implementing intelligent information management. There are some ways to keep on the information management, such as.

a. AI is the process of extracting meaning from vast amounts of data collected by an Internet of Things device.
b. Data capture and management are crucial to achieving faster, better, and more secure transactions. However, to get the most out of the collected data, the process of storing and managing it needs to be done digitally.
c. There has been an increasing focus on quality and accuracy.

Different businesses have unique characteristics. So, it's essential to consider how digital transformation can affect your industry and how it can help you grow. The retail industry is one of the fastest-changing sectors in the world. It is constantly adapting to meet the needs of its customers. Digital transformation is already prevalent in the retail industry. From the front end to the back office, the various processes related to the retail sector are constantly being updated to accommodate the customer's needs. Even though the shop is still critical to many consumers, they have come to expect more innovative experiences when it comes to their shopping experience. Several other technologies have transformed the retail industry, such as the IoT. According to analysts, this tech is already influencing how stores operate.

Expect more innovations that combine various technologies to improve the way people shop for products continuously. But, more than just new products, retailers are also focused on addressing the needs of their customers. The Industrial Internet is already becoming an integral part of the manufacturing industry, experiencing a digital transformation. Combining various technologies, such as data and industrial technology, can improve processes and increase efficiency. Leaders in manufacturing are constantly looking for ways to improve their operations and enhance their customer-centricity. However, many of them are still focused on implementing new strategies and methods of revenue generation. This strategy is not ideal for manufacturers as they may become disruptive due to the lack of a comprehensive digital

transformation plan. Although the Industrial Internet and Industry 4.0 are emerging, their main challenges are still unclear.

The Industrial Internet of Things is an integral part of the industry 4.0 digital transformation. It is proved by the leading role that it plays in manufacturing. The manufacturing industry is leading the way to adopt the Internet of Things. Most of the time, this industry's success is due to the right strategy and execution. But, to truly succeed, this requires a deep understanding of the various challenges and opportunities.

Conclusion

With digital transformation becoming a hyper-connected reality, the need for hybrid, integrated, and inclusive approaches is becoming more apparent. To successfully execute digital transformation, executives need to have a deep understanding of various domains. A CEO needs to know about the different parts of a business process, including reengineering, cybersecurity, and more. Understanding the impact of digital transformation on various areas is a must-have for executives. People and processes are the two most vital requirements which stand on technology for the successful implementation of digital transformation. It is about taking advantage of the power of digital technologies to improve processes and enhance customer experiences. Even beyond digital technology, digital transformation can support and enhance existing processes. It can also create new business models and alter existing ones.

Contrary to popular belief, digital transformation is not a linear process. It involves responding to the changes brought about by digital technologies in our daily lives. The technologies themselves are not the only factors that make digital transformation happen. The human dimension is also an essential part of this process as it informs us about the unforeseen consequences of our actions and behavior. To successfully implement a digital transformation, we need first to establish a culture focused on what people need.

References

Behera, M Dash, M. Ayasa Kanta Mohanty, A. K. & Das, S. (2019). Entrepreneurial ecosystem: A geographical upliftment. *Revista Espacios.* Vol. (40), pp. 26–36. Retrieved from http://www.revistaespacios.com/a19v40n01/19400126.html

Benbrahim, H., Hachimi, H., & Amine, A. (2021). Deep transfer learning pipelines with apache spark and keras tensorflow combined with logistic regression to detect COVID-19 in Chest CT images. *Walailak Journal of Science and Technology (WJST)*, *18*(11). https://doi.org/10.48048/wjst.2021.13109

Das, S. (2020a). *Media impact of advertising on consumer buying behaviour a comparative study of different media.* Shiksha o Anusandhan University. http://hdl.handle.net/10603/273691

Das, S. (2020b). Innovations in digital banking service brand equity and millennial consumerism. *Digital Transformation and Innovative Services for Business and Learning* (pp. 62–79). IGI Global. https://doi.org/10.4018/978-1-7998-5175-2.ch004

Das, S. (2021a). Digital Entertainment: The Next Evolution in Service Sector. *Springer Nature*. https://doi.org/10.1007/978-981-15-9724-4.PrintISBN978-981-15-9723-7.OnlineISBN978-981-15-9724-4

Das, S. (2021b). Search engine optimization and marketing: A recipe for success in Digital Marketing (1st ed.). CRC Press. https://doi.org/10.1201/9780429298509

Das, S. (2021c) A systematic study of integrated marketing communication and content management system for millennial consumers. In *Innovations in Digital Branding and Content Marketing* (pp. 91–112). IGI Global. https://doi.org/10.4018/978-1-7998-4420-4.ch005

Das, S., & Mondal, S. (2016). Yours digitally: Patanjali. *Available at SSRN 2737299*.

Degl'Innocenti, M., Frigerio, M., & Zhou, S. (2020). Development banks and the syndicate structure: Evidence from a world sample. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3615477

Duman, Ü. O., & Das, S. (2021). The dynamic rise of digital brands' market mavens in digital entertainment: A complete know how for curious customers. In *Digital Entertainment* (pp. 147–172). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_8.

Duy, N. T., Mondal, S. R., Van, N. T. T., Dzung, P. T., Minh, D. X. H., & Das, S. (2020). A study on the role of web 4.0 and 5.0 in the sustainable tourism ecosystem of Ho Chi Minh City, Vietnam. *Sustainability*, *12*(17), 7140. https://doi.org/10.3390/su12177140

Fan, L., & Xie, J. (2021). Identify determinants of container ship size investment choice. *Maritime Policy & Management, 1–16*,. https://doi.org/10.1080/03088839.2021.1971784

Gupta, D. K., Jena, D., Samantaray, A. K., & Das, S. (2019). HRD climate in selected public sector banks in India. *Revista ESPACIOS*, *40*(11).

Jain, S., Jain V., & Das, S. (2018). Relationship analysis between emotional intelligence and service quality with special evidences from Indian banking sector. *Revista ESPACIOS*, *39*(33).

K K, K. S. (2021). The Covid-19 pandemic and the global economy : A synopsis. *Global Journal for Research Analysis*, 65–67. https://doi.org/10.36106/gjra/1207748

Liao, X., Wang, B., & Kang, Y. (2020). Novel coronavirus infection during the 2019–2020 epidemic: Preparing intensive care units—the experience in Sichuan Province. *China. Intensive Care Medicine, 46*(2), 357–360. https://doi.org/10.1007/s00134-020-05954-2

Mohanty, P.C.; Dash, M.; Dash, M. & Das, S. (2019). A study on factors influencing training effectiveness. *Revista Espacios*. Vol. (40), pp. 7–15. Retrieved from http://www.revistaespacios.com/a19v40n02/19400207.html

Mondal, S. (2021) A systematic study of new age consumer engagement and exploration for digital entertainment for over-the-top platforms in various digital media. In *Innovations in Digital Branding and Content Marketing* (pp. 113–133). IGI Global. 0.4018/978–1–7998–4420–4.ch006

Mondal, S. R. (2020b). A systematic study for digital innovation in management education: An integrated approach towards problem-based learning in Vietnam. In *Digital Innovations for Customer Engagement, Management, and Organizational Improvement* (pp. 104–120). IGI Global. https://doi.org/10.4018/978-1-7998-5171-4.ch006

Mondal, S. R., & Das, S. (2021). Examining diabetic subjects on their correlation with TTH and CAD: A statistical approach on exploratory results. In *Machine Learning and the Internet of Medical Things in Healthcare* (pp. 153–177). Academic Press. https://doi.org/10.1016/B978-0-12-821229-5.00007-0

Mondal, S. R., Virgilio, F. D., & Das, S. (2022). HR Analytics and Digital HR Practices. *Springer*. https://doi.org/10.1007/978-981-16-7099-2

Mondal, S., Das, S., Musunuru, K., & Dash, M. (2017). Study on the factors affecting customer purchase activity in retail stores by confirmatory factor analysis. *Revista ESPACIOS*, *38*(61).

Mondal, S. R (2020a). *Factors influencing store image loyalty and satisfaction from customer perspective an empirical study in retail sector*. Shiksha o Anusandhan University. http://hdl.handle.net/10603/273688

Nadanyiova, M., & Das, S. (2020). Millennials as a target segment of socially responsible communication within the business strategy. *Littera Scripta*, 13(1), pp.119–134. https://doi.org/10.36708/Littera_Scripta2020/1/8

Patel, D., & Kore, S. A. (2020). Artificial intelligence: Future impacts, challenges and recommendations on healthcare services. *International Journal of Community Medicine And Public Health*, *7*(4), 1596. https://doi.org/10.18203/2394-6040.ijcmph20201480

Paul, D., Sanap, G., Shenoy, S., Kalyane, D., Kalia, K., & Tekade, R. K. (2021). Artificial intelligence in drug discovery and development. *Drug Discovery Today, 26*(1), 80–93. https://doi.org/10.1016/j.drudis.2020.10.010

Ravi, S., & Mondal, S. R. (2021). Digital entertainment based do it yourself content & advertisement as a factor of driving force for trust & customer patronage. In *Digital Entertainment* (pp. 127–146). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_7

Scekic, O., Nastic, S., & Dustdar, S. (2019). Blockchain-supported smart city platform for social value co-creation and exchange. *IEEE Internet Computing, 23*(1), 19–28. https://doi.org/10.1109/mic.2018.2881518

Sharma, E., & Das, S. (2020). Measuring impact of Indian ports on environment and effectiveness of remedial measures towards environmental pollution. *Int. J. Environment and Waste Management, 25*(3), 356–380. https://doi.org/10.1504/IJEWM.2019.10021787

Sharma, E., & Das, S. (2021). Integrated model for women empowerment in rural India. *Journal of International Development, 1–18*,. https://doi.org/10.1002/jid.3539

Sharma, E., Nigam, N., & Das, S. (2020). Measuring gap in expected and perceived quality of ICT enabled customer services: A systematic study of top ten retailers of India. *International Journal of Applied Systemic Studies, 9*(2), 159–184. https://doi.org/10.1504/ijass.2020.113260

Singh, L. B., Mondal, S. R., & Das, S. (2020). Human resource practices & their observed significance for Indian SMEs. *Revista ESPACIOS*, *41*(07). Retrieved from http://www.revistaespacios.com/a20v41n07/20410715.html

Singh, S., & Das, S. (2018). Impact of post-merger and acquisition activities on the financial performance of banks: A study of Indian private sector and public sector banks. *Revista Espacios Magazine, 39*(26), 25.

Siri, R., Mondal, S. R., & Das, S. (2020). *Hydropower: A renewable energy resource for sustainability in terms of climate change and environmental protection.* Springer. https://doi.org/10.1007/698_2020_635

Siri, R., & Das, S. (2021). A Study on processing of information storage & use of new AGE consumers in digital wellness sector through story telling & creating interest. In *Digital Entertainment* (pp. 45–63). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_3

Srinivasa Rao, A. S. R., & Vazquez, J. A. (2020). Identification of COVID-19 can be quicker through artificial intelligence framework using a mobile phone–based survey when cities and towns are under quarantine. *Infection Control & Hospital Epidemiology, 41*(7), 826–830. https://doi.org/10.1017/ice.2020.61

Tiwari, M., & Mondal, S. R. (2022). Technological dynamism of workforce management for effective education service delivery during and after Covid-19. In *HR Analytics and Digital HR Practices* (pp. 199–215). Palgrave Macmillan. https://doi.org/10.1007/978-981-16-7099-2_8

Van, N. T. T., Vrana, V., Duy, N. T., Minh, D. X. H., Dzung, P. T., Mondal, S. R., & Das, S. (2020). The role of human–machine interactive devices for post-COVID-19 innovative sustainable tourism in Ho Chi Minh City. *Vietnam. Sustainability, 12*(22), 9523. https://doi.org/10.3390/su12229523

Wong, Z. S., Zhou, J., & Zhang, Q. (2019). Artificial intelligence for infectious disease Big Data Analytics. *Infection, Disease & Health, 24*(1), 44–48. https://doi.org/10.1016/j.idh.2018.10.002

Yegen, C., & Mondal, S. R. (2021). Sharenting: A new paradigm of digital entertainment of New age parenting and social media. In *Digital Entertainment* (pp. 213–231). Palgrave Macmillan. https://doi.org/10.1007/978-981-15-9724-4_11

Zhang, G. Z., Deng, Y. J., Xie, Q. Q., Ren, E. H., Ma, Z. J., He, X. G., Gao, Y. C., & Kang, X. W. (2020). Sirtuins and intervertebral disc degeneration: Roles in inflammation, oxidative

stress, and mitochondrial function. *Clinica Chimica Acta, 508*, 33–42. https://doi.org/10.1016/j.cca.2020.04.016

Zou, F. W., Tang, Y. F., Liu, C. Y., Ma, J. A., & Hu, C. H. (2020). Concordance study between IBM Watson for oncology and real clinical practice for cervical cancer patients in China: A retrospective analysis. *Frontiers in Genetics, 11*. https://doi.org/10.3389/fgene.2020.00200

HO Minh-Nhat, Ph.D., is working in Department of Science and Technology, Ho Chi Minh City Government. His specialization areas are sustainable development goals, digital enterprise and their evolution, and various managerial innovation.

Huu-Long Nguyen is working with government department of National Startup Support Center, Science and Technology Business and Market Development, Ministry of Science and Technology. Huu-Long's research areas are sustainable development goals of various digital practices.

Subhra R Mondal, Ph.D., is working as senior research fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Vietnam. Her research interests are brand management, brand equity with innovative tools, smart tourism, destination marketing, social media marketing, AI & Web 5.0, and digital recruitment. She has published 25 publications indexed with WoS and Scopus along with 2 books and 12 scientific monographs. She has over 12+ years of experience in research and teaching. She is associated with different collaborative projects in European and Vietnamese organizations.

Chapter 7
Inclusive Stakeholders' Model: A Post COVID-19 Strategy for Achievement of SDGs Through E-Waste Management

Eliza Sharma and John Ben Prince

Introduction

The survival of every nation may it be the developed or developing, in the highly competitive environment, is based on the foundation of fitting oneself in the frame of consumerist economy (Rode, 2012; Spash, 2021). The advancement in the science and technology with the Industrial Revolution in the eighteenth century and the Information Revolution in the twentieth century have acted as hallmarks in enhancing our modern day lives (Rajya Sabha Research Unit, 2011). The excessive use of technology has created a menace of growth in the e-waste at the global level. There are several factors that have contributed toward the incorporation in the use of technology in the routine lives such as boom in the electronic industry, affordability among the consumers to swiftly opt for the global products and services, global expansion of the markets due to relaxation of trade norms (Daum et al., 2017; Grant, 2019; Song & Zhou, 2020).

Apart from it, the outbreak of COVID-19 pandemic at the global level is expected to result in the exponential growth in the use of electronic equipment such as computers, laptops, I-pads and mobile phones to pursue the ongoing activities across numerous spheres.[1] The increase in the need to utilize the technology and its various tools like networking applications during this crucial time would also act as beginning to incorporate 'work from home' initiatives through online in the future. Keeping in

[1] "What Coronavirus Outbreak Means for Global Higher Education", Outlook India, March 29, 2020.

E. Sharma (✉) · J. B. Prince
Symbiosis Institute of Business Management, Symbiosis International University (Deemed University), Bengaluru, India
e-mail: eliza.sharma@sibm.edu.in

J. B. Prince
e-mail: john.ben@sibm.edu.in

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_7

view the requirement of the present and future use of technology, there is possibility of exponential growth in the use of electronic equipment to meet the needs of the personal and professional lives resulting in the generation of excess of e-waste. All the stakeholders such as government agencies, corporate companies, individuals, non-government agencies, and heath care units are now highly relying on the use of technology to carry out their pursuits.[2] The pandemic has revolutionized the technological culture in the field of academia, corporate sector and government sector across the developing nations like India.[3] It would result in promoting the online work culture, enhanced online learning mechanism and employment generation on the verge of technological utility in furtherance. Mobile communication has become the pivot source of socialization amid the social distancing norm.[4] The individuals who were reluctant to use the technology have shifted their preferences to learn more practical aspects to get along with need of the hour. This approach would be considered to be helpful in combating the multifarious challenges posed by COVID-19 pandemic. The new trend of higher reliance on technology would also result in increase in the demand of electronics as well as the waste generated due to the consistent introduction of mobile phones, laptops and various other digital gadgets in the post-pandemic scenario (Ilyas et al., 2021). Recently, Environmental Protection Department of Hong Kong intercepted four cases of illicit import of e-waste from Germany and United Kingdom.[5] The sea cargoes and containers were loaded with hazardous electronic waste containing waste tablet displays, batteries, mobile phone displays and printed circuit boards bearing the market value of about HK$900,000.[6] The importers were penalized with humongous amount of HK$122,000 to prevent the Hong Kong for being the distribution hub of illicit import and export of e-waste.[7]

As per the studies, the number of mobile phone users harnessing the social media avenues has also perplexed by leaps and bounds in terms of academic enhancement with the introduction of many webinars and work from home to garner livelihood. As per a Report of United Nations, the e-waste generated from mobile phones would be 7 times higher in China and 18 times higher in India by the year 2020 (Young, 2010). Additionally, the e-waste from the antiquated computers is likely to jump by 400% in China and 500% in India by the year 2020 in comparison to the year 2007 (Young, 2010). The present-day situation would also lead to excessive reliance on the technology and electronic gadgets in the future (Stansberry et al., 2019) resulting in replacement and replication of new electronic gadgets at the astounding

[2] "The Global Impact of Coronavirus on Education", ABC News, March 06, 2020.

[3] "Coronavirus is Changing How We Live, Work, and Use Tech-Permanently, Singularity Hub, April 10, 2020.

[4] "Coronavirus is Changing How We Live, Work, and Use Tech-Permanently, Singularity Hub, April 10, 2020.

[5] "Four Importers fined HK$122,000 for Importing Hazardous Electronic Waste from the United Kingdom and Germany", Dimsumdaily Hong Kong, June 01, 2020.

[6] "Four Importers fined HK$122,000 for Importing Hazardous Electronic Waste from the United Kingdom and Germany", Dimsumdaily Hong Kong, June 01, 2020.

[7] "Four Importers fined HK$122,000 for Importing Hazardous Electronic Waste from the United Kingdom and Germany", Dimsumdaily Hong Kong, June 01, 2020.

rate (Lundgren, 2012). As far as the purchasing behavior is concerned, it is generally said that there are more phones than people on planet and people have the habit of discarding 99% of the things within the six months of the purchases made by them.[8]

As far as developed economies such as Japan, United States, United Kingdom and Australia are concerned, they are already exporting approximately 80% of their e-waste to the developing nations for reuse and dismantling (Kinamman & Yokoo, 2011). The developed nations lack in processing the e-waste as per the norms suggested by Environmental Protection Agency (EPA) and shirk in adoption of Extended Producer Responsibility, so they put the entire onus on the developing nations (Fehm, 2011; Pinto, 2008; Rode, 2012). On the other hand, the developing nations like India, Uganda, Nigeria, Lagos and Bangladesh are also generating more of e-waste in their own capacities to gain several precious metals for their rapid growth (Chen et al., 2011; Kumar & Shah, 2014; Sullivan, 2014). There are many factors like availability of cheap and easy labor, lack of stringent laws in the unorganized sector, inadequate initiative on the part of government agencies, improper application of laws in the organized sector and absence of Extended Producer Responsibility among the manufacturers and absence of initiative on the part of private sector, which present a more challenging picture of processing of e-waste in the developing nations (Senior, 2009). The Mumbai Port Trust and the Jawaharlal Nehru Port Trust are found to accumulate a large amount of e-waste, which is imported to India from Australia, North America, Japan and South Korea (The Times of India, 2010). Dubai acts as transit center, which collects the e-waste from US, Europe and West Asian Nations and re-export it to the other nations Like India being its major buyer (Rajya Sabha Research Unit, 2011). The middle class in India comprising about 320 to 340 million shell out their disposable income for consumer goods (Rajya Sabha Research Unit, 2011). India is one of the largest e-waste importing nation across the globe and the irony also lies in the fact that most of the segregation and processing of e-waste is done by the unorganized sectors i.e., humans across these developing nations like India. Only a few of facilities in terms of security norms are available in the organized sector, which also needs inclusion of a lot of active interventions.

This system represents the approach of linear economy, where goods are produced by extracting the valuable resources, then sold to the people as per their utilities and later disposed of by them after a short span of time.[9] This way to harness the rich natural resources is the prominent factor leading toward the pile of e-waste, raising social and environmental cost at the global level (Clark & Clark, 2019; Cuomo, 2011; Robinson, 2009; Stone, 2009; Webb, 2007). As India has a wider network of informal sector that is engaged in the management of e-waste, the fair management of e-waste is still a challenge before it in order to assure compliance with the achievement of Sustainable Development Goals (SDGs).

Hence, two major questions that will be answered in the study are mainly;

[8] "What a Sustainable Circular Economy Would Look Like", The Conversation, May 06, 2020.

[9] "What a Sustainable Circular Economy Would Look Like", The Conversation, May 06, 2020.

RQ1 What kind of challenges are encountered by emerging economies like India with regard to the e-waste management, despite the existence of a fair knitted framework of laws and regulations? What are the root causes behind these challenges?

RQ2 Is there any midway approach, which could be practiced by the nations to have a long-lasting curb for the e-waste menace along with the compliance of Sustainable Development Goals i.e. (Community Development, Economic Prosperity and Environmental protection)?

In the present study, the researcher has discussed the penetration in the use of electronic equipment resulting in the hoarding of e-waste at the large scale as the mainstream lethal component in the society. Later on, the discussion has been made related to various e-waste management techniques incorporated by several developed as well as developing nations to combat the challenges posed by e-waste in their way toward sustainable growth. In furtherance, the paper would suggest the holistic approach based on inclusiveness of all stakeholders for the policymakers and government to manage the e-waste menace, which would enable them to reorient their strategies and establish themselves as significant contributor toward the achievement of e-waste management.

Review of Literature

The review of literature provides grounds for understanding the different perspectives associated with the conceptualization of e-waste and the constitution of e-waste in the current scenario. Moreover, it provides comprehensive overview regarding the interconnectedness of e-waste and the sustainable development. The findings of the research work conducted by the eminent scholars have portrayed the several aspects related to e-waste and they have been discussed under different concepts.

The higher intensity of increase in the innovativeness and growth in the electronic industry has resulted in the heaps of e-waste over the globe (UNEP, 2013). All the developed as well as developing countries are encountering increase in the e-waste (Lawhon, 2012). E-waste is broadly defined as surplus, loosely discarded, broke, obsolete, electronic devices or electricals (The Hindu, 2009). Amankwaa (2013) has regarded e-waste as a generic term that defines the demise of the electronics who are no longer fruitful for the individuals who owns them. The concept of e-waste has become very prominent as the municipal waste stream throughout the world. Many eminent scholars have given their point of views to conceptualize the term e-waste and they have been represented in the Table 7.1.

As per the different perspectives discussed in Table 7.1, e-waste is recognized as the generic term, which was first of all acknowledged in the beginning of the nineteenth century (Smith, 2015). European Union has categorized the e-waste or

Table 7.1 E-waste definition

S. No.	Meaning/Definition	Citation
1	The household, consumer, IT, Telecom and business products, which could either be recycled for further utilization or disposed of. It can be the mobile phones; videogames; telephones; computers; laptops and Xerox machines	(Pinto, 2008)
2	E-waste is result of purchase of new electronic gadget by the consumer and replacement of the former one to satisfy his/her demand	(Palmbeck & Wang, 2009)
3	The hazardous substances like cadmium, mercury, lead and flame-retardants resulting in fatality among humans and annihilation in the environment comprise e-waste	(Yokoo, 2012)
4	E-waste comprises and includes waste Cathode Ray Tube, Laptops, Desktops, computer mice, copiers, televisions whose recycling releases toxicants in the environment	(Chen et al., 2011)
5	A collective term, which is used to dispose of the electronics and the electrical equipment like computers; cell phones; washing machines; televisions and refrigerators	(Aggarwal, 2012)
6	E-waste is the outcome of the tech-savvy society resulting in the abundance of outdated, abandoned and ultimate end of the e-products	(Rode, 2012)
7	The various types of ICT equipment; household appliances; entertainment electronics; healthcare equipment; consumer electronics and the all other major paraphernalia containing e-chips form the e-waste	(Grant, 2019)

'EEE' also called Electrical and Electronic Equipment into 'components', 'consumables' and the 'sub-assemblies' (Jain, 2008). As mentioned, e-waste as the appliances, which are in their end-of-life phase and further put to recover either by recycle or reuse (The Times of India, 2010). They comprise of the refrigerators, air conditioners, TVs, computers and their accessories as well as the other household appliances. Thereafter, the hoard of ostentation and keen to have up-to-date versions of electronic gadgets among the individuals have led to the acceptance of new and technically sound technological equipment resulting in the fastest growth of e-waste among the developing as well as developed nations (UNEP, 2013). Every year, about the tens of the millions of electronic goods are dismantled, which is a lucrative means of business for the several developing nations to keep up with the pace of economic growth (Peralta & Fontanos, 2005). Nigeria has been recognized as the highly receptable country for the discarded e-waste; where by Lagos acts as the port of collection and Ikeja as the prominent place for exchanging the e-waste (Sullivan, 2014). A fair score of women and children is working in the heterogeneous informal sector to process the e-waste under the insecure and annihilating environment (Rode, 2012). The electricals and electronic equipment contain toxins in an abundant quantity such as Barium, Cadmium, Chrome, Copper, Lead, Arsenic,

Mercury, Zinc, Silver and Brominated flame proofing agent, which are present in the batteries, circuit boards, LCDs and plastics (Janz & Bilitewski, 2008). Majority part of the e-waste is processed by the informal sector in India, the existence of certain loopholes like absence of humanitarian work standards; inadequate legislation to protect the workers; ineffective programs for the skill development of e-Junkers; lack of policies to ensure security and safety to the workers pose big challenges before the nation to manage the e-waste (Agarwal, 2012; Grant, 2019; Stone, 2009). The issues like optimum utilization of scare natural resources, minimization of the e-waste, eco-friendly recycling of waste, production of green products and adequate disposal of the waste are necessary to be addressed in order to promote the sustainable living and economic growth at the global level (Rajya Sabha Research Unit, 2011). It is essential on the part of the economies to meet these demands of the hour in order to survive for the long span of time. In the common parlance, every nation whether developed or developing has acknowledged the term e-waste (Pinto, 2008).

E-waste Management Strategies in Developed Countries

The issue of proper management of hazardous waste is critical for the protection of health, livelihood as well as environment (Grant, 2019). The process of e-waste management has been existing since the nineteenth century by way of managing the products through reuse, recycle and complete disposal. The management of e-waste is necessary at the different levels right from the production of the electronics to even after their end use (Schelup et al., 2009). The new indices of e-waste management include more of economic efficacy in the processing, constant monitoring and check over the social as well as environment cost (Hotta et al., 2008; Kobayashi, 2014; Lepawsky, 2015). Recycling has been ubiquitously reckoned as the significantly regular practice (Williams et al., 2013). The developed nations have now acknowledged their responsibility to combat the impacts being posed by the debunk of their responsibilities and improper functional capacities to manage the e-waste (Sharma, 2016). They have acknowledged and addressed the issue of e-waste by incorporating some strategical interventions and adopting certain scientific modes of disposal and recycling of e-waste (Jain, 2008). The developed nations have adopted some significant strategies to standardize their practices in context to the management of e-waste by persisting in pace with the global yardsticks (Lepawsky & McNabb, 2010). Table 7.2 gives an impression of e-waste management initiatives being proposed by several developed nations across the globe to process the e-waste.

E-waste Management Strategies in the Developing Nations

Ogunseitan (2009) have drawn the attention toward the dark side of the practice prevailing in several developed nations like United States; where the citizens have

Table 7.2 E-waste management strategies in developed countries

S No	Strategy	Country/Agencies/Organizations	Citation
1	The Registration of E-waste processors with the Local Government	United States	(Brighthouse & Robeyns, 2010; Stone, 2009)
2	Global Awareness and Cooperation at global level	Germany	(Fela, 2010)
3	Proper Funding Mechanism to Boost Competition among the domestic e-waste recyclers	Japan, United States,	(Fehm, 2011; Kinnaman & Yokoo, 2011)
4	Scientific Research and Development Initiatives	California, USA	(Oladele et al., 2009)
5	Implementation of 3Rs i.e., Reuse, Reduce and Recycle as the internal part of Extended Producer Responsibility	Japan	Suzuki et al., 2009

been found unaware of the restrictions and strategies in context to e-waste. This negligence on the part of citizens have made the United States a largest e-waste generator in the world. Europe and United States have been widely reckoned as the major exporters of e-waste to the Asian and African nations (Sovacool, 2020). On the other hand, Webb (2007) in his study has revealed that about 80% of the Chinese residents who toil on dismantling and recycling the electronic goods as well as the natives who live near these locations are highly exposed to chemicals in their blood. E-waste consists of quite higher quantity of fatal chemicals like cadmium, mercury, lead and dioxin, which ends up in the environment and social cost posing challenges at the global level (Peralta & Fontanos, 2005). Kumar and Shah (2014) in their study revealed the shift the onus from developed to developing nations in order to process the e-waste completely and lack of active global interventions have been defined as the root causes of all the challenges struggled by the nations to combat the menace of e-waste (Fehm, 2011). The developing nations like China, Brazil Mexico, India and others are likely to encounter a rise in the health and environment damage by entirely relying on the vagaries of informal sector to manage the e-waste (Borthakur, 2020; Rajya Sabha Research Unit, 2011). The global environment bears the ramification in terms of the fatal diseases, reduction in immunity, impact on fertility of land, increase in mortality of several species of birds and animals toward extinction as well as poor quality of living (Rode, 2012; Robinson, 2009; Cuomo, 2011).

The developed nations have recycling amenities and adequate laws to combat the challenges posed by the e-waste; so, the developing nations can learn lessons from them to reinforce the better version for the fruitful results (Oladele et al.,

2009). Brighthouse and Robeyns (2010) have illuminated that the regulatory agencies working across the developing nations are supposed to implement the long-term practical approaches with the introduction of stringent reforms and modernized mechanism to handle the e-waste at the local level. The Urban Local Bodies (ULBs) are also required to provide a well-defined impetus for the corporate privatization of e-waste (Grant, 2019). On the footprints of the developed nations, the developing nations have adopted certain strategies, which could be applied to manage the challenges posed by the e-waste and improve the current economic, environment and social system. Table 7.3 gives an impression of certain practical approaches adopted and implemented by the developing nations to combat the problems arisen due to the penetration of e-waste.

Globally, it is known that lithium and cobalt are in short supply. Being key materials in the making of lithium-ion batteries used in electric vehicles, it is imperative to develop a mechanism to retrieve critical material such as cobalt from e-waste. However, Cobalt is a by-product, complicating investment decisions (Desai &

Table 7.3 E-waste management strategies in the developing nations

S. No.	Strategy	Country/Agencies/Organizations	Citation
1	Incorporating Progressive Principles like Extended Producer Responsibility and Removal of Hazardous Substances	China, India	(Stone, 2009)
2	Chocking-off the Imports of E-waste	China	(Stone, 2009)
3	Stricter Enforcement of the Existing Laws	China	(Agarwal, 2012; Stone, 2009)
4	Awareness among the Manufacturers of e-goods to deal with the e-waste	India	(EPW)
5	Consortium among all the stakeholders for the disposal of e-waste by way of the green channel	India	Agarwal, 2012)
6	Public Private Partnership	Bangalore, India	(Reddy, 2013)
7	Greening e-waste through green skills and chain dynamics	South Africa	(Grant, 2019)
8	Reuse of the electronic equipment	Brazil	(Senior, 2009)

Nguyen, 2021); the article mentions that due to high prices of Lithium, capacity decisions face inordinate delays, while cobalt depends on the prices of copper.

Research has been conducted to understand how lithium-ion batteries can be recycled, thereby increasing utility of e-waste after the consumer product has reached its end-of-life. Boyden et al. (2016) discussed several merits of recycling lithium-ion batteries: reduction in energy consumption, reduction in greenhouse gas emissions and savings in natural resources. Their study also identified the useful quantum of materials that could be recovered from different recycling processes, while concluding that processes that use low temperatures are ideal, in the long run. Concerns have also been expressed about the realization of economies of scale in the manufacturing of lithium-ion recycling process (Wang et al., 2014); the authors study the different stages involved in the end-to-end supply chain which starts once the consumer product is discarded or reaches its useful life. Roy et al. (2021) point to the circular approach to sustainable businesses where they discuss green methods to recycle lithium-ion batteries. The technology involved in recycling can also be studied in detail, leading more industry partners to focus on improving efficiencies in the reclaiming of precious metals and components (Li et al., 2017). At an overall level, we may infer that much needs to be done to increase the efficacy and efficiency of recycling lithium-ion batteries on the one hand, while at the upstream end of the supply chain, more investments are required to increase extraction of lithium and cobalt.

Apart from the implementation of strategies to curb the growing challenge of e-waste, there is problem in terms of lack of cooperation and sense of responsibility among the various stakeholders; proper execution of strategies across the developing nations and absence of awareness among the customers as well as producers to keep up in pace with the nation's growth along with the environmental protection and community development at the grassroots level. There are certain loopholes, which are needed to be addressed in a well manner to overcome the proliferating problem of e-waste management as post COVID-19 strategy.

Research Gaps

Several research initiatives undertaken in the past have primarily concentrated on highlighting the causes of proliferation of e-waste and the challenges posed by it in context to the developed nations (Awasthi et al., 2019; Kinnaman & Yokoo, 2011). There is dearth of existing literature pertaining to the adequate interventions by encompassing the interests of all the concerned stakeholders and combating the loopholes in the existing strategies pertaining to e-waste. Moreover, sufficient research work has been done with regard to the implementation of stringent laws to strengthen the formal sector across the developed as well as developing nations for e-waste management. But the problem persists in the developing nations. The developing nations like Bangladesh, Pakistan and India occupy about 70–80% of import and process of the e-waste in the global market (Rajya Sabha Research Unit, 2011).

Unorganized sector plays a prominent role in the entire chain of e-waste management, where the women and children work in the sub-standard environment away from the humanitarian grounds. The irony is that only a handful of research works have been undertaken to raise the concerns and provide suitable solutions for the problems faced by workers in the unorganized sector.

Moreover, the COVID-19 pandemic has added work and learn from home culture, which ignited the higher reliance on technology to ensure the existence in the post COVID-19 era. It would certainly result in the demand of new technological equipment to get along with the trend and heaps of antiquated gadgets leading to e-waste. The developed nations have a well-knit mechanism to handle the e-waste; whereas the developing nations need to put strenuous efforts to team with the challenges waiting ahead with the bang of pandemic. Several developing nations like India have committed to align their nationwide activities and strategies to achieve the Sustainable Development Goals, 2030. The pandemic has posed the inexplicable challenge to mitigate the surging level of e-waste in near future on the ground of accomplishing the SDGs by combating the human, environmental and nation's well-being. Hence, the present scenario has instigated the need to introduce a practical, holistic and inclusive approach, which could act as mid-way between the effective management of the growing menace of e-waste. An inclusive ideology needs to be implemented to help the nation comply with the interests of all the stakeholders as the post COVID-19 strategy to achieve the Sustainable Development Goals such as Environmental protection, Economic prosperity and community development.

Research Objectives

The objectives of the research are as following:

- To highlight the strategies adopted by developed and developing nations for e-waste management.
- To unravel the challenges faced by the developing nations regarding the e-waste management.
- To suggest an Inclusive Stakeholders' approach as a post COVID-19 strategy to attain the Sustainable Development Goals.

Research Methodology

The study is conceptual in nature, where the literature related to the e-waste management in developed and developing countries was accessed and studied thoroughly to develop a post COVID-19 strategy to handle the e-waste in India. The research was purely based on secondary data and the model developed was the major implications of the study. Total 59 research papers and latest articles related to the COVID-19, its impact on e-waste have been studied.

Discussion

The study highlights mainly two major aspects, one being the increase in the demand of electronics and electrical gadgets due to the COVID-19 pandemic span at the global level to keep pace with the demands of the transforming work and learning culture. It will result in increased use of electrical gadgets to ensure the compatibility for the long run survival by meeting the requisites of the changing scenario. The use of gadgets and technology becomes of paramount importance as the world will have to learn along with the coronavirus and adopt the work from home culture. Once the Government would ease down the norms and market would be back in the form, the sale of e-gadgets will increase. This would result certainly result in the e-waste. While on the other hand, despite the adoption of e-waste management strategies adopted by the developed as well as developing nations, the loopholes would need to be addressed by introducing a mid-way approach by looking into the challenges encountered by the nations amid the pandemic. This section discusses the various challenges being faced on the global turf and suggest a practical mid-way approach required to protect and promote the growth of the nation keeping in view the social and environmental well-being.

Challenges Encountered Across the Developed and Developing Nations to Manage the E-waste

The thriving phenomenon regarding the management of e-waste has become complex posing several new challenges for the nation. The execution of e-waste management with the application of a relevant instituted method is a major challenge due to the existence of several bottlenecks. The havoc created by the e-waste is necessary to be dealt with at the war footing as both the developed and developing nations encounter certain challenges in their own capacities in order to manage the e-waste (Lubick, 2012).

- **Developed Nations**
  As far as the developed nations are concerned, they have not been completely able to comply with the International standards and comprehensive framework as suggested by the Environmental Protection Agencies so far (Fehm, 2011). The developed nations encounter comparatively less challenges to manage e-waste as they put the maximum onus on developing nations by exporting the e-waste to them.
- **Developing nations**
  The ease in the availability of labor and readiness on the part of toilers to work in the sub-standard situations have raised the developing nations as major gateways for the disposal of e-waste (Agarwal, 2012). A fair score of women and children is involved in the processing of e-junk in the unorganized or informal sector across

the developing nations, which lacks in the adequate humanitarian and environmental standards. As per Grant (2019), the workers are not much sentient of their rights against the exposure to hazardous environment and lack in adequate training with regard to the management of e-waste being well acquainted about the problems and safety measures. The main stakeholders connected with the management of e-waste also shirk from their responsibilities (Fehm, 2011). Grant (2019) in his study illuminated the harassment of waste pickers throughout the entire e-waste value chain right from the authorities to community abuse and prejudice on the part of profiteering negotiators, where the e-Junkers lack bargaining powers. The inadequacy on the part of government to provide regulatory mechanisms and regulations refrains the corporate sector to step ahead in introducing the collaborative ventures with the government in the field of e-waste management (Arya & Kumar, 2020; Ciocoiu et al., 2011; Godfrey & Oelofse, 2017). As per Lines et al. (2016) the biggest challenge before the developing nations is the health issues of the humongous number of workforces employed in the informal sector and the impact of the hazardous activities on the environment.

These challenges across the developed and developing nations are likely to cause severe damage to the environment, economy and society if confined to the vagaries of the stakeholders. Therefore, the collection and management of e-waste is substantial to be regulated among these nations as it could have tremendous impact on the global turf by introducing a practical sustainable approach with collaborative actions by the authorities at the large scale.

South Korea & Conglomerates: E-waste Initiatives, Practices

In February 2017, Samsung Electronics held a press conference to herald the introduction of some of their new devices in the global market. During the conference, Greenpeace activists interrupted the Chief Marketing Officer's speech by unfurling a banner (Park & Lim, 2017), urging the company to sustainably manage the disposal or recycle the millions of Samsung Galaxy Note 7 which had to be recalled on account of reported battery fire incidents. The context for the protest was the potential addition of several thousands of tons of e-waste, by Samsung to the pile of 45 million tons of global electronic waste already present. Two months later, Samsung refurbished 400,000 devices (Galaxy Note 7) into a variant which they sold under the brand variant, 'Galaxy Note Fan Edition'. This was introduced in South Korea first, followed by launches in global markets.

Samsung conducts environmentally sustainable operations throughout its global ecosystem in alignment with its supply chain partners. Moreover, the firm complies with e-waste legislation in more than 70 countries. Extending the sustainability agenda to tier 1, tier 2 and beyond, Samsung ensures its suppliers at all these levels undergo strict certification every two years under the eco-partner scheme (Park & Lim, 2017). Across a ten-year time-span, from 2009 to 2019, Samsung collected

about 4 million tons of e-waste. To complement these policies, Samsung also has the Re + program in place which carries out free recycling service in 54 countries. The mechanics of the recall program works thus: the battery once removed is put through four stages: (a) salting, (b) perforation, (c) drying and (d) fragmentation. The sustainability initiative dates back to 1998 when Samsung started their Asan Recycling Center which has a processing capacity of 400,000 electronic products and can separate plastics, steel, copper and aluminum during the recycling stages.

The South Korean government shows due concern toward metal waste generation. An estimate by United Nations Environment Program (UNEP) discussing the metal waste recycling plan (UNEP Report, 2019) notes a potential value of KRW 4 trillion metal waste generated every year in Korea. For the year 2022, the South Korean government has plans to reduce the amount of disposable plastic by 50% and increase recycling by 70% (The Edinburgh Reporter, 2021). As per government policy, 10 items including televisions are subjected to mandatory recycling mechanisms under the EPR norm relating to electrical and electronic products nearing their end-of-life. A conglomerate of Korean origin, Hyundai Engineering has announced plans to generate clean hydrogen (Korea Bizwire, 2021) through setting up of a plant about 120 km away from Seoul. The unit is expected to use about 100,000 tons of waste plastic taken through a pyrolysis and gasification process; the end product would be an annual output of 22,000 tons of clean hydrogen.

Chinese Firms: Experiences with E-waste Management

Unilever, the Anglo-Dutch conglomerate partnered with Alibaba, the Chinese e-commerce giant to launch the 'Waste Free World', a closed-loop plastic recycling agenda and program in China (Joe, 2021). Using Artificial Intelligence powered recycling devices installed across different cities, consumers would be able to scan QR codes and using Alibaba's e-wallet, customers can deposit their plastic waste. Once sorted, the plastic would be taken to a processing center which would convert it into granule-form which would subsequently be used in Unilever's product packaging. The intent was showcased in the form of a pilot project which saw the installation of 20 such devices in Shanghai and Hangzhou. Xiaomi, the Chinese smart devices firm announced a recycling program in partnership with TES-AMM to offer recycling services to Indian consumers (Mathews, 2017). Operationally, this would require consumers to login to the Mi.com website and give details for pickup; within 15 days, the company would send personnel to collect the device from the customers' doorsteps. Dow, an American firm partnered with Chinese milk brand Shiny Meadow (Ng, 2021) to collect used milk bottles and recycle them into a form suitable for mixing with asphalt for road-laying.

Apple: E-waste Management

Since 2019, Apple has had an e-waste or recycling program in place (Press release, 2019). In the United States, the company uses a recycling robot, Daisy which would disassemble and recycle some iPhone models; these would be re-circulated back to chain stores. The program has been operational in Netherlands as well. The robot is capable of handling 200 phones per hour. A key material recovered here is cobalt which is a critical ingredient in the smartphone batteries; Apple is able to recover this material from used phones and recirculate back to the battery manufacturing process, thereby ensuring a true closed-loop for this rare metal. Karo Sambhav, an Indian start-up which is part of Microsoft ScaleUp (Economic Times, 2021) has ventured into recycling electronic waste, enabling recovery of key components or materials and closing the loop. The company has actively tied up with corporate entities such as Lenovo, HP, Apple and Dell to recover e-waste and put them back into the recycling ecosystem (Kedia, 2018) thereby enabling recovery and reuse of critical materials.

Holistic Approach for E-waste Management: Inclusive Stakeholders' Model

The active involvement of environmentalists, higher cost of recycling and lack of sound trade practices, these nations put the entire onus on the developing nations (Fela, 2010). India has been witnessing an increase in the e-waste trade along with Dubai and Singapore acting as the transit centers in the route (Rajya Sabha Research Unit, 2011). Indian government has devised some infrastructural facilities to manage about 8 lakh tons of e-waste, which is likely to be doubled in the approaching years (Sharma, 2016). Above all, it is required that all the concerned stakeholders such as government, household sector, industrial sector, formal sector and informal sector of e-waste management as well as Non-Government Organizations or the Social Services Sector. The inclusive model specifying that management of e-waste is not the sole responsibility of one stakeholder in the chain rather the collective effort of all of them keeping in view the significance of enhancing sustainability in the economy on the foundation of sustainable circular economy approach. It redefines new dimensions of production and consumption patterns based on adequate utilization of resources keeping in view the social, economic and environmental benefits.

The COVID-19 pandemic has made the people more tech-savvy. It would result in the excessive use of electrical equipment amid the uncertain circumstances enables the individuals to keep the track of outer world and ensures their survival as per the demand of changing scenario. This would lead to greater digitalization with the frequent launch of new variants of e-gadgets. Such trend is also likely to become the root cause of more troubles in the form of tons of e-waste. This calls for the quick and active interventions to curb the menace caused due to the rise in the demand of

e-gadgets and heaps of e-waste generated out of rejected e-gadgets. The effective management of e-waste is need of the hour to deal with the abundance of e-waste in the future, which would be the resultant of demand of new e-gadgets to get along with the 'New Work and Learn from Home Culture'. It is also revealed by a UN Report that as the e-waste is a raging menace, India is likely to produce the estimated 2 million tons of e-waste per annum by the year 2020 with the annual growth rate of about 30% (Malhotra, 2020). The management of e-waste involves a well-defined series of activities starting from segregation of e-waste material at the household level, followed by fair collection, timely transportation of the collected material, careful handling of the hazardous material keeping a close account of the standardized norms, precise treatment, recovery and final disposal of the materials to prevent the pollution and adequate resource mobilization. If the e-waste is collected and recycled properly, then it could be the best remedy to curb the problems associated with the health, to provide employment opportunities, limit the emission of carbon footprints and revitalize the economy. The effective management of e-waste as mentioned in the above calls for the active participation of all stakeholders right before the manufacturing of the product to the end complete utilization keeping in view the social and environmental cost at the global turf.

1. **Government:** The Government of the developed nations as per the Federal Acquisition Regulation has posed mandatory requisites on the institutions, producers in the industrial unit, traders, consumers and importers to acquire the eco-friendly products and services to reduce the challenges put forth due to the excessive utilization of electronics and electronic equipment (Stone, 2009). Government makes it mandatory that the stakeholders work through proper green channel collectively encompassing the aspects like procuring, dismantling, recycling and complete dispose of the e-goods and services (Fehm, 2011). Like the Government in China has made it compulsory for the waste processors to get themselves registered with the local government to avoid pollution (Stone, 2009). As mentioned in EPW, the governments of some nations have restricted or banned the toxins such as furans, chromium, dioxin and chlorofluorocarbons in the production of electronic goods. Moreover, the active involvement of the government to keep check over the illicit transboundary movements of the e-waste acts as imperative push to enhance the possibility of (PPP) Public Private Partnership. The focus on providing employment opportunities to the populace keeping in view the safety standards, lead to improvement in the social, economic and environment systems. Government is also required to liberalize the norms for those producers who aim at producing the new goods by recycling and recovering the already used products. Massive investment in the recycling infrastructure is required to perpetuate employment opportunities to increase equity, enhance economic growth and improve environment.
2. **Household Sector:** The use of electronic gadgets to be in touch with the outer world would become more preferable as post COVID-19 pandemic strategy. The business and learning process would want their employees to use the technology to meet the obligations through several e-gadgets. The survival along with the

new norms posed by the pandemic would demand the individuals to become tech-savvy resulting in their excessive engagement with the e-gadgets. Qu et al. mentioned the significance of collaborative efforts of all stakeholders to make the households aware of their responsibilities to keep check over the purchasing of electronics, segregation of e-waste from the green waste and focus on the proper disposal of e-waste post the product utilization. The concept of sustainable circular economy aims at influencing the ideology of households to demand the products only when they are in the dire need at one point of time rather by reforming their buying behavior.

3. **Industrial Sector:** The principle of Extended Producer Responsibility ensures the producers take active part in production of eco-friendly goods, pay off EPR at the point of sale ensuring proper collection; treatment and sound disposal of the e-waste generated at the time of disposal of electronic goods. Extended Producer Responsibility envisions the disposal of the product as a prominent part of its life with the proper training of e-waste collectors either working in the organized or unorganized sector for segregating the e-waste and transporting it to their designated point (Agarwal, 2012). Senior (2009) has added that the industrial units are supposed to incorporate a cohesive ideology to reduce the social and environmental impacts of e-waste. Ogunseitan (2009) and Plambeck and Wang (2009) have stressed on the green electronic product design as the core responsibility of the manufacturing units along with the proper processing of their own product rather than their disposing off, in order to reduce the heaps of e-junk in the nation. The sustainable circular economy restrains the functional values of the products and steers the manufacturers to design and promote the products having Running time for long span, Reusability, Remanufacturing and Recovery/Recycling (4Rs).
4. **Formal Sector of E-waste Management:** Municipalities act as the effective bodies and therefore, they need to take active interventions at the local level for the management of e-waste (Li, 2006). Qu et al. emphasized the significant part played by the municipalities in keeping check to limit the e-waste to the landfills by replacing it with the reliance on clean technology to recycle or dismantle of the product. Greening of the e-waste as gradual, patient and a long-term phenomenon, which is the amalgamation of adequate knowledge in terms of green skills, finance and patient strategy with the full involvement of municipality at the local level in close association with the SMEs and the behemoths. The greening the e-waste is done effectively by localizing the economic benefits and broadening the social and economic transformational advancements (Aboelmaged, 2021; Smith & Musango, 2015a; Widmer et al., 2005). The formal sector must engage actively in the constant research and development by investing adequate financial resources to find effective ways to combat the e-waste by reducing the social and environmental cost. The formal sector must take initiatives to proceed with green e-waste management chain by imparting green skills and making the workers aware of using the safety mechanism. Formal sector should take the lead to work as per the rules and regulations framed by the government to protect the interests of the workers engaged in the

processing of e-waste. They must step ahead to pave way for the workers in terms of the use of clean technology to prevent the exposure of workers to the hazardous conditions.

5. **Informal Sector of E-waste Management:** The developing economies have widely scattered unorganized or informal sector engrossed in e-waste management usually using the unsafe or insecure ways, which results in exposure of lethal toxins (Agarwal, 2012). Lines et al. (2016) mentioned the introduction of some policies and training programs for the safety and awareness of e-Junkers working in the informal firms. Both the e-waste toilers and the informal organizations are required to be made aware to escalate the vulnerability of the workers and the environment as well (Lines et al., 2016). Informal sector must harness the facilities of skill development being provided by the formal sector. The active involvement of workers in the informal sector is required to bridge the gray economy and unorganized sector to boost the operationalization of green channel pertaining to e-waste (Beukering & Bergh, 2006). It would act as an improvised, enhanced, well-supported, well-knitted, continuous and sustainable channel (Smith & Musango, 2015b). As India has a wider network of informal sector that deals with processing and managing the e-waste, it is needed that the toilers must be made aware of their responsibility to act as active agent for promoting the economic growth, social development and environmental protection. They must actively participate in learning green skills essential to comply with the norms of green chain of e-waste management. They must engross in the management activities by being knowledgeable of their safety and security. Both the formal and informal sector must go hand in hand as they have to work in unison as a significant stakeholder in the entire chain of e-waste management.
6. **NGOs or Social Services Sector:** Lubick (2012) has mentioned the contribution of Non-Government Organizations in acknowledging their responsibility to vanquish the hazardous effects of e-waste. The involvement of corporate sector in the domain of e-waste management also brings in the attention of several voluntary organizations to work on human grounds by way of introducing skill development and capacity building programs to train the aspirants working in the informal sector to be well acquainted with their rights and safe terms of services. Stone (2009) recognizes that several NGOs also work with the authorized agencies and corporates to ensure that responsible and authentic e-waste processors are to be contracted to combat the menace of e-waste.

India has been charting its own journey after the pandemic. While economic growth is slowly picking up in the second half of year 2022, the SDG achievement levels leave out a lot to be desired. India ranks lower than four South Asian countries due to the challenges posed by SDG-6 from the list of 17. SDG-6 relates to availability of clean water and sanitation (News18, 2021). While the office of the prime minister declared rural India defecation-free, much needs to be done regarding developing consciousness of hygiene and sanitation nationally.

SDG-12 in India has shown very less traction. This relates to sustainable consumption and production wherein very little headway has been achieved by industry. This

is the only metric relating to management of e-waste, which is close to end-of-life programs. While production and consumption has been at the forefront due to its close linkages with industry-linked metrics such as Index of Industrial Production (IIP), the work on SDG-12 has not been suitably documented. Shahbaz et al. (2021) identify the various problems associated with the economic growth and the resulting carbon dioxide emissions while charting out a customized framework for the country; their contribution suggests factoring in the resurgence of specific industries and triggers for resumption of economic activity, even while industry is under pressure to deliver on SDG goals, which are not restricted to production and consumption alone. In the services domain, the quality provided by a logistics firm provides suitable grounds further refinement to enhance customer satisfaction (Gupta & Singh, 2020). Research which is India-specific pertaining to SDG-12 is relatively limited as of now; most of the research papers discussing academic perspectives or the practitioner articles describing achievements of industry lean toward renewable energy or cleanliness, hygiene, sanitation and eradication of poverty and hunger.

There is dire need to introduce, prescribe and execute the national layouts to keep check over the flow of the junk across the nation. Hence, the sustainable circular economy approach is the panacea, which represents the broader domain enhancing the environmental sustainability and economic well-being while inclusively restoring the interests of all stakeholders in current and future scenario.[10] The resources once come in the system must be reused, repair, recycle and remanufacture to regenerate natural capital, enhance social equity, eco-effectiveness and multidimensional progress. Every stakeholder could play an important role in effective management of e-waste and enable the nation to step ahead to reach the culmination of economic prosperity, community development and environmental sustainability. The following table (Table 7.4) illuminates the contribution of each stakeholder in the management of e-waste as bedrock to enable the nation achieve the Sustainable Development Goals (SDGs).

As elucidated in the Table 7.4, the Government and other stakeholders are required to realize the seriousness of the challenges, which are waiting ahead with the COVID-19 pandemic in the near future. There is dire need to be well acquainted with the current scenario and put strenuous efforts to implement concrete measures as post COVID-19 strategy to mitigate the facets of e-waste. Developing nations like India depict the reverse logistics system where the informal sector has the dominance due to its edge in terms of reaching out the end users (Malhotra, 2020). The inclusiveness and active participation of all stakeholders especially the informal sector is necessary to cure the menace of e-waste by bringing in sensitization and eco-consciousness that would result in production of eco-friendly products and their proper management (Ciocoiu et al., 2011). The sustainable circular economy chain redefines the intrinsic efforts on the part of all influenced by the external out product, which is resultant of the initiatives undertaken at individualistic level contributing toward global betterment. The demands on the part of consumers cannot be put at stake rather they are to be made aware to go with the products when required; whereas manufactures must produce

[10] "What a Sustainable Circular Economy Would Look Like", The Conversation, May 06, 2020.

Table 7.4 E-waste management and SDGs

Stakeholders	Environment protection	Economic prosperity	Community development
Government Sector	• Persuade the other stakeholders to acquire the eco- friendly products and services Establishment and Execution of the environmental standards • Monitoring of EPR plans and strategies at regular intervals of time.	• Investment in recycling infrastructure Public Private Partnership to introduce new ventures • Liberalize the Norms for producers keen to accept the Extended Producer Responsibility (EPR) • Standardize the e-waste value chain via common digital system to ensure the transparent system	• Ensuring the improvement in Safety and Security Norms for workers in the unorganized sector • Expanding the role of Local Bodies for the collection of e-waste to reach the end use customers • Use of Public media avenues to enhance awareness about aftermaths of generation of e-waste and ways to manage it to promote the community health • Introduce integrated programs to involve the industries, society and business
Household Sector	• Check over the habit of frequent unnecessary buying behavior pertaining to e-gadgets • Discard of the old gadgets keeping in view the concerns for the environment Unmix the green and e-waste • Individuals must learn the ways to mend the little flaws in their gadgets own their own rather than discarding them • Parents could educate their children about management of e-waste by practicing the same	• Spare parts of the electronics must be sold to authentic scrap dealers to enable them make their living	• Reset the current consumption and disposal system to reduce the ill effects of hazardous waste on the health

(continued)

Table 7.4 (continued)

Stakeholders	Environment protection	Economic prosperity	Community development
Industrial Sector	• Adoption of EPR norms Adherence to Green procurement practices • Introducing 'Carbon Reduction Targets' by stressing on e-waste recycling methods • More emphasis online services and applications	• Promoting Product redesigning to grow employment opportunities for the people • Effective channelization and adequate disposal of e-waste to induce the economic well-being of the nation • Aligning the practices with the circular system and substitute the demand of new precious metals with the materials extracted from the electronics	• Ensuring the safe and complete disposal of e-waste to reduce the social cost
Formal Sector	• Regular research and development practices to find innovative ways to manage e-waste, which are eco-friendly • Collecting the e-waste from the contributors who follow the norms of green e-waste supply chain • Proper implementation of production strategies keeping in view the regulatory environment laws related to e-waste	• Arrangement of different supervisors to keep vigil over the working of workers • The employers in formal sectors must pay adequate remuneration for the services of the workers employed in their units	• Providing the safety mechanisms, secured work environment to the workers • Organize the skill development and training programs to make the workers aware of their rights to work in the safe environment and enhance their work-related skills • Arrangement of Awareness campaigns for the consumers about the components of e-waste and do's as well as don't' s while handling the e-waste to avoid health hazards
Informal Sector	• Collection of e-waste from the contributors' avenues by following the environmental norms • Collection of e-waste materials from the collection points, where it has been segregated from bio-waste	• Availing the opportunities to grabbing the knowledge through the skill development programs • Establish themselves in the chain of e-waste management by devising the learned skills and earn for their better living	• Compliance with the safety norms to protect themselves and their children from the exposure to the hazards
NGOs, Social Service Sector	• Various awareness campaigns to sensitize the stakeholders about their responsibility toward the protection of environment	• Financial Assistance and training subsidy to the potential workers	• Initiation of Skill Development and Capacity Building Programs for the various stakeholders in the e-waste chain

the products keeping in view the further usability of designed and manufactured products.

Hence, it would be possible to protect, preserve and promote the benefits and well-being of the individuals (defining Equity and Quality of Living); Nation (defining economic growth and increase in Gross Domestic Product) and Environment (defining balance and protected biodiversity).

Conclusion

It is evident from the above discussion that the commercial establishment, government agencies, individuals, producers and corporate institutions are the major contributors of e-waste. The global COVID-19 pandemic has called upon the necessity to use the technological tools across diverse spheres. The use of technology has become a panacea to resist the highly challenging and dynamic scenario. Hence, the post COVID-19 era would usher a new trend of higher reliance on the technology to meet the workplace demands resulting in the increased demand and supply of e-gadgets. The trend would also depict the dark side of increase in e-waste due to the linear economy approach. The developed nations have the ample resources to management the fair portion of e-waste and the rest is done by putting the entire onus on the developing nations, which is a well acknowledged trend in vogue during pre-COVID-19 scenarios. But the need of the hour is that the nations at the global level must work collectively on e-waste management practices as the post COVID-19 strategy. The quick action is required to protect the virgin resources and ensure their proper utilization as a worldwide movement by switching to the circular economy. It is done only when every stakeholder engrossed in the entire chain of e-waste management should be well sensitize of their roles and work with enthusiasm to be accountable thereby contributing toward the better future. Although the role of all the stakeholders is of paramount importance, its is quintessential to acknowledge the role of Government that acts as bedrock for persuading and redefining the role of other stakeholders in the e-waste management chain.

The research has highlighted the main flaw in the effective management of e-waste, which is the open loops at the end of concerned stakeholders. Moreover, the workers employed in the informal sector are expected to comply with the ill-managed and insecure working environment. The desired eco-friendly and interconnected chain of e-waste management have also been found missing leading to the 'profit oriented' e-waste management sector rather the Social, Economic and Environment centric. Such scenario the result of lack of awareness and reluctance on the part of all stakeholders to take up as well as share the responsibility in handling the e-waste. So, the present study has depicted the need of active involvement and interventions on the part of concerned stakeholders, which is possible with the help of Integrated and Interactive centric approach. This approach is primarily based on the clear-cut role of every stakeholder in the entire chain of e-waste management to prevent overlapping and ambiguity of roles. It envisages the multi-stakeholder engagement by introducing

their roles at every required stage of e-waste management to lead to paradigm shift and revamp the disposal system in the nation.

This circular approach for managing the e-waste aims to reduce its quantum at each stage in the entire life cycle of the electronics. The inclusive circular holistic approach is executed by encompassing the interests of various stakeholders as an active intervention especially for the developing nations like India, which highly depend upon its wider informal sector to manage the e-waste. The prominent stakeholders are the kabadiwalas (rag pickers) or the informal recyclers representing the informal sector, who undertake the responsibility of collecting the e-waste and hand it over to the highest bidders i.e., formal recyclers (Malhotra, 2020). The approach has emphasized on mainstreaming the informal sectors to neutralize the annihilating impacts of e-waste disposal. The mid-way approach is necessary as it imbibes the interests of all stakeholders who are responsible in the chain of e-waste management and have the potential to regenerate the environment and enhance the economic prosperity. This circular approach could prove to be fruitful as a prominent post COVID-19 strategy to fix the challenges posed by the pandemic as the result of aggravating demand of electronics and heaps of discarded and antiquated e-waste.

The timely implementation of this inclusive ideology would enable the nation to move ahead to stabilize the economy, protect the environment and enhance the community development. The execution of such economy, environment and society-centric approach would enable the nation to fulfill its commitment toward the Sustainable Development Goals by the year 2030.

Practical Implications

The paper provides the novel contribution to the literature of challenges encountered by the nations while executing the e-waste management practices. The research has drawn some significant implications with the assertion that the nations, which will aim at implementing the effective e-waste strategies post COVID-19 scenario, would be able to achieve the Sustainable Development Goals (SDGs) by promoting the economic growth, protecting the interests of the society and promoting the environmental health.

Implications for PolicyMakers

The role of policymakers and government is foundation for promoting the well-being of the nation. The study would also highlight the prospects for the government, private sector and the aspirants to focus on ascertaining the relevance of adequate practices pertaining to their environment and make their best possible use to get the fruitful outcomes specially to sustain in the amid and post COVID-19 scenario of establishing themselves. The policymakers might get an idea to ameliorate the

present strategies, execute them with the inclusive approach striking the balance between all the stakeholders. The study would also enable the decision-makers to commence debate on the formal-informal hybrid active models and make sufficient social implementation of the green strategies for the growth and development of the economy, but keeping in view the social and environmental benefits. The introduction of the approach would draw the attention of the policymakers on reinventing the role of government in the promotion of interests of toilers working in the entire chain of e-waste management for the balanced growth of the nation.

Implications for Society

The approach being proposed in the study would enable the household to acknowledge and be well acquainted with their significant role in the entire chain of e-waste management. The approach would sensitize the individuals and all the other concerned stakeholders to resteer their psychology and drive their interests for the well-being of the society, nation and the environment. The sustainable circular approach would illuminate the social beings of their role in proper utilization of natural resources and transform their consumption patterns to preserve the natural resources for the upcoming generation as well. Most prominently, the study would persuade the stakeholders to actively participate to overcome the challenge posed by the COVID-19 pandemic by updating their knowledge and making them aware to act as catalytic agent for bring positive results in terms of economic prosperity and preservation of biodiversity.

Moreover, the aspiring readers will have the visual research about the post COVID-19 remedial actions taken with the active participation of the stakeholders by addressing the loopholes in the existing strategies and making way for the new dialogues and ideological prospects in furtherance.

Limitations and Future Scope

Before reaching the certain prospects related to future scope, the study would depict certain limitations, which would offer a platform for the future research. The findings of the study are subjected to certain limitations. The study was qualitative in nature. The future study could be quantitative in nature and consider the perspectives of the concerned stakeholders to get the better results in the future as post COVID-19 remedy.

The paper makes an assessment of current scenario in handling the e-waste in the perspective of developing nations like India. The study could foster the cross-national review of generation of e-waste and current practices related to its management to explore the global galore and have international experiences in the area. The household sector plays the role in disposal of e-waste to the local rag pickers, who

undertake door to door for collecting the e-waste. The research would also enable the governments of developing nations to acknowledge the prominent role of informal sector in the e-waste management as well as reinvent the strategies to promote the safety and security of workers employed in this sector. The research work will also be helpful for the avid readers to carry out their research in the sphere of e-waste and suggest effective ways to overcome the hurdles in its effective management.

References

Aboelmaged, M. (2021). E-waste recycling behaviour: An integration of recycling habits into the theory of planned behaviour. *Journal of Cleaner Production, 278*, 124182.

Agarwal. (2012). E-Waste law: New paradigm or business as usual. *Economic and Political Weekly, 45*(67), 14–16.

Amankwaa. (2013). Livelihoods in risk: Exploring health and environmental implications of e-waste recycling as a livelihood strategy in Ghana. *Cambridge University Press, 51*(4), 551–575.

Arya, S., & Kumar, S. (2020). E-waste in India at a glance: Current trends, regulations, challenges and management strategies. *Journal of Cleaner Production*, 122707.

Awasthi, A. K., Li, J., Koh, L., & Ogunseitan, O. A. (2019). Circular economy and electronic waste. *Nature Electronics, 2*(3), 86–89.

Borthakur, A. (2020). Policy approaches on e-waste in the emerging economies: A review of the existing governance with special reference to India and South Africa. *Journal of Cleaner Production, 252*, 119885.

Boyden, A., Soo, V. K., & Doolan, M. (2016). The environmental impacts of recycling portable lithium-ion batteries. *Procedia Cirp, 48*, 188–193.

Brighthouse, H., & Robeyns, I. (2010). *Measuring justice: Primary goods and capabilities* (pp. 45–55). Cambridge University Press.

Beukering, P. J. H. V., Bergh, J. C. M. V., & Bergh, D. (2006). Modeling and analysis of international recycling between developed and developing countries. *Resources, Conservation and Recycling, 46*, 1–26.

Chen, A., Dietrich, K. N., Huo, X., & Ho, S.-M. (2011). Development Neuotoxicants in e-waste: An emergining health concern. *Environmental Health Perspectives, 119*(4), 431–438.

Ciocoiu, C. N., Colesca, S., & Burcea, S. (2011). An AHP approach to evaluate the implementation of WEEE Management systems in recent researches in energy, environment, planning and pollution. *Proceedings of 5th WSEAS International Conference on Renewable Energy Sources*, RES'11, EPESE'11, WWAI'11 (pp. 233–238).

Clark, L. A., & Clark, W. R. (2019). Global e-waste: Unintended consequences of marketing strategies necessitates A plan for change. *Journal of Managerial Issues, 31*(3), 331–225.

Cuomo, C. J. (2011). Climate change, vulnerability and responsibility. *Hypatia, 26*(4), 690–714.

Daum, K., Stoler, J., & Grant, R. (2017). Towards a more sustainable trajectory of e-waste policy: A review of a decade of research in Accra. *Ghana International Journal of Environmental Research and Public Health, 14*(2), 135–155.

Desai, P., & Nguyen, M. (2021). *Shortages flagged for EV materials lithium and cobalt*. Retrieved from https://www.reuters.com/business/energy/shortages-flagged-ev-materials-lithium-cobalt-2021-07-01/, Accessed 26 December 2021.

Economic Times. (2021). *How Karo Sambhav, an Indian startup part of Microsoft ScaleUp, is solving e-waste problems.* Retrieved from https://economictimes.indiatimes.com/industry/miscellaneous/how-karo-sambhav-an-indian-startup-part-of-microsoft-scaleup-is-solving-e-waste-problems/fighting-e-waste/slideshow/81549561.cms, Accessed 26 December 2021.

Fela. (2010). Developing countries face e-waste crisis. *Wiley on the Behalf of the Ecological Society of America, 123*, 78–91.
Fehm, S. (2011). From iPOd to e-waste building a successful framework for extended producer responsibility in the United States. *American Bar Association, 41*(1), 173–192.
Godfrey, L., & Oelofse, S. (2017). Historical review of waste management and recycling in South Africa. *Resources, 6*(57), 1–11.
Grant, R. (2019). E-waste challenges in Cape Town opportunity for the green economy. *Urban and Spatial Challenges in South Africa: Continuing the Conversation, 78*, 56–72.
Gupta, A., & Singh, R. K. (2020). Managing operations by a logistics company for sustainable service quality: Indian perspective. *Management of Environmental Quality: An International Journal, 31*(5), 1309–1327.
Hotta, Y., Elder, M., Mori, H., & Tanaka, M. (2008). Policy considerations for establishing an environmentally sound regional material flow in East Asia. *Journal of Environment and Development, 17*(1), 26–50.
Ilyas, S., Srivastava, R. R., Kim, H., Das, S., & Singh, V. K. (2021). Circular bioeconomy and environmental benignness through microbial recycling of e-waste: A case study on copper and gold restoration. *Waste Management, 121*, 175–185. https://doi.org/10.1016/j.wasman.2020.12.013
Jain, A. (2008). Global e-waste growth in Rakesh Johri. *E-waste: Implications, Regulations and Management in India and Current Global Best Practices* (p. 4). TERI.
Janz, Alexander, & Bilitewski B. (2008). Hazardous substances in waste electrical and electronic equipment. In R. Johri (Ed.), *E-waste: Implications, regulations and management in India and current global best practices* (p. 93). TERI.
Joe, T. (2021). *Unilever X Alibaba: Duo debuts closed loop recycling system in China to tackle plastic waste.* Retrieved from https://www.greenqueen.com.hk/unilever-x-alibaba-duo-debuts-closed-loop-recycling-system-in-china-to-tackle-plastic-waste-3/, Accessed 25 December 2021.
Kedia, S. (2018). *With nearly 300,000 kg of e-waste saved from reaching landfills, Karo Sambhav is creating wealth from waste.* Retrieved from https://yourstory.com/2018/02/e-waste-karo-sambhav/amp, Accessed 26 December 2021.
Kumar, R., & Shah, D. J. (2014). Review: Current status of recycling of waste printed circuit boards in India. *Journal of Environmental Protection, 5*(1), 9–16.
Kobayashi, A. (2014). Whereabouts of waste and chemical substances. *Chemical Substances and the Environment., 12*, 11–12.
Korea Bizwire. (2021). *Hyundai engineering gears up to churn out clean hydrogen using waste plastics.* Retrieved from http://koreabizwire.com/hyundai-engineering-gears-up-to-churn-out-clean-hydrogen-using-waste-plastics/207308, Accessed 25 December 2021.
Kinnaman, T., & Yokoo, H.-F. (2011). The Environmental consequences of global reuse. *Papers and Proceedings of the One Hundred Twenty Third Annual Meeting of the American Economic Association, 101*(3), 71–76.
Lawhon. (2012). Contesting power, trust and legitimacy in the south african e-waste transition. *Springer, 89*, 123–139.
Lepawsky, J. (2015). The changing geography of global trade in electronic discards: Time to rethink the e-waste problem. *The Geographical Journal, 181*(2), 1–13.
Lepawsky, J., & McNabb, C. (2010). Mapping international flows of electronic waste. *The Canadian Geographer, 54*, 177–195.
Lines, K., Garside B., Sinha, S., & Fedorenko, I. (2016). Framing e-waste in Informality and Green Economy Thinking. *International Institute for Environment and Development*, 16–22.
Li, J. (2006). Status quo of e-waste management in Mainland China. *Journal of Material Cycles & Waste Management, 8*(1), 13–20.
Li, J., He, X., & Zeng, X. (2017). Designing and examining e-waste recycling process: Methodology and case studies. *Environmental Technology, 38*(6), 652–660.
Lubick. (2012). International environmental health. Shifting mountains of electronic waste. *Environmental Health Perspectives, 120*(4), A148–A149.
Lundgren, K. (2012). *The Global Impacts of E-waste-Addressing the Challenge.* ILO.

Malhotra, M (2020). E-waste management: Policy analysis and implementation. *Policy Perspective Foundation*, 1–61.

Mathews, A. (2017). *Xiaomi launches new electronic recycling initiative in India.* Retrieved from https://news.metal.com/newscontent/100735260/xiaomi-launches-new-electronics-recycling-initiative-in-india/, Accessed 25 December 2021.

News18 (2021). *Access to clean water and sanitation: India strives towards SDG 6*. Retrieved from https://www.news18.com/news/mission-paani/access-to-clean-water-and-sanitation-india-strives-towards-sdg-6-4501901.html/, Accessed 26 December 2021.

Ng, E. (2021). *Circular economy: How multinationals are recycling plastic waste, packaging in China to cut carbon emissions.* Retrieved from https://www.scmp.com/business/china-business/article/3160254/circular-economy-how-multinationals-are-recycling-plastic/, Accessed 25 December 2021.

Ogunseitan, S. S. (2009). The electronics revolution: From e-wonderland to e-wasteland. *American Association for the Advancement of Science*, 89–98.

Oladele, A., Ogunsitan, J. M., Schoenung, J.-D., & M., Saphores, Shapiro, A. (2009). The electronics revolution: From e-wonderland to e-wasteland. *Science New Series, 326*(5953), 670–671.

Park, A. H., & Lim, M. K. (2017). *Save the galaxy: E-waste recycling at samsung and sustainability in Korea.* Retrieved from https://s-space.snu.ac.kr/bitstream/10371/173951/1/3.%EC%9E%84%EC%9E%AC%ED%98%84.pdf, Accessed 25 December 2021.

Peralta, G. L., & Fontanos, P. M. (2005). E-Waste issues and measures in the Philippines. *Journal of Material Cycles and Waste Management, 8*, 34–39.

Press Release. (2019). Apple expands global recycling programs. Retrieved from https://www.apple.com/in/newsroom/2019/04/apple-expands-global-recycling-programs/, Accessed 26 December 2021.

Pinto, V. N. (2008). E-waste hazard: The impeding challenge. *Indian Journal of Occupational and Environmental Medicine, 12*(2), 65–70.

Plambeck, E., & Wang, Q. (2009). Effects of E-waste regulation on new product introduction. *Management Science, 55*(3), 333–347.

Rajya Sabha Research Unit (2011). E-waste in India. *Research Unit* (pp. 1–112).

Reddy. (2013). Revitalizing economics of disassembly: informal recyclers, development exports and e-waste reforms in Bangalore. *Economic and Political Weekly, 48*(13), 62–70.

Robinson, B. H. (2009). E-waste: An assessment of global production and environment impacts. *Science of the Total Environment, 408*(2), 183–191.

Rode. (2012). E-waste management in mumbai metropolitan region: Constraints and opportunities. *Theoretical and Empirical Researches in Urban Management, 7*(2), 89–103.

Roy, J. J., Rarotra, S., Krikstolaityte, V., Zhuoran, K. W., Cindy, Y. D. I., Tan, X. Y., … & Srinivasan, M. (2021). Green recycling methods to treat lithium-ion batteries e-waste: A circular approach to sustainability. *Advanced Materials*, 2103346.

Shahbaz, M., Sharma, R., Sinha, A., & Jiao, Z. (2021). Analyzing nonlinear impact of economic growth drivers on CO2 emissions: Designing an SDG framework for India. *Energy Policy, 148*, 111965.

Smith, S., & Musango, J. (2015a). Exploring the connections between the green economy and the informal economy in South Africa. *South African Journal of Science, 111*(11–12), 1–12.

Smith, S., & Musango, J. (2015b). Towards connecting the green economy with the informal economy in South Africa: A review and way forward. *Ecological Economics, 116*, 154–159.

Spash, C. L. (2021). 'The economy'as if people mattered: Revisiting critiques of economic growth in a time of crisis. *Globalizations, 18*(7), 1087–1104.

Song, L., & Zhou, Y. (2020). The COVID-19 pandemic and its impact on the global economy: What does it take to turn crisis into opportunity? *China & World Economy, 28*(4), 1–25.

Stone, R. (2009). Confronting a toxic blowback from the electronics trade. *American Association for the Advancement of Science, 324*(5944), 1055.

Schelup M., Haglueken, C., Kuehr, R. Magalini, F., Maurer, C., Meskers, C., Meuller, E., & Wang, F. (2009). Recycling: From e-waste to resources. *United Nations Environment Programme*, 1–34.

Senior. (2009). E-waste: Reuse, don't recycle. *Frontiers in Ecology and the Environment, 7*(5), 235.
Sharma. (2016). India 50 regulate e-waste recycling. *Frontiers in Ecology and the Environment, 14*(4), 178.
Smith. (2015). The economics of e-waste and the cost to the environment. *Natural Resources and Environment, 30*(2), 38–41.
Stansberry, K., Anderson, J. & Rainiee, L. (2019). *Leading concerns about the future of digital Life.* Retrieved from https://www.pewresearch.org/internet/2019/10/28/5-leading-concerns-about-the-future-of-digital-life/, Accessed on 25 December 2021.
Sullivan, J. (2014). Trash or treasure: Global trade and the accumulation of e-waste in Lagos, Nigeria. *Africa Today,* SI: Narratives of the African Landscape: Perspectives on Sustainability, 89–112.
Suzuki, M., Subramaniam, L., Wtanabe, T., & Hasegawa, H. (2009). International resource recycling system to manage e-waste in the Asia-Pacific Region: The case of Fuji xerox. *Institute for Global Environment Strategies*, 1–11.
Sovacool, B. K. (2020). Toxic transitions in the lifecycle externalities of a digital society: The complex afterlives of electronic waste in Ghana. *Resource Policy, 64*(101459), 1–21.
The Edinburgh Reporter (2021). *What a waste. A global review of solid waste management*. Retrieved from https://theedinburghreporter.co.uk/2021/11/what-a-waste-a-global-review-of-solid-waste-management/, Accessed 25 December 2021.
The Hindu (2009). Rules on E-waste Management by March. *The Hindu*, 20 December 2009.
The Times of India (2010). Mumbai port has largest amount of hazardous material. *The Times of India*, 16 August 2010.
UNEP (2013). The Japanese Industrial Waste Experience: Lessons for Rapidly Industrializing Countries. *IETC*, Osaka, 1–67.
UNEP Report. (2019). Korea environmental policy bulletin—Metal waste recycling plans. Retrieved from https://www.unep.org/resources/report/korea-environmental-policy-bulletin-metal-waste-recycling-plans/, Accessed 26 December 2021.
Wang, X., Gaustad, G., Babbitt, C. W., & Richa, K. (2014). Economies of scale for future lithium-ion battery recycling infrastructure. *Resources, Conservation and Recycling, 83*, 53–62.
Webb, S. (2007). E-Waste Hazards: Chinese gear recyclers absorb toxic chemicals. *Society for Science and the Public, 172*(2), 20.
Widmer, R., Oswald-Krapff, D., Sinha Khetriwal, M., & Schellmann and Bani, H. (2005). Global perspectives on e-waste. *Environmental Impact Assessment Review, 25*, 436–458.
Williams, E., Kahlat, R., Bengtsson, M., Hayashi, S., Hotta, Y., & Totoki, Y. (2013). Linking Informal and formal electronics recycling via AN interface organization. *Challenges, 4*(2), 136–153.
Yokoo, K. A. (2012). The environmental consequences of global reuse. *American Economic Association, 41*(1), 1–21.
Young, T. (2010). E-waste a growing problem for China and India. Available on http://www.computing.co.uk. Retrieved on 12 April 2020.

Eliza Sharma is working with Symbiosis International University, Bengaluru, as an Assistant Professor. She holds a Ph.D. in Management and Finance from Jaypee Institute of Information Technology, Noida. Her research was on "Performance of Indian Commercial Banks and Its Relationship with Human Aspects in Banking." She has ten years of work experience in academics and research. She has published 35 research papers in national and international journals and conference proceedings. Her area of research is CSR, sustainability, ESG, SDG, and social issues.

John Ben Prince is working as an Assistant Professor at Symbiosis Institute of Business Management Bangalore. His corporate work experience spans ten years in industries such as Automobiles and Apparel. He has also spent about nine years in academics, where he has been teaching subjects such as Strategic Management and Operations Management. He completed his Ph.D. from the

Indian Institute of Management Lucknow. He has published in reputed journals and has attended international conferences.

Chapter 8
Sustainable Goal Achievement by Digital Revolution During and After Pandemic; How Much One Wins and Losses: A Bird's Eye View for Future Planning

Pham Tien-Dung, Xuan-Doa Nguyen, and Subhankar Das

Introduction

The digital revolution, which includes virtual reality, 3D printing, and artificial intelligence, has entered the public discourse in many countries (Adner, 2016). The digital revolution is becoming a key driver of society's transformation. Its potential to transform society must be considered along with the various goals and initiatives of the 2030 Agenda (Amit & Zott, 2015). The digital revolution will transform society's operation and how it thinks about sustainability. It is also a driver of disruptive change.

The digital revolution is the key enabler of sustainable development. However, it can create many negative externalities (Anjum et al., 2017). The digital process is a powerful force that can propel change through its transformative capabilities. At the same time, it can also carry solid social disruptive power if handled with caution and innovation (Benner & Tripsas, 2010). The report highlights the various benefits of the digital revolution and its potential negative impacts. It also warns about the challenges of addressing the digital divide, which excludes many people currently living in poverty (Besharov & Smith, 2014). The chapter also outlines the various conditions that a successful digital transformation needs to be successful. It also talks about the social implications of the digital revolution and the related governance considerations. Humanity's dilemma is to live within a safe and just Earth system.

P. Tien-Dung · S. Das (✉)
Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam
e-mail: subhankardas@idr.edu.vn

P. Tien-Dung
e-mail: dungpt@ueh.edu.vn

X.-D. Nguyen
Ho Chi Minh City Institute for Development Studies, Ho Chi Minh City Government, Ho Chi Minh City, Viet Nam

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_8

A growing list of global risks threatens our planet's stability. While preserving the planet's resiliency depends on optimizing socioeconomic development, it also requires improving human welfare.

In 2015, the world's prominent organizations adopted the 2030 Agenda for sustainable development. The 2030 Agenda is a far-reaching and time-bound plan that aims to achieve ambitious goals (Candau & Gbandi, 2019). It was developed through a comprehensive consultation among civil society and national governments. It includes a set of goals and targets that can be achieved by 2030. It also has plans for social and economic development. The rise of the digital revolution, which includes artificial intelligence (A.I.), virtual reality, and additive manufacturing, has been widely debated.

The digital transformation will have a transformative effect on society and economies. It will also change the way we view and act on sustainable development. Below are some of the critical considerations that should be considered when exploring the potential of the digital revolution for sustainable development. Digitalization aspects are discussed in the following elements (Chellappa & Mukherjee, 2021). Figure 8.1 represents the six aspects of digital revolution.

A. ***Digitalization & Society:*** The digital revolution, which started in the 1950s, is a third civilizational revolution accelerating. It marks the emergence of new technical systems that can enhance human cognition. In 2019, real numbers were spontaneously generated in a deep neural network trained to recognize visual objects. The performance revealed the characteristics of the animal and human number discriminations. Digital Anthropocene is a newly configured context that needs to be rethought and developed to address the various challenges and opportunities that it presents (Cropanzano et al., 2017). Digital technologies

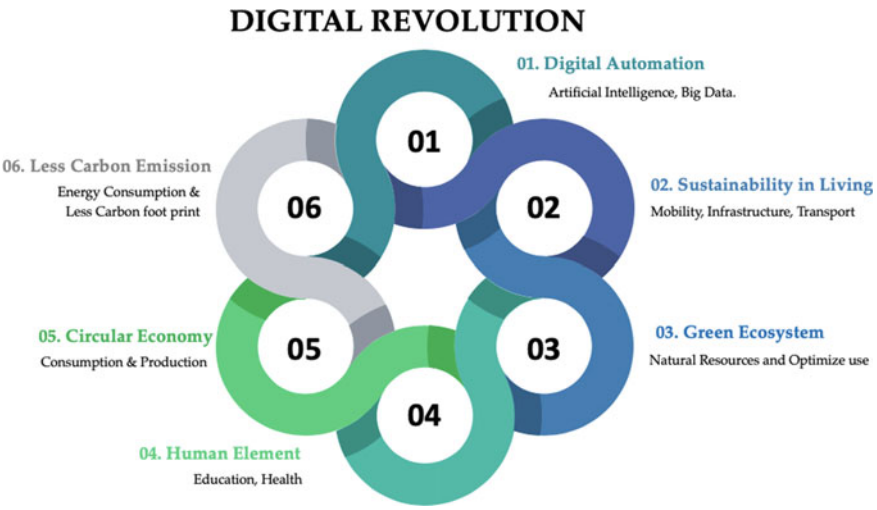

Fig. 8.1 Different aspects of digital revolution (*Source* Authors' conception)

can help us achieve a Sustainable Anthropocene by accelerating the decarbonization of all sectors and by contributing to a reduction of greenhouse gas emissions. This report and many others show that digital platforms can help achieve these goals. Although digital media can help accelerate the decarbonization of various sectors, this transition will not be an automatic process (Foss & Saebi, 2016). Technological revolutions have led to resource and greenhouse-gas-intensive growth patterns for many years. To avoid disrupting the current trends, a radical reversal of these trends is needed to create pathways toward sustainable development (Huang & Rust, 2018). The report identifies six fundamental transformations required to achieve the 17 Sustainable Development goals.

B. ***Digital automation for SDG:*** Digital technologies can help accelerate the decarbonization of the world, and they can also contribute to a more sustainable Anthropocene. According to the TWI2050 report, digital technologies can help accelerate the decarbonization of the world, and they can also contribute to a more sustainable environment (Joung et al., 2021). Although digital technology can help accelerate the decarbonization of the world, it will not be an automatic process. Until now, the transition to a more sustainable future has been primarily triggered by the effects of the previous industrial revolutions (Kaldeli et al., 2016). A radical change in current trends helps achieve the Sustainable Development goals (SDGs) and maintain a long-term sustainable future. The report TWI2050 identifies six fundamental transformations needed to reach the goals.

   The 2030 Agenda for Sustainable Development is a set of goals that should be regarded as mid-point indicators toward achieving sustainable development by 2050. There is an urgent need for policies and incentives to support this goal. The Six Essential Mechanisms can be linked to enable the Six Fundamental Challenges of Sustainable Development using digital technologies (Kim et al., 2014). These include mobilizing market forces and environmental policies that support sustainable development. Using digital technology to transform planning and markets processes for a sustainable future is an essential component of this strategy (Korkeamäki & Kohtamäki, 2020). It can help pave the way for more effective and efficient use of resources and better understanding goals and milestones for various sectors.

C. ***Effect on digitalization on society and sustainable development goals:*** The rapid emergence and evolution of digital technologies have raised the concerns of society's leaders. If not addressed properly, these changes could threaten community cohesion and undermine the 17 Sustainable Development Agenda. The four significant challenges facing humanity are inequality, education systems, labor market, and dissipative forces (Marinova et al., 2016). There is also a potential rise of political power due to the so-called Big Five companies (e.g., Amazon, Facebook, Google, and Microsoft). With the potential to improve governance and steering policies, digitalization could also help address the four slippery slopes.

D. ***Digital technology and effect on humans; Quantum leap beyond current trend:*** The next decade will see profound changes in society and economies because of digital transformation. It requires policymakers and organizations to step up their efforts to understand digital change's various effects and prepare for the inevitable structural changes (Ng & Vargo, 2018). With the rise of digital disruption, we are entering a new era of cultural and economic realities. We can now improve our cognitive capabilities to make informed decisions using artificial intelligence and virtual reality. The emergence of autonomous systems based on artificial intelligence will fundamentally transform society. By processing vast amounts of data, AI-based machines will change how we consume and work (Rust & Huang, 2014). They will also enable new treatments for diseases and provide personalized forecasts for individuals. The evolution of human intelligence has had no rival since humans first appeared. With the rise of artificial intelligence, it is now considered a primary task for humanity to meet sustainable development goals (Sick et al., 2019). There are many challenges in developing and governing sustainable pathways aligned with the profound societal transitions that are happening right now. How can our legal systems keep up with the rapid technological change brought about by the rise of virtual and self-learning environments? How can automation help people become more prosperous while leaving no one behind? What ethical guardrails should be placed in place when it comes to transforming humans and artificial intelligence? What role should human judgment play in the development of machine learning? Can we avoid making systems that can control human behavior? These questions are not part of the 2030 Agenda. They illustrate the complexity of the tasks that need to be done to build a sustainable global society. These tipping points are based on the various characteristics of our communities and consider the multiple configurations of society that will shape up over the next decade (Turber et al., 2014). Climate change and its impacts are triggering various tipping points on Earth's planetary boundaries due to the digital growth patterns not diverted toward sustainability (Urbinati et al., 2021). These points are also triggered by the erosion of civil society due to the increasing use of digital surveillance and authoritarian rule. Others are concerned about the uncontrolled human enhancement methods that will transform humanity.

E. ***Circular economy with human intervention and the digital revolution:*** The paradox of the digital Anthropocene is that although the digital process has created unprecedented opportunities for transformative change, it is also endangering the very foundations of sustainable development. The evolution of the circular economy is already within reach (Vargo & Lusch, 2017). It could allow us to decouple wealth creation from the consumption of resources. The fusion of knowledge breakthroughs and technological innovations can create new opportunities for humanity. This potential is evidenced by new biomimetics, synthetic biology, and composite materials. The digital dynamics could enable new cultural and institutional innovation (Westerlund et al., 2014). It could help build a global society based on shared values and create new common goods

perspectives. Virtual worlds could help people better understand cultural diversity. In parallel, digitalized voting procedures could help democratize democracy and improve local governance efficiency. The convergence of digital technologies and physical and cognitive capabilities will enhance human performance (Wirtz et al., 2010). Human life spans have increased dramatically due to the achievements of scientists and athletes in the field of knowledge and health. In the future, artificial organs and limbs will be developed, while the capabilities of humans with physical augmentation will also be enhanced. The rise of virtual reality and the fusion of various facts could result in losing privacy and control over one's personal data and personality. It could threaten the freedom of people in the future. The loss of control is considered one of the biggest threats to the human Anthropocene. Despite the hype about the potential of digital technology, machines controlling humans is a real danger. Despite the uncertainties of the future, the direction of change remains unknown.

Therefore, the importance of steering change must be the highest priority. The Digital Revolution presents a unique opportunity to build responsible knowledge societies that act toward sustainability (Xu et al., 2014). The potential risks posed by the various technologies and artificial intelligence that can be used in the digital era can be tackled if the two communities can come together. To achieve sustainable development, we will need to connect the tremendous potential of the twenty-first century's technological breakthroughs with the most challenging tasks. The current era of digitalization presents various challenges in addressing the multiple issues of the Digital Anthropocene. How can we interact with A.I., and how can we maintain democracy in the face of technological change? In times of digital disruption, authoritarian governments and powerful business actors pose significant threats to democracy and civil rights.

F. ***Societal challenges for the digital revolution*** Technology can face many societal challenges, such as increasing digitalization. However, it is also clear that the benefits of technology can be maximized for a sustainable future. The potential for significant progress in education, health, and wealth creation is undisputed. There are also societal impacts that will be brought about by our changes in how we live and work. With so many changes happening in society, governments and organizations are at a critical crossroads (Zott & Amit, 2010). The crucial question is whether these changes can be managed or regulated to be accommodated efficiently. Unfortunately, when introducing new technologies, most of the consequences are only acknowledged after the fact. The digital revolution can help inform the public about the many advantages of new technologies (Das & Mondal, 2016). However, it can also restrict their full potential due to public concerns. The following principles help create an interconnected system architecture that will support digital and sustainable transformation management.

   a. Education and science are the key factors that people need to understand and shape the digital shifts. Through education, people will shape the

future of digital transformation. Science will also play a crucial role in transforming knowledge networks.

b. Digitalized development needs to improve the capabilities of public institutions to manage and understand the digital world.
c. Experimental spaces are the key to cultivating a culture of learning and experimenting.
d. The Digital Revolution will have global impacts, such as the modernization of the U.N.
e. The 2030 Agenda can be seen as a new social contract that will guide how we think about the world beyond 2030. It will involve new development models focused on the environment and society.

The Six Transformations are actions that can help us achieve a better life for ourselves and our planet. They are linked to power dynamics that can affect the development of humans. The various processes that make up the Six Transformations are managed according to their evolution. If they are appropriately managed, they can serve as an entry point for achieving the goals of the SDGs.

Sustainable Development and Digitalization: Prerequisites

The Sustainable Development Goals are a set of goals that aim to improve the lives of all people on Earth. These goals are sometimes referred to as the triple bottom line. They are focused on human, environmental, and economic development. The 2030 Agenda emphasizes the importance of good governance. The 17 SDGs are universal and also referred to as holistic goals. They are designed to provide a globally agreed framework for achieving goals and management directions (Mondal et al., 2017). The U.N.'s Sustainable Development Goals are a unique concept that sets a new social contract for the world. They are designed to address the most critical issues of our times. Since human activity has already breached planetary safe spaces, all countries must now shoulder their responsibilities to achieve the goals of the Sustainable Development Agenda (Jain et al., 2018). Some prerequisites are needed for sustainable development, which are described as follows. Figure 8.2 represents all the prerequisites for sustainable development and digitalization.

a. ***Development mindset for sustainable growth***:

The Digital Revolution has the potential to improve the well-being of people globally. However, its potential to do so is overshadowed by the uncertainties associated with the nature and future of work. Despite the significant productivity growth that technology has provided, there is no guarantee that it will create more jobs (Mondal & Das, 2021). Understanding the economic conditions that left those without a college education is pressing for policymakers (Singh & Das, 2018). There is no immediate solution to the issue of productivity growth, which most countries are likely to face. We need to move away from a planned obsolescence model that involves the disposal

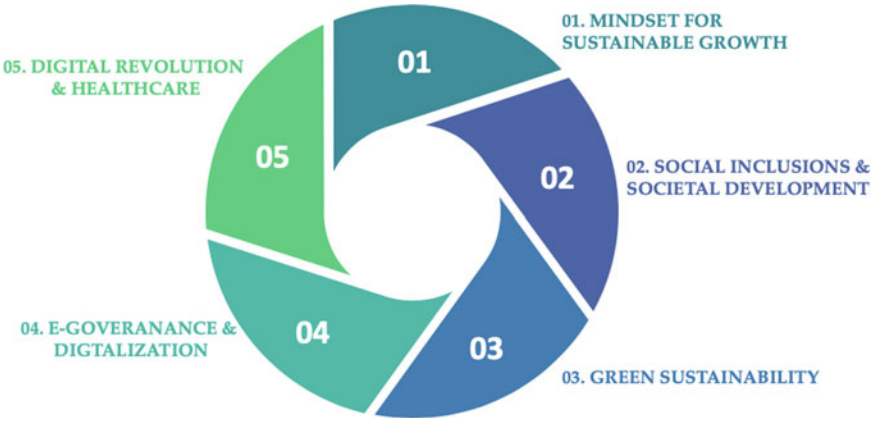

Fig. 8.2 Prerequisites for sustainable development and digitalization (*Source* Authors' conception)

of non-productive resources. Instead, it should be a circular economy that encourages the reuse of resources.

Unfortunately, despite the rapid emergence of digital technologies, most do not yet have the proper incentive to reuse finished products and materials. It is mainly due to the increasing number of features in devices. Due to the growing number of marketing campaigns, consumers are now buying replacement products that are often only as good as the new ones (Gupta et al., 2019). Although they may be obsolete, many new products still have the same functionality. In the U.K., it has been estimated that around four times as many mobile phones are still unused as those currently used. Over 30% of household appliances are still in working condition in Germany (Behera et al., 2019). The growth of green industries through the circular economy can help in an increasing number of jobs created by

b. ***Social inclusions and Societal development:***

Digital technologies have made their way across much of the world, but they also have characteristics that make them more prone to social inequality. Even more so, the digital divide shows that the various benefits of using digital technologies have fallen short of being inclusive. This divide is often relevant to different social groups and regions across the globe. Equalities are affected by various factors such as access to digital technologies, education, and affordability (Mohanty et al., 2019). They also impact the economy through job losses, technological breakthroughs, and increased productivity. The promise of digital inclusion is only realized if it reaches the currently left behind people.

There may be warning signs of the dangers of algorithms and their potential to leave people behind. Digitalization can help bridge the digital divide, but it can also cause more problems if not managed well. Most of the barriers to digital inclusion are related to access. For instance, around half of the world's population still lacks Internet access. This list does not consider the various factors that affect the quality of service, such as reliability and affordability (Nadanyiova & Das, 2020). Most of the

time, digital technologies are more prone to diffuse than some basic ones. Internet access can also bridge the divide between people living in different countries. A 2016 study by the World Bank showed that economic disparities remained large even across generations. Unfortunately, there are still barriers to accessing these resources, such as the lack of electricity and Internet costs. Open-source databases such as Wikipedia help ensure the spread of information globally. Due to the steady growth of Internet access and electricity, the proportion of people with Internet access is expected to reach almost full coverage by 2030 (Mondal, 2020b). Through social media, groups and movements can become mainstream. However, this platform can also reduce the diversity of perspectives, creating echo chambers. The development of echo chambers could disrupt a well-informed public debate. It could also lead to the rise of mental disorders (Das, 2020b). Internet access can help spread values and norms according to human rights principles. These can be spread through various means, such as social media and television, to enable people to make informed decisions about their bodies and sexual and reproductive health.

c. ***Green Sustainability:***

The Anthropocene is characterized by the rapid emergence of new technologies and their potential to improve society's well-being. However, achieving a sustainable future requires addressing the various factors that affect it, such as land use and climate change. Technology's increasing adoption has led to the depletion of Earth's natural resources and climate change. The increasing popularity of digital devices, especially smartphones, has raised concerns about their lack of Earth's resources (Sharma & Das, 2020). In addition, their use increases the amount of e-waste. The number of mobile devices has more than doubled in less than three decades, and this rapid increase in consumption places additional stress on the environment (Singh et al., 2020). A report released in 2018, for instance, indicated that the greenhouse gas emissions from digital technology will increase by around 2% in 2020 and 8% in 2025. A reduction in energy and carbon footprint can be achieved with new, highly efficient technologies. However, this trade-off can be appropriately managed (Siri et al., 2020). Unfortunately, the pace of the digital revolution has caused regulators to adopt policies that are often enacted after the fact. It leads to the development of too short regulations and tends to impose harsh conditions on the use of new technologies.

d. ***E-governance and digitalization boost for sustainability:***

Peace and good governance are critical to sustainable human development. The digital transformation can also shape the political actors' roles in shaping this ideal. The digital transformation presents new political and security challenges, such as the rise of cyberwars and drone wars. Although states and societies can now rely on digital tools to address these challenges, they still need to make the most of them. These reforms are still the same as those proposed in the TWI2050 framework. The digital transformation can also create new opportunities for governments and communities to work together to achieve the SDGs (Van et al., 2020). Getting the most out of the digital transformation involves ensuring that technology is not used in contested

governance spaces. It is because it can magnify existing inequalities. Despite the potential benefits of the digital economy, there are still many ways to use it for good. Strictly following the rules and regulations can still be very beneficial for humanity. One of these challenges is having someone with deep technical knowledge evaluate multiple platforms (Duy et al., 2020). After transitioning to a free and open-source platform, government agencies must rethink their procurement process. There are also opportunities for governments to implement flexible digital media.

e. ***Digital revolution and healthcare***

The use of technologies for healthcare has always been an essential part of the system. In particular, advancements in medical imaging have led to a reduction in invasive procedures (Mondal, 2021). Due to the rapid emergence of digital technology, healthcare has become more accessible and personal. For instance, ultrasound technology is now available via smartphones. Various new technologies such as virtual reality and mobile health have emerged in the past couple of years. With the rapid emergence and acceptance of fitness trackers, people can now monitor their health in real-time. Through these tools, people can monitor various aspects of their health, such as their weight, heart rate, and sugar levels. It has led to an increase in their motivation to stay healthy. New mobile technologies have also saved many lives. According to researchers, the availability of telemedicine could help improve the healthcare system in developing countries. For instance, a remote community in Australia was able to establish a self-service clinic that provided patients with access to regular medicines (Das, 2021c). Telemedicine is expected to play a massive role in the future, as it can help overcome the shortage of skilled health professionals and reduce travel times for patients.

Patients can receive regular updates from their doctors (Das, 2020a). They can also keep track of their vital statistics using their smartphones. Doctors can also implant wearable devices into their bodies to collect data on various health conditions. About 90% of prostate surgeries are carried out using robots (Mondal, 2020a). Due to their ability to perform the surgery, they are being used more frequently. The ability to perform virtual surgery allows surgeons to improve their capabilities and provide an alternative to traditional open surgery. And it's also being used to treat mental disorders (Sharma et al., 2020).

Discussions

This chapter aims to describe the impact of intelligent technologies on business models. Instead of focusing on the effects of the Internet of Everything on a single firm, we used a service ecosystem perspective to examine how intelligent things can affect resource flows in a network. Using all the digitally published and printed secondary studies, we observed that the intelligent technologies' impact on business models increases with smartness (Das, 2021b). Less sophisticated smart objects may also potentially affect business models at the micro-level. The authors then draw on

our analysis to develop propositions about intelligent devices and their impact on value creation. The various propositions authors observed can be used as starting points for scholars who want to create new insights into innovative technologies' impact on business models.

A. ***Micro-level policies:***

Ending things with smartness may transform the way we deliver services and products to our customers. This benefit can improve the efficiency of our workforce and provide better convenience. According to our observation, high-level smartness can be autonomous and work seamlessly with other people. These tools help customers save time and effort. For instance, when a car's software update is needed, they can ask the customer to arrange for it without the need for the customer to interact with a car maintenance firm (Yegen & Mondal, 2021). The increasing level of smartness helps customers accept intelligent objects. However, this level of acceptance can be affected by various factors such as security and privacy (Duman and Das, 2021, 2021a, 2021b, 2021c). Unfortunately, exchanging data between different bright things can expose sensitive information such as passwords and tell hackers. It could expose them to various security risks.

At high levels of smartness, customers might feel apprehensive about their data being shared with other parties. It could affect their trust in the businesses that use the data collected by these connected objects. Prior studies suggest that companies should communicate the types of data they collect and the purposes for which it is used (Ravi & Mondal, 2021). Despite the advantages of having a variety of intelligent objects, businesses have a hard time developing effective business models that are flexible enough to handle the customers' demands (Siri & Das, 2021). Concerns about the security of the data collected by intelligent objects and the companies that use it can also decrease the acceptance of these products.

From a frontline employee's perspective, intelligent technology tools that allow people to do their jobs better are valuable. This expectation aligns with the literature that shows that adopting technology leads to better customer service and increased employee productivity. However, achieving this advantage can be challenging since implementing innovative technology often involves a lot of work (Das, 2021a). For instance, implementing innovative technology can require much time and effort in healthcare. The right tools and training can help people become more productive and leave their desk-bound colleagues to handle their tasks more smoothly (Sharma & Das, 2021). However, with high levels of smartness, people might feel that they lose their autonomy and decision-making power.

B. ***Meso-level policies:***

Business models are not static, which helps to understand how intelligent digital technologies work. They are constantly being enacted through the actors' resource integration practices. Data flows are the backbone of digitalized business models. They dictate how value is created and how business models can create conflicts or complementarity (Mondal and Das, 2021, 2021a, 2021b, 2021c). Human capabilities

can help minimize risks and make sure that value creation occurs. It is because they can manage the complexity of the process and provide the necessary tools and resources to support value creation (Tiwari & Mondal, 2022). For instance, if a home security system is connected to a mobile phone and a doorbell, this could result in a business model that is not acceptable to insurance companies. Humans play a dual role in the digitalized ecosystem, as they are both moderators and instigators of conflicts among connected business models. They both have their own needs to support value creation.

C. ***Macro-level policies:***

As part of our discussion, we consider the various challenges of studying digital technologies and intelligent things. This chapter shows how connected things can transform the value ecosystems of industries. This convergence leads to new service ecosystems and new business models. Industries do it in the form of digitalized technology-enabled services. One of the most challenging factors in establishing value co-creating ecosystems is choosing the right partners. It is an area where we often encounter conflicts (Mondal et al., 2022). Despite the various transitions in the industry, many firms still struggle to identify the opportunities and challenges presented by intelligent device-enabled industry convergence. For instance, smart cars are becoming more connected, creating intra-industry connectivity between various actors within the car industry, such as parking companies, car-sharing firms, and petrol stations.

Conclusion

The smartness of connected things is brought about by their ability to adapt to new circumstances and act autonomously. This concept supports the need for organizations to have effective networks and processes to enable their connected devices to perform their tasks. Most firms are limited by their path dependencies and require developing a network-based business model. It is where the mutual benefit-sharing agreements come in. There has been debate about how digitalization will affect how we live and work. It is widely believed that we will have entirely new institutional arrangements because of this transition. Innovative technologies cut costs by reducing marginal production, increasing economies of scale, and lowering entry barriers for digital products and services. However, this centralization process leads to a reduction in competition and a rise in social inequality. Various trade-offs influence the dynamics of platform competition. In the case of the Internet of Things and other technologies, this could result in a more fragmented technical landscape. The early stages of the digitalized platform development suggest no clear trend toward consolidation. Instead, the potential of intelligent technologies is only realized when all relevant parties can share data. There is also potential for highly powerful monopolists to pressure other players to acquire their data, but this will likely be managed in new institutional arrangements.

Intelligent technologies will be influenced by how people use the products and services they buy. The concept of service-dominant logic states that people's products and services are designed to serve their needs. The interactions between various entities will become more sophisticated, and the way they operate will also change. This chapter discusses concepts related to smart technologies and how they impact lives for sustainability, which can explore the various levels of smartness and their implications for business models. Through this framework, researchers can develop case studies to help them understand the nature of smartness and its various levels. This chapter targets to help researchers understand the multiple effects of smartness on different stakeholder groups. For instance, the rise of intelligent technologies is expected to trigger new challenges and opportunities.

References

Adner, R. (2016). Ecosystem as structure. *Journal of Management, 43*(1), 39–58. https://doi.org/10.1177/0149206316678451

Amit, R., & Zott, C. (2015). Crafting business architecture: The antecedents of business model design. *Strategic Entrepreneurship Journal, 9*(4), 331–350. https://doi.org/10.1002/sej.1200

Anjum, A., Sporny, M., & Sill, A. (2017). Blockchain standards for compliance and trust. *IEEE Cloud Computing, 4*(4), 84–90. https://doi.org/10.1109/mcc.2017.3791019

Behera, M., Dash, M., Ayasa Kanta Mohanty, A. K., & Das, S. (2019). Entrepreneurial ecosystem: A geographical upliftment. *Revista Espacios, 40*, 26–36. http://www.revistaespacios.com/a19v40n01/19400126.html

Benner, M. J., & Tripsas, M. (2010). The influence of prior industry affiliation on framing in nascent industries: The evolution of digital cameras. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1721005

Besharov, M. L., & Smith, W. K. (2014). Multiple institutional logics in organizations: Explaining their varied nature and implications. *Academy of Management Review, 39*(3), 364–381. https://doi.org/10.5465/amr.2011.0431

Candau, F., & Gbandi, T. (2019). Trade and institutions: Explaining urban giants. *Journal of Institutional Economics, 15*(6), 1017–1035. https://doi.org/10.1017/s1744137419000328

Chellappa, R. K., & Mukherjee, R. (2021). Platform preannouncement strategies: The strategic role of information in two-sided markets competition. *Management Science, 67*(3), 1527–1545. https://doi.org/10.1287/mnsc.2020.3606

Cropanzano, R., Anthony, E. L., Daniels, S. R., & Hall, A. V. (2017). Social exchange theory: A critical review with theoretical remedies. *Academy of Management Annals, 11*(1), 479–516. https://doi.org/10.5465/annals.2015.0099

Das, S. (2020a). *Media impact of advertising on consumer buying behaviour a comparative study of different media.* Shiksha o Anusandhan University. http://hdl.handle.net/10603/273691

Das, S. (2020b). Innovations in digital banking service brand equity and millennial consumerism. *Digital Transformation and Innovative Services for Business and Learning* (pp. 62–79). IGI Global.

Das, S. (2021a). Digital entertainment: The next evolution in service sector. *Springer Nature.* https://doi.org/10.1007/978-981-15-9724-4.PrintISBN978-981-15-9723-7.OnlineISBN978-981-15-9724-4

Das, S. (2021b). *Search engine optimization and marketing: A recipe for success in digital marketing* (1st ed.). CRC Press.

Das, S. (2021c) A systematic study of integrated marketing communication and content management system for millennial consumers. In *Innovations in digital branding and content marketing* (pp. 91–112). IGI Global.

Das, S., & Mondal, S. (2016). Yours digitally: Patanjali. *SSRN 2737299*.

Duman, Ü. O., & Das, S. (2021). The dynamic rise of digital brands' market mavens in digital entertainment: A complete know how for curious customers. In *Digital entertainment* (pp. 147–172). Palgrave Macmillan.

Duy, N. T., Mondal, S. R., Van, N. T. T., Dzung, P. T., Minh, D. X. H., & Das, S. (2020). A study on the role of web 4.0 and 5.0 in the sustainable tourism ecosystem of Ho Chi Minh City, Vietnam. *Sustainability*, *12*(17), 7140. https://doi.org/10.3390/su12177140

Foss, N. J., & Saebi, T. (2016). Fifteen years of research on business model innovation. *Journal of Management, 43*(1), 200–227. https://doi.org/10.1177/0149206316675927

Gupta, D. K., Jena, D., Samantaray, A. K., & Das, S. (2019). HRD climate in selected public sector banks in India. *Revista ESPACIOS*, *40*(11).

Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research, 21*(2), 155–172. https://doi.org/10.1177/1094670517752459

Jain, S., Jain V., & Das, S. (2018). Relationship analysis between emotional intelligence and service quality with special evidences from Indian banking sector. *Revista ESPACIOS*, *39*(33).

Joung, J., Kim, K. H., & Kim, K. (2021). Data-driven approach to dual service failure monitoring from negative online reviews: Managerial perspective. *SAGE Open, 11*(1), 215824402098824. https://doi.org/10.1177/2158244020988249

Kaldeli, E., Lazovik, A., & Aiello, M. (2016). Domain-independent planning for services in uncertain and dynamic environments. *Artificial Intelligence, 236*, 30–64. https://doi.org/10.1016/j.artint.2016.03.002

Kim, N., Lee, H., & Kim, W. (2014). Dynamic patterns of industry convergence: Evidence from a large amount of unstructured data. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2519054

Korkeamäki, L., & Kohtamäki, M. (2020). To outcomes and beyond: Discursively managing legitimacy struggles in outcome business models. *Industrial Marketing Management, 91*, 196–208. https://doi.org/10.1016/j.indmarman.2020.08.023

Marinova, D., de Ruyter, K., Huang, M. H., Meuter, M. L., & Challagalla, G. (2016). Getting smart. *Journal of Service Research, 20*(1), 29–42. https://doi.org/10.1177/1094670516679273

Mohanty, P. C., Dash, M., Dash, M., & Das, S. (2019). A study on factors influencing training effectiveness. *Revista Espacios*. Volume (40), 7–15. http://www.revistaespacios.com/a19v40n02/19400207.html

Mondal, S. R. (2020a). *Factors influencing store image loyalty and satisfaction from customer perspective an empirical study in retail sector*. Shiksha o Anusandhan University.

Mondal, S. R. (2020b). A systematic study for digital innovation in management education: An integrated approach towards problem-based learning in Vietnam. In *Digital innovations for customer engagement, management, and organizational improvement* (pp. 104–120). IGI Global.

Mondal, S. (2021). A systematic study of new age consumer engagement and exploration for digital entertainment for over-the-top platforms in various digital media. In *Innovations in digital branding and content marketing* (pp. 113–133). IGI Global

Mondal, S. R., & Das, S. (2021). Examining diabetic subjects on their correlation with TTH and CAD: A statistical approach on exploratory results. In *Machine learning and the internet of medical things in healthcare* (pp. 153–177). Academic Press.

Mondal, S., Das, S., Musunuru, K., & Dash, M. (2017). Study on the factors affecting customer purchase activity in retail stores by confirmatory factor analysis. *Revista ESPACIOS*, *38*(61).

Mondal, S. R., Virgilio, F. D., & Das, S. (2022). *H.R. analytics and digital H.R. practices*. Springer.

Nadanyiova, M., & Das, S. (2020). Millennials as a target segment of socially responsible communication within the business strategy. *Littera Scripta, 13*(1), 119–134. https://doi.org/10.36708/Littera_Scripta2020/1/8

Ng, I. C., & Vargo, S. L. (2018). Service-dominant logic, service ecosystems and institutions: An editorial. *Journal of Service Management, 29*(4), 518–520. https://doi.org/10.1108/josm-07-2018-412

Ravi, S., & Mondal, S. R. (2021). Digital entertainment based do it yourself content & advertisement as a factor of driving force for trust & customer patronage. In *Digital entertainment* (pp. 127–146). Palgrave Macmillan.

Rust, R. T., & Huang, M. H. (2014). The service revolution and the transformation of marketing science. *Marketing Science, 33*(2), 206–221. https://doi.org/10.1287/mksc.2013.0836

Sharma, E., & Das, S. (2020). Measuring impact of Indian ports on environment and effectiveness of remedial measures towards environmental pollution. *International Journal of Environment and Waste Management, 25*(3), 356–380. https://doi.org/10.1504/IJEWM.2019.10021787

Sharma, E., & Das, S. (2021). Integrated model for women empowerment in rural India. *Journal of International Development, 1–18*,. https://doi.org/10.1002/jid.3539

Sharma, E., Nigam, N., & Das, S. (2020). Measuring gap in expected and perceived quality of ICT enabled customer services: A systematic study of top ten retailers of India. *International Journal of Applied Systemic Studies, 9*(2), 159–184. https://doi.org/10.1504/ijass.2020.113260

Sick, N., Preschitschek, N., Leker, J., & Bröring, S. (2019). A new framework to assess industry convergence in high technology environments. *Technovation, 84–85*, 48–58. https://doi.org/10.1016/j.technovation.2018.08.001

Singh, L. B., Mondal, S. R., & Das, S. (2020). Human resource practices & their observed significance for Indian SMEs. *Revista ESPACIOS*, *41*(07). http://www.revistaespacios.com/a20v41n07/20410715.html

Singh, S., & Das, S. (2018). Impact of post-merger and acquisition activities on the financial performance of banks: A study of Indian private sector and public sector banks. *Revista Espacios Magazine, 39*(26), 25.

Siri, R., & Das, S. (2021). A study on processing of information storage & use of new age consumers in digital wellness sector through story telling & creating interest. In *Digital entertainment* (pp. 45–63). Palgrave Macmillan.

Siri, R., Mondal, S. R., Das, S. (2020) Hydropower: A renewable energy resource for sustainability in terms of climate change and environmental protection. In *The handbook of environmental chemistry*. Springer.

Tiwari, M., & Mondal, S. R. (2022). Technological dynamism of workforce management for effective education service delivery during and after covid-19. In *H.R. analytics and digital H.R. practices* (pp. 199–215). Palgrave Macmillan.

Turber, S., vom Brocke, J., Gassmann, O., & Fleisch, E. (2014). Designing business models in the era of internet of things. *Advancing the Impact of Design Science: Moving from Theory to Practice, 17–31*,. https://doi.org/10.1007/978-3-319-06701-8_2

Urbinati, A., Manelli, L., Frattini, F., & Bogers, M. L. A. M. (2021). The digital transformation of the innovation process: Orchestration mechanisms and future research directions. *Innovation, 1–21*,. https://doi.org/10.1080/14479338.2021.1963736

Van, N. T. T., Vrana, V., Duy, N. T., Minh, D. X. H., Dzung, P. T., Mondal, S. R., & Das, S. (2020). The role of human-machine interactive devices for post-covid-19 innovative sustainable tourism in Ho Chi Minh City Vietnam. *Sustainability, 12*(22), 9523. https://doi.org/10.3390/su12229523

Vargo, S. L., & Lusch, R. F. (2017). Service-dominant logic 2025. *International Journal of Research in Marketing, 34*(1), 46–67. https://doi.org/10.1016/j.ijresmar.2016.11.001

Westerlund, M., Leminen, S., & Rajahonka, M. (2014). Designing business models for the internet of things. *Technology Innovation Management Review*, *4*(7), 5–14. https://doi.org/10.22215/timreview/807

Wirtz, B. W., Schilke, O., & Ullrich, S. (2010). Strategic development of business models. *Long Range Planning, 43*(2–3), 272–290. https://doi.org/10.1016/j.lrp.2010.01.005

Xu, L. D., He, W., & Li, S. (2014). Internet of things in Industries: A survey. *IEEE Transactions on Industrial Informatics, 10*(4), 2233–2243. https://doi.org/10.1109/tii.2014.2300753

Yegen, C., & Mondal, S. R. (2021). Sharenting: A new paradigm of digital entertainment of new age parenting and social media. In *Digital entertainment* (pp. 213–231). Palgrave Macmillan.
Zott, C., & Amit, R. (2010). Business model design: An activity system perspective. *Long Range Planning, 43*(2–3), 216–226. https://doi.org/10.1016/j.lrp.2009.07.004

Pham Tien-Dung is working as PhD Research Scholar, Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Viet Nam. His research areas are digitalization efficacy, digital transformation, managerial evolution, and digital innovations.

Nguyen Xuan-Doa is a Master Scholar in Ho Chi Minh City Institute for Development Studies, Ho Chi Minh City Government. Xuan-Doa's research interests lie with sustainable living, financial inclusions of digital enterprises, and digital innovations, digital transformation, and digitalization

Subhankar Das (Academician, Researcher, Author, Writer, Blogger, Data Science trainer, Social Media Marketing Consultant) received his Ph.D. in Social Media Advertisement & Media Planning. He has 12+ years of teaching and research experience. He is currently associated as senior research fellow with Institute of Development Economics Research, University of Economics, Ho Chi Minh City, Vietnam. He has published 20+ Research Papers in various International Referred Journals (Scopus, Thomson Reuters, SSCI, SCIE).

Chapter 9
Wake-Up Call for People and the Planet to Move Ahead with Conviction. Where to Start and Plan?

Mária Szalmáné Csete

Introduction

The world's leaders make increasingly serious decisions and commitments for a more sustainable future (e.g., European Green Deal, Green New Deal). However, the researchers of Global Footprint Network say the world has returned to its old, resource-wasting pace despite the pandemic-related closures. On June 4, 2021, the Ecological Overshoot Day 2021 was announced in Glasgow. (Global Footprint Network, 2021) In 2020, in addition to the many terrible consequences of the pandemic, there was at least a little good: nearly a month (from July 26, 2019 to August 22, 2020), the deficit point shifted. This has broken a trend that has been deteriorating since 1970 but only for a short time. In 2021, despite reserved closures, we declined, and the environmental gift effect of the pandemic is wholly gone. According to a KPMG survey, half of the world's executives do not expect everything to get back on the same track. In terms of business prospects and challenges, the business leaders interviewed put cybersecurity at the forefront of several factors that can affect their operations and its success due to the increasing level of distance working. The top five business risks following cybersecurity were the changes in the regulatory environment, tax risk, supply chain risk, and environmental and climate change threats. (KPMG, 2021).

Adaptation can play a pivotal role for people and the planet to move ahead with conviction. The availability of different resources (socio-economic, environmental), the main characteristics of a region, the possible impacts of climate change can also influence the conditions concerning the adaptive capacity or the need for adaptation. Based on the scientific literature, it can be emphasized that different examinations

M. Szalmáné Csete (✉)
Faculty of Economic and Social Sciences, Department of Environmental Economics and Sustainability, Budapest University of Technology and Economics, Műegyetem rakpart 3, 1111 Budapest, Hungary
e-mail: csete.maria@gtk.bme.hu

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_9

concerning adaptation, moreover the measure of adaptation progress has turned into an expanding research theme considering climate change related phenomena (Briesbroek et al., 2013; Bosello, 2014; Isoard, 2011; Ledda et al., 2020; Porter et al., 2014). The pace and scale of climate change are the biggest challenges for effective adaptation. Social and economic systems may not be able to adapt dynamically and flexibly to rapid change, which may jeopardize the system's stability and trigger new challenges for the different stakeholders. The interrelationships between digitalization and sustainability may foster positive synergies also in planning and implementation.

Will Digitalization Lead To Sustainable Transition?

Nowadays, the various digital transformation issues are becoming increasingly important in the search for answers to global environmental challenges and in the practical implementation of the efforts to achieve a sustainable transition. The feasibility of the digital switchover raises several questions from both a regional and a sectoral point of view, which have yet to be answered. The development of digital transformation offers many new challenges, opportunities, and solutions for different sectors and locations alike. Digital transformation can have significant environmental and socio-economic impacts all over the world. (Esses et al., 2021) The development of the tools we use is accompanied by an increase in consumption and an increase in prosperity. Every technical development also results in economic growth. Companies engaged in economic activity always want a competitive advantage over their competitors, so they are constantly developing their products and services and are especially interested in innovation. The innovations that appear in everyday life will transform the economy and all other areas as everything will adapt to the new invention. In such paradigm shifts, well-responsive, adaptive companies can reap huge benefits.

Digitalization actually means that previously physical or analog objects and contents become digital. The concept of digital transformation goes beyond that. It has resulted in a complex, ongoing change in the organization's life. Not just because of innovation, it is more about investing in new skills and rethinking resources and existing processes. Digitalization also involves the significant development of innovative technologies, artificial intelligence, automation processes, and digital platforms. (Shkarlet et al., 2020) Nowadays, digital transformation can support different regional development pathways concerning the various tools of development policies. The possible role of innovation and the digital transition is becoming increasingly important as more varied and complex problems emerge (e.g., human health issues, pandemic, mitigation and adaptation challenges, environmental pollution, etc.). According to Trasca et al. (2019), digitalization can deliver not only new challenges but also unique ideas and innovative solutions for diverse stakeholders on different scales. Digital solutions, innovations, and related processes can influence different stakeholders operating in diverse fields due to digitalization-related operational, organizational, or cultural changes. The digital transition can influence several

economic processes and increase prosperity. (Matthess & Kunkel, 2020) Different intelligent and creative solutions can provide state-of-the-art management, design and other types of possible developments. (Schieferdecker & Mattauch, 2014) Digital transformation also enhances the main aims of the Green Agreement. (European Commission, 2021).

The effects of digital transformation on the pillars or dimensions of sustainability (environmental, social, economic) are diverse. It is a crucial question whether digitalization can foster the practical implementation of sustainable transition and if yes, to what extent. Most of the recent studies dealing with this question mainly focus on the natural pillar or dimension of sustainability (Del Rio Castro et al., 2021; Goueva et al., 2018; Isensee et al., 2020; Seele, 2016) or an integrated approach of the environmental and social dimensions. There is a lack of complex multidimensional and interdisciplinary research; however, there are a few examples (e.g., Brenner & Hartl, 2021; Esses et al., 2021).

Considering the current perception of digitalization and sustainable transition, moreover, taking into account the interrelations between the two phenomena, it is pivotal to deal with the perception of different stakeholders. (Brenner & Hartl, 2021). The success can depend and also can be influenced by the understanding of policymakers and managers considering digitalization and sustainability. Policymakers need to be aware of the interrelations, synergies, and possible rebound effects between digital transformation and the sustainable pathway.

Wake-Up Calls on Different Levels of Sustainability

The effectiveness of global environmental agreements and environmental and sustainability programs can and should be assessed at multiple levels and stages. This is not different for the digital transition. Considering the last published IPCC Report (IPCC, 2021), mitigation and adaptation efforts and processes still play a pivotal role in sustainable development transition possibilities. Climate adaptation has been a high priority for the British Presidency of this year's Glasgow UN Climate Summit, which has been given a strong emphasis in the negotiations compared to previous meetings. Related international processes are the following:

- On the one hand, a two-year work program (Glasgow-Sharm-el-Sheikh Work Program) was set up to define the Global Adaptation Objective of the Paris Agreement. (So far, only the well-known global emission reduction target has existed, but adaptation to existing adverse climate effects is at least as important, especially for the most vulnerable groups of countries, such as Small Island Developing States or Least Developed Countries).
- On the other hand, the adopted Glasgow Climate Pact calls on developed country Parties to at least double their climate finance support for adaptation by 2025, compared to $ 15 billion in 2019 (approximately the 20% of total climate finance support).

The goals of adaptation are also reflected in several domestic national policy documents. Adaptation and sustainable development usually can go hand in hand. Considering the European development policies, it can be stated that innovation and sustainability are both the cornerstones of the relevant policy documents. Due to the synergies between the two terms moreover the transition pathways, innovation can play a significant role in fostering the practical implementation of a green, resource-efficient, and zero-carbon-oriented competitive economy. Digital and sustainable transition are both crucial elements considering climate change mitigation and adaptation-oriented goals and related attitudes.

On the regional level, the interrelation between digitalization and sustainability was grasped with an indicator-based evaluation due to the work Esses et al. (2021). This case study focused on examining the progress of digitalization in the four countries of the so-called Visegrád Group also considering sustainable transition. The "Visegrád Group" of Central European Countries (also known as the Visegrád Four, VG or V4) was established in 1990. The four countries form a multi-level, multi-aspect alliance dealing with the regions' economic, cultural, political, military, and energy aspects (Dangerfield, 2014) since they have long been sharing numerous characteristics: let it be history, culture, religion, or regional proximity. These countries are increasingly gaining influence in the European scheme; hence their stand in environmental actions and climate change adaptation practices might be influential to many other nations. The interrelations between the two phenomena were examined between the dimensions of the Sustainable Development Goals (SDGs) and the Digital Economy and Society Index (DESI) in case of the "V4" countries (Table 9.1). (Esses et al., 2021) The main aim of the DESI is to measure and monitor the digital performance of the EU member countries, as shown in Table 9.1.

Altogether ten relevant SDG targets were evaluated and two selected significant indicators represented each. In relation, the V4 countries, based on the collected regional indicators, a ranking was set up. Rankings related to the indicator are marked with four colors (green—first place for 4 points, yellow—second place for 3 points, orange—third place for 2 points, red—fourth place for 1 point). The results are based on the overall evaluation and the total is the following: 1. Czech Republik, 2. Slovakia, 3. Hungary, and 4. Poland. Considering the EU average several indicators need to be improved such as *"Early leavers from education and training (% of the population between ages of 18–24)"*, *"Young people neither in employment nor in education and training (NEET) (% of the population between the ages of 15 and 29)."* Among the employment rate of 20–64-year-olds, Poland lags behind the EU average, while according to the indicator *"share of environmental taxes in total tax revenues"* the Czech Republic does not reach the EU average.

Considering the local level developments, it is also essential to deal with the concept of climate innovation, especially in relation to sustainability. On the local level, besides the precautionary principle also the idea of subsidiarity comes in the forefront. Considering digitalization and sustainability, it needs to be emphasized that innovation systems and management tools can support both transition pathways at the same time and also support responsible innovation. It is critical to share burdens and opportunities on different spatial levels. Innovation can be considered as one

Table 9.1 Interrelationship of digitalization and sustainable transition in the "V4" countries

	DESI indicators	SDG goals	Indicators	Czech Republic	Hungary	Poland	Slovakia	EU
D E S I	Connectivity	1. NO POVERTY	People at risk of poverty or social exclusion (% of population) 2018	12.2	19.6	18.9	16.3	21.6
			Population unable to keep home adequately warm (% of population) 2018	2.7	6.1	5.1	4.8	7.6
		4. QUALITY EDUCATION	Early leavers from education and training (% of population 18-24) 2019	6.7	11.8	5.2	8.3	10.2
			Employment rate of recent graduates (% of graduates 20-34) 2019	87.3	85.6	84	83.9	80.9
	Human Capital	10. REDUCED INEQUALITIES	Young people neither in employment nor in education and training (NEET), by citizenship (% of population 15-29) 2018	9.5	12.9	12.1	14.6	12.2
			Risk of poverty and social exclusion - urban (% of population) 2018	12	14.2	13.4	10.4	21.5
		8. DECENT WORK AND ECONOMIC GROWTH	Employment rate (% of population 20-64) 2019	80.3	75.3	73	73,4	73.1
			Inactive population due to caring responsibilities (% of inactive population 20-64) 2019	28.8	23.4	30.7	26.4	22.2
	Use of Internet	17. PARTNERSHIPS FOR THE GOALS	Financing to developing countries by financing source (million €) 2018	109	932	826	117	104070
			Share of environmental taxes in total tax revenues (%) 2018	5.44	6.16	7.7	7.22	6
		13. CLIMATE ACTION	Greenhouse gas emissions (Index, 1990=100) 2018	64.8	67.8	87.4	59.2	79.3
			Share of renewable energy in gross final energy consumption by sector (% of gross final energy consumption) 2018	15.14	12.54	11.48	11.9	18.91
	Integration of Digital Technology	6. CLEAN WATER AND SANITATION	Water exploitation index, plus (WEI+) (% of LTAA) 2017	19.53	1.19	6.87	0.39	8.39
			Bathing sites with excellent water quality (% of inland water bathing sites) 2018	81.6	72.33	56.25	26.71	80.85
		7. AFFORDABLE AND CLEAN ENERGY	Final energy consumption in households per capita (kgoe) 2018	663	595	512	378	553
			Energy import dependency by products (% of imports in total gross available energy) 2018	36.75	58.12	44.76	63.68	58.19
	Digital Public Services	9. INDUSTRY, INNOVATION AND INFRASTRUCTURE	Gross domestic expenditure on R&D by sector (% of GDP) 2018	1.9	1.51	1.21	0.84	2.18
			Share of buses and trains in total passenger transport (of inland passernger-km) 2017	27.1	30	21.5	25.6	17.1
		11. SUSTAINABLE CITIES AND COMMUNITIES	Overcrowding rate (% of population) 2018	15.7	20.1	39.2	35.5	17.1
			Population living in households considering that they suffer from noise (% of population) 2018	14.6	8.5	13.8	11.2	18.2
			V4 countries rank	63	45	44	48	

Source Esses et al. (2021)

of the most effective and important tools to tackle climate change challenges and sustainability together with fostering digital transition.

There is an urgent need for innovation to address mitigation and adaptation toward a low carbon economy and effective adaptation pathways. (Szalmáné Csete & Barna, 2021) The definition of climate innovation based on WWF (2011) says that it is *"a transformative non-fossil fuel and non-nuclear product, service or system that given favorable conditions, will generate > 20 million tons of annual greenhouse gas reduction in ten years if applied at scale."* Considering climate innovation as a useful option to enhance the positive synergies between digitalization and sustainability also in case of living COVID-19 the system map of climate innovation needs to be introduced. (Fig. 9.1) The figure differentiates the climate innovations as incremental or disruptive innovation and indicates the level of changes from products and processes to value systems (EIT Climate-KIC, 2016).

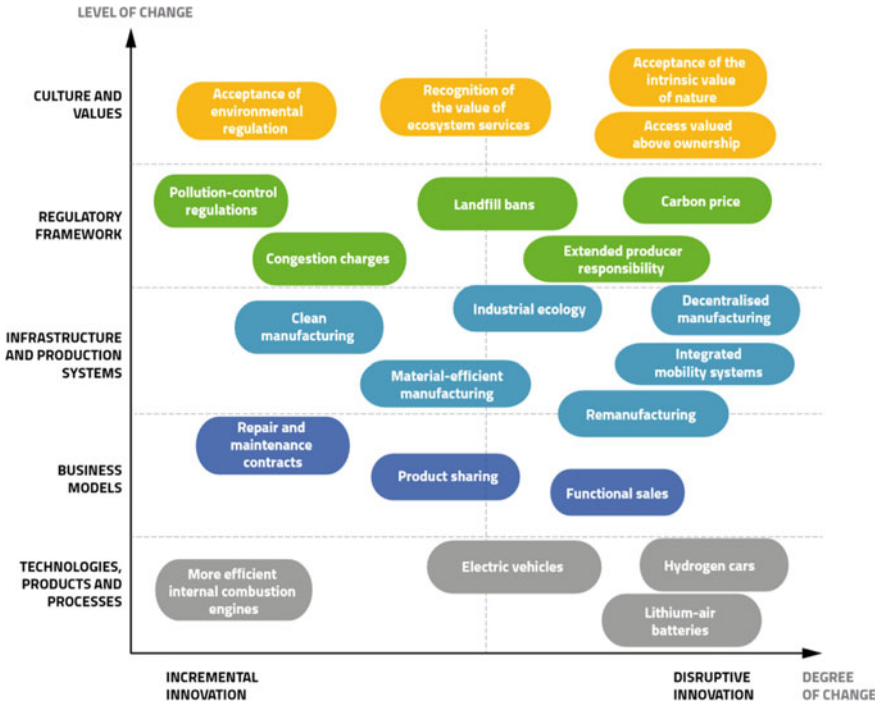

Fig. 9.1 Mapping climate innovation (*Source* Based on Fig. 1a in EIT Climate-KIC (2016) in Szalmáné Csete and Barna (2021))

Mapping climate innovation (Fig. 9.1) can help the understanding of climate innovation in the form of the following for instance:

- Product sharing (business model climate innovation);
- Carbon price (regulatory framework climate innovation);
- Hydrogen cars (technological climate innovation);
- Clean manufacturing (production system climate innovation), etc.

It can be an effective structure to show the system of climate innovation also on a regional scale, however spatial digitalization and sustainability-related characteristics are missing regarding innovation.

Considering local innovation processes and the digital and sustainability transition goals, taking into account climate-related challenges (both mitigation and adaptation), system thinking is required to find the most effective and useful low-impact developments and solutions. Figure 9.2. introduces the 5 main elements in relation to climate innovation in the era of digitalization and sustainability based on Szalmáné Csete and Barna (2021):

- "The soil represents climate change since its harmful effects influence not only primary natural resources but also the economic and social processes.

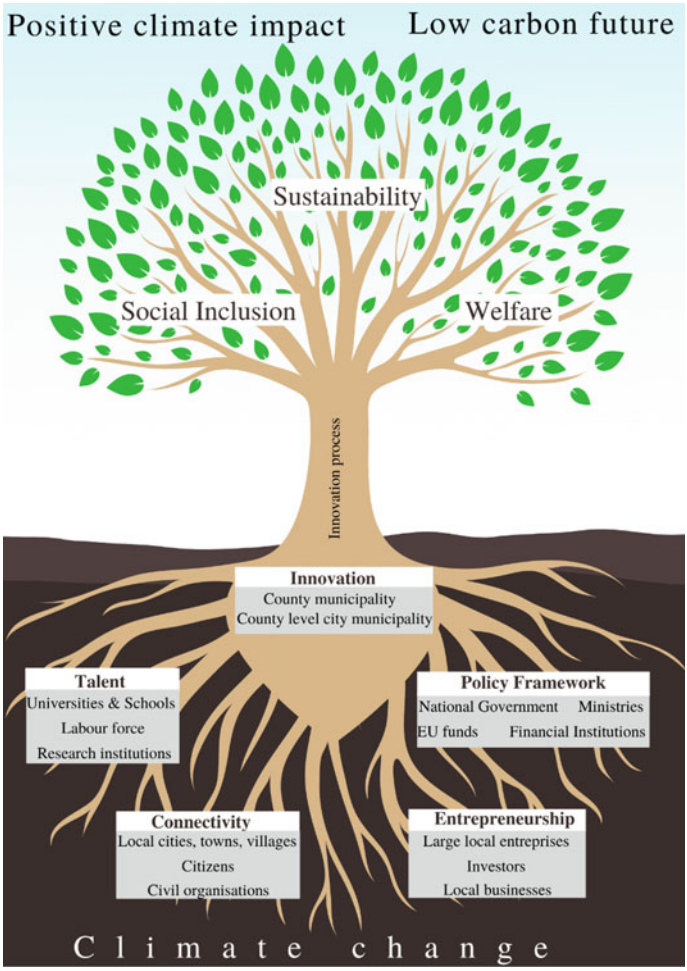

Fig. 9.2 The tree of climate innovation on the local level (*Source* Szalmáné Csete and Barna (2021))

- The primary root represents the innovation itself as it has to connect all the circumstances and stakeholders to be effective and successful.
- The tree trunk represents the innovation process that integrates all inputs from the roots.
- The tree crown positively affects welfare, sustainability, and social inclusion through economic competitiveness tools such as green taxes, climate-conscious employment, and green investments.
- The overall results of the model: low carbon future and positive climate impact are represented by the oxygen created by the tree."

Figure 9.2 shows the positive synergies and complex impacts of climate-related issues. Furthermore, highlights the perspectives of climate-oriented innovations in the context of a pandemic considering digitalization and sustainability perspectives dealing with the positive externalities of these processes and development pathways influenced by the adaptive capacity of the current system.

Considering climate-smart solutions on the local level, there is no doubt that the diverse stakeholders can present a relevant aspect of further examination, especially in terms of cognitive sustainability management on urban level. The use of smart solutions requires digital competencies on the part of people and residents, which enable them to be active participants in urban processes. This idea deals with local stakeholders (e.g., inhabitants, entrepreneurs, NGOs, policymakers, etc.) as intelligent agents of a city or region who are able to influence public management to support sustainability transition in the era of digitalization.

… And What Now?

There is no doubt that the stakeholder approach needs to be emphasized in multidisciplinary areas such as digital transformation toward sustainable transition. Living with COVID-19 for different stakeholders on different levels (global, regional and local) can cause several further challenges, which need to be adapted. Adaptation can play a pivotal role in planning the necessary steps regardless of the level of the activity. However, the spatial characteristics of the action can influence the adaptation capacity, thus, the opportunities related to the PDCA (Plan-Do-Check-Act) steps, as well. It is critical to clarify the understanding of interrelations between digitalization and sustainability among different stakeholders, who are involved in the four phases of the Deming cycle. It needs to be highlighted that considering digital transition, all the "classic" three dimensions of sustainability (environmental, social, economic) can be influenced and vice versa.

Organizations often focus on enterprise performance that can be supported effectively due to digital development, innovative solutions, etc. Considering these processes, new business models also play a pivotal role in recent and future changes according to COVID-19 induced impacts. Taking into account the performance goals and challenges of enterprises, there is an emerging need related to sustainability and digitalization moving toward responsible and climate-smart innovations.

The key to solving significant sustainability and climate change challenges is to bring innovative solutions and businesses to the forefront, among other things. Furthermore, it lies in the effective implementation and also in preparedness in accordance with the precautionary principle. Digital innovations can significantly contribute to solving social challenges, but they can also have negative social externalities that are worth keeping in mind in both design and implementation. Digital transformation in relation to sustainability management may further strengthen the processes of cognitive sustainability Zoldy et al. (2022).

Effective adaptation management toward the practical implementation of digital and sustainable transformation may affect the operation of businesses. There are a wide range of innovative solutions for enterprises and other stakeholders considering new sustainable business models and related to smart sustainable or climate-smart solutions.

Considering all dimensions of sustainability in relation to digitalization, the low-impact developments can foster the practical implementation of effective transition toward sustainability and digitalization goals also during and after the pandemic. The interrelations between digitalization and sustainability can play a pivotal role in living with COVID-19 for enterprises and will be the focus of the planet and people to move ahead with conviction.

Acknowledgements This chapter was supported by the János Bolyai Research Scholarship of the Hungarian Academy of Sciences and by the ÚNKP-21-5 New National Excellence Program of the Ministry for Innovation and Technology.

References

Brenner, B., & Hartl, B. (2021). The perceived relationship between digitalization and ecological, economic, and social sustainability. *Journal of Cleaner Production,* (315) 128. https://doi.org/10.1016/j.jclepro.2021.128128

Bosello, F. (2014). The role of economic modelling for climate change mitigation and adaptation strategies. In A. Markandya, I. Galarraga & E. S. de Murieta (Eds.), Routledge handbook of the economics of climate change adaptation. Routledge. https://doi.org/10.4324/9780203095201.

Biesbroek, G. R., Termeer, C. J. A. M., Klostermann, J. E. M., & Kabat, P. (2013). On the nature of barriers to climate change adaptation. *Regional Environmental Change, 13*, 1119–1129. https://doi.org/10.1007/s10113-013-0421-y

Dangerfield, M. (2014). V4: A new brand for Europe? Ten years of post-accession regional cooperation in Central Europe. *The Poznan University of Economics Review, 14*(4), 71. https://www.ebr.edu.pl/pub/2014_4_71.pdf

Del Río Castro, D., González Fernández, M. C., & Uruburu Colsa, Á. (2021). Unleashing the convergence amid digitalization and sustainability towards pursuing the Sustainable Development Goals (SDGs): a holistic review. *Journal of Cleaner Production, 280*, 122204. https://doi.org/10.1016/j.jclepro.2020.122204

Esses, D., Csete, M. S., & Németh, B. (2021). Sustainability and Digital Transformation in the Visegrad Group of Central European Countries. *Sustainability, 13*(11), 5833. MDPI AG. http://dx.doi.org/https://doi.org/10.3390/su13115833

EIT Climate-KIC. (2016). System climate innovation for a transformative impact, Climate innovation insights, Series 1.3., Climate-KIC UK.

European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. 2021. https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/eu_strategy_2021.pdf

Global Footprint Network. (2021). *How the date of earth overshoot day 2021 was calculated?* https://www.overshootday.org/2021-calculation/

Gouvea, R., Kapelianis, D., & Kassicieh, S. (2018). Assessing the nexus of sustainability and information & communications technology. *Technological Forecasting and Social. Change*, *130* (2018), 39–44. https://doi.org/10.1016/j.techfore.2017.07.023

Isensee, C., Teuteberg, F., Griese, K.-M., & Topi, C. (2020). The relationship between organizational culture, sustainability, and digitalization in SMEs: A systematic review. *Journal of Cleaner Production, 275*, 122944. https://doi.org/10.1016/j.jclepro.2020.122944

Isoard, S. (2011). Perspectives on adaptation to climate change in Europe. In J.-d. Ford & L. Berrang-Ford (Eds.), *Climate change adaptation in developed nations* (pp. 51–68). Springer.

IPCC. (2021). Climate change 2021: The physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Card, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

KPMG. (2021). 2021 KPMG CEO outlook pulse. https://assets.kpmg/content/dam/kpmg/xx/pdf/2021/09/kpmg-2021-ceo-outlook.pdf

Ledda, A., Di Cesare, E., Satta, G., Cocco, G., Calia, G., Arras, F., Congiu, A., et al. (2020). Adaptation to climate change and regional planning: A scrutiny of sectoral instruments. *Sustainability*, *12*(9), 3804. MDPI AG. http://dx.doi.org/https://doi.org/10.3390/su12093804

Matthess, M., & Kunkel, S. (2020). Structural change and digitalization in developing countries: Conceptually linking the two transformations. *Technology in Society, 63*, 101428. https://doi.org/10.1016/j.techsoc.2020.101428

Porter, J. R., Xie, L., Challinor, A. J., Cochrane, K., Howden, S. M., Iqbal, M. M., Lobell, d. B., & Travasso, M. I. (2014). Food security and food production systems. In C. B. Field, V. R. Barros, d. J. dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, K. L. M. Chatterjee, Y. O. Ebi, R. C. Estrada, B. Genova et al. (Eds.), Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.

Schieferdecker, I., & Mattauch, W. (2014). ICT for smart cities: Innovative solutions in the public space. ICT for smart cities: Innovative solutions in the public space In J. Zander, P. J. Masterman (Eds.), *Computation for humanity: Information technology to advance society 2014* (p. 30). Taylor Francis Group.

Seele, P. (2016). Envisioning the digital sustainability panopticon: A thought experiment of how big data may help advancing sustainability in the digital age. *Sustainability Science, 11*, 845–854. https://doi.org/10.1007/s11625-016-0381-5

Shkarlet, S., Dubyna, M., Shtyrkhun, K., & Verbivska, L. (2020). Transformation of the paradigm of the economic entities development in digital economy. *WSEAS Transactions on Environment And Development, 16*, 413–422. https://doi.org/10.37394/232015.2020.16.41

Szalmáné Csete, M., & Barna, O. (2021). Assessment of regional climate innovation potential in Hungary. *International Journal of Global Warming, 25*(3–4), 378–389. https://doi.org/10.1504/IJGW.2021.119007

Trască, D. L., Stefan, G. N., Sahlian, D. N., Hoinaru, R., & Serban-Oprescu, G.-L. (2019). Digitalization and business activity. The struggle to catch up in CEE countries. *Sustainability, 11*, 2204. https://doi.org/10.3390/su11082204

WWF. (2011). *Enabling the transition, climate innovation systems for a low carbon future*, WWF Report, WWF Sweden, Ulriksdals Slott. https://wwfeu.awsassets.panda.org/downloads/110613__wwf_report___enabling_the_transition__final_.pdf-

Zoldy, M., Szalmane Csete, M., Kolozsi, P. P., Bordas, P., & Torok, A. (2022). Cognitive sustainability. *Cognitive Sustainability*, *1*(1). https://doi.org/10.55343/cogsust.7

Mária Szalmáné Csete holds an MSc degree in Engineering and Management (BME, 2004); MSc in Spatial and settlement development (BME, 2007); Master 3 degree in Regional- and urban development (Sorbonne-Paris IV, 2007); and obtained PhD in business and management in 2009 from the Budapest University of Technology and Economics (BME). Her fields of

interest include environmental economics, sustainable regional and urban development perspectives, climate innovation, digitalization, sustainability management, mitigation and adaptation-oriented evaluations. She is a habilitated Associate Professor and Vice-Dean at the Budapest University of Technology and Economics, Faculty of Economic and Social Sciences. She is the Head of the Regional and Environmental Economics Master Programme. She is the author of more than 160 publications and her complete list of publications is available at https://m2.mtmt.hu/gui2/?type=authors&mode=browse&sel=10018544&view=simpleList.

Chapter 10
Sustainable Goal Achievement by Digital Enterprises During Pandemic; How Much One Wins and Losses: A Critical Review

Monika Hudáková, Jana Kozáková, and Mária Urbánová

Introduction

The pandemic of COVID-19 stalled and reversed expansion of the Sustainable Development Goals (SDGs). Currently, we are at the beginning of last decade to achieve the goals of Agenda 2030. Time is shortening, but the world has to deal with the pandemic of COVID-19 which distract us from the goals of sustainable development set back in 2015 when 2030 Agenda was created, agreed and started by members of United Nations. This document sets a common plan for sustainable development throughout the United Nations (Yin, et al., 2021). The core of this agenda based on the set of seventeen SDGs which contains hundred and sixty-nine targets aimed at the strategies to achieve environmental, economic and social aspects of sustainability in human wealth (UN, 2015). These environmentally, economic and socially oriented topics show main concerns of future development and include issues such as peace, human well-being, gender equality, hunger, health, clean water, poverty, quality education, climate action, sanitation, energy and environment. Last but not least, the United Nations incorporated the problem of social justice into Agenda (McArthur & Rasmussen, 2018). Mentioned set of seventeen SDGs and the hundred and sixty-nine associated targets are less or more directly linked to the previously highlighted three pillars of sustainable development aimed at the economic, social and environmental sustainability with the goal of transforming the Earth into sustainable planer in time frame of next years (Omer, & Noguchi, 2020). But, the pandemic of COVID-19 brings a huge stress and tests the progress of SDGs. Unfortunately, pandemic clearly caused stagnation in the line of this progress and created a stress

M. Hudáková (✉)
Department of Economics and Finance, Bratislava University of Economics and Management, Economics and Management Institute, Furdekova 16, 85104 Bratislava 5, Slovakia
e-mail: monika.hudakova@vsemba.sk

J. Kozáková · M. Urbánová
Slovak University of Agriculture in Nitra, Trieda A. Hlinku 2, 94901 Nitra, Slovakia

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5_10

according global ability to reduce degradation of nature, achieve goals of sustainable development and save future of human being (Yin et al., 2021).

The whole set of countries formed in United Nations is actually highly incorporated in discussions and negotiations regarding ways of the best support for selected countries to achieve the SGSs by the year of 2030. But, the huge relationship between social and economic development and efforts of peace is more and more visible on the national and international level too. The need of cooperating in line of the "triple nexus" of social, environmental and economic dimensions is increasingly incorporated and emphasized. However, so far, there is a great confusion about what this interlink is described from the conceptual as well as practical point of view. At the centre of interest is also the question of its contribution to progress of the sustainable development and SDGs (Howe, 2019). Described concept of triple approach is officially formulated by (United Nations in 2017 and again by United Nations and World Bank back in 2018). After, this concept and its definitions are highly involved in literature, the main part of which aim at the examination of three previous approaches (economic, social and environmental) and forming new framework of mentioned connection between global peace efforts, humanity and development. In a way, this concept was adapted and transferred the resilience concept. Resilience is the term used in several disciplines as metallurgy or ecology, based on the system's ability to support society, to "accommodate, anticipate, heal or absorb from the damages of a stress or shock situations" (Mitchell & Harris, 2012). Even though these are occasionally described in various ways, the concept itself has several advantages. It emphasizes the well-being of directly affected (internal) stakeholders more than the forces of external stakeholders. Also, this concept is built on the principles of discussion in which all stakeholders and the actions are started in respect of continuum with previous approaches of sustainable (Howe, 2019).

In response of actual fast progress of digitalization and information and communication technologies (e.g. data networking, computing power, data storage), organizations have to deal with the increase of connecting collective systems more than with the independent information systems typical for previous decades. In connection with this, the importance of digital business platforms will only grow in future (Subramaniam et al., 2019; Zhu & Iansiti, 2019). Nowadays, institutions can design and control various IT technologies or digital subsystems using unified tools which were not possible in the past. Almost every business environment today puts pressure on companies to take the adoption of a digital business platform into consideration. Responsible persons and managers need to be aware of this and able to introduce the importance and value of digital platforms for their (business). But, it has to be highlighted, that the fast skip to using of digital platforms without enclosing company's uniqueness would be very irresponsible and risky (Montealegre & Iyengar, 2021).

Digital Enterprises

The topic of sharing economy (known as SE) raised recently and created a novel approach across businesses and industries (e.g. tourism, transport or restaurants). It based on the concept of creating value thorough implementing basic managerial tools (planning, organizing, leading and control), followed by marketing and providing services in novelty-based design (Munoz & Cohen, 2017). Sharing economy is defined as an approach which enabled and closely connected with digitalization and use of technologies (Kumari et al., 2020). It is well known as a type of socioeconomic system created to allow changes and new approaches in traditional exchanges of goods and services on the market with the goal to encourage effectivity and optimization of individuals and organizations resources which are under-utilized (Feng & Marco, 2019). SE can change the ways of creating business models of organizations (Gilchrist, 2016). Moreover, the frame of these can be considered as a value creation and the process of delivery and capture in selected business entity.

During period of the last fifteen years, several top innovative and very successful global players, as for example Uber, Airbnb and Blablacar, incorporated this system and the design of shared economy and surprisingly reached new type and design of successful digital business model (DBM) which can be implemented across various technological platforms. This new approach allows them to as central mediators (or so-called meta-organizers) of new global and complex ecosystems, usually build on the background of heterogeneous set of stakeholders (Schiavone et al., 2021).

Technological changes present many business opportunities but also new threats (Ngang & Kuo, 2010). The global economy which is nowadays strongly connected with the fast rise of information and communication technologies (ICTs) is closely connected also with the increase in the customers' expectations which created a new business landscape. This frame includes the digital transformation as a crucial tool of company's innovation ability since they have to develop this process continuously and can't let competitors to overrun them (World Bank, 2018).

The traditional business models (BMs) used before, are not able to fulfil challenges and needs of currently widespread level of development strongly connect with the new systems and digital environment. In regard of this, companies have to promote digital transformation of their processes, including the restoration of operating models, organizational structures and knowledge. In this environment, the design and implementation of innovative business models can be very effectively adapted in several sectors to help companies with the achievement of competitive advantage (Perelygina et al., 2022). In connection with this, the five new trends in technology were described. These based on the using smarter words; supercomputing of big data and memory computing; interactions and identities, the cyber security of data; hyper-connectivity of social and business networks, as well as cloud computing is based on the approach of software, platform or infrastructure as a service as shows Fig. 10.1 (SAP, 2015).

The digital economy is one of the strongest megatrends and with no uncertainty it will continue. The world witness an unparalleled era of innovation and business

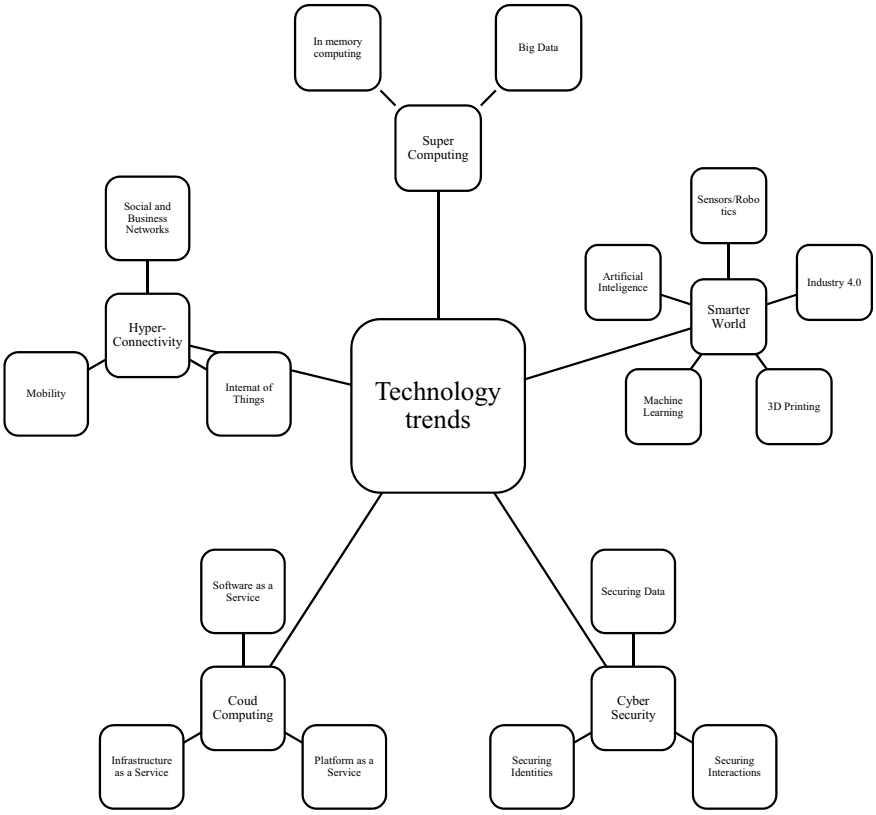

Fig. 10.1 The current trends in the technology (*Note* Own processing based on SAP (2015))

transformation. New and innovative technologies have matured and reached the scale, allowing already mentioned trends to be defined (SAP, 2015). The trends as super-computing, hyper-connectivity, cloud computing, cyber security and smarter world are step by step becoming the core elements of future development of every industry. The process of digitalization described as switching from analogue to digital form is definitely irreversible. Moreover, it is extremely fast and it affects wide range of human activities. The process of digitization includes breakthroughs in digital technology and continual changes in human behaviour, attitudes and expectations. It has relative low barriers to entry and it is typical for its availability of large amounts of venture capital. During digitalization the processed are slowly transformed and connect with labour as well as products and services. Changes are visible in case of business models too. The impact of digitization includes a significant and interdisciplinary effect on the economy, in the form of new challenges and opportunities. Considering the characteristics and effects of digitization it becomes must have for global business and its subjects. For every company and industry in every region, the

digitalization is crucial for challenging their market position (Schreckling & Steiger, 2017).

The industrial world is step by step becoming digital. This phenomenon accelerated by the COVID-19 pandemic. Digital transformation becomes the need in the process of managing the expectations and needs of the growing population of the world. This process enhances the significant changes in business organizations. Hand-in-hand with the digital technologies it starts the era of new tools and processes which can impact the key business structures (Kraus et al., 2021). Firms are and will be able to stay competitive only if using the benefits and advantages of DT, as for example the internet, big data analysis, digital intelligence, 5G networks, cloud computing, big data and analytics, robotics or virtual simulation. Last but not least, the new hybrid trends as social computing or cyber-physical systems. The global spread of the coronavirus pandemic back in 2019 created a new ways of accepting and understanding of the crucial role of the ability to catch up with digital innovations. New era also enlightens some weaknesses of the previous approaches and the need of their advance. As a result, the designing of new business models is becoming a key in digital survival (Coskun-Setirek & Tanrikulu, 2021).

Before analysing the thematic evolution of digital transformation research in management and entrepreneurship, it is essential to distinguish digital transformation from various closely connected terms which are used globally (Health, 2020). These include digitization, digital transformation and digital conversion (Kapucu, 2006). According to the Gartner IT Glossary, the term digitization can be described as the process of changing from analogue to digital systems (Kraus et al., 2021). At the turn of the millennium, information and communication technologies, as for example data processor, mobile phones, data processors or storage and digital networks have made great progress. These new trends in digital conversion are more advanced than digitization itself. Digitalization becomes also the standard for new ways of workplace cooperation and communication. According to Kraus et al. (2021) digitalization can be describe as using the DTs and data which can be digitized or native digital, to generate income and other business advances and opportunities. Also, they can improve business and change its processes, not just in terms of their digitalization.

Digitalization as the new phenomenon based on the set of drivers connected with the changes in people's behaviour, availability of capital and others. These drivers created objects of digitalization which can be defined as system of the work, processing of products and services and creating of business models. Out of these, the effect of digitalization is summed up. This includes not just effect on the human society and global economy, but also impacts on the business opportunities and challenges (Fig. 10.2).

Digitalization strongly contributes to the new ways of building platforms and rapidly scaling up platforms on the basis of simplicity. Such trend strongly affected some of the most famous companies which own best-known brands. The shiniest examples are Alibaba, Amazon, Alphabet and/or Microsoft. These companies run on platform-based and digital business models which allowed their rapid successes and growth (Hagiu & Altman, 2017; Parker et al., 2016).

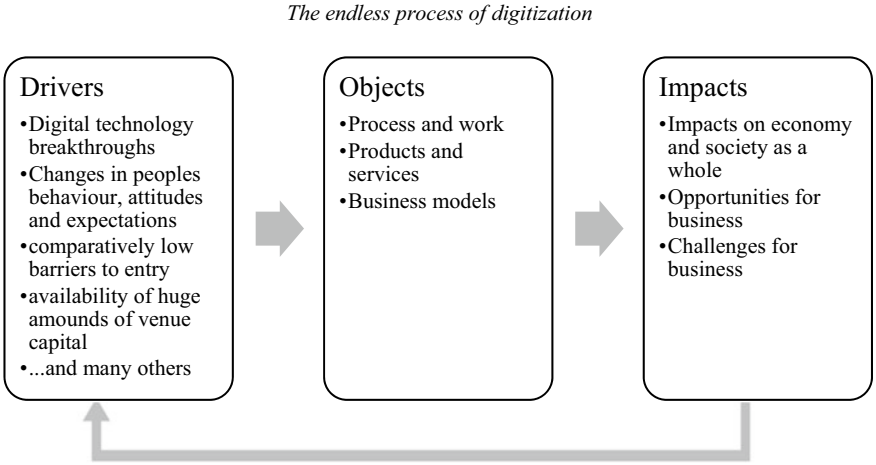

Fig. 10.2 The endless process of digitization (*Note* Own processing based on Schreckling and Steiger (2017))

Nowadays, DP can be increasingly seen within entities which are changing their conceptual spirit in regard to increasing their competitive advantage (Fryatt & Bhuwanee, 2017). These organizations are changing from the core of their business behaviour and strategies. These organizations are creating ecosystems consisted of human resources, data and managerial tools which are connected with the use of digital technologies. The highest level of this approach is the use of shared systems designed beyond the scope of single organization of digital system (Henfridsson & Bygstad, 2013). These systems can connect several groups of stakeholders and enable their collaboration in regard of wide beneficial results for every involved business entity, organization or individual (Shneiderman & Preece, 2007). In connection with this, digital platforms were considered most influential changes in business environment, since they are creating new models and methods which shape internal ecosystems and culture of organizations (Montealegre & Iyengar, 2021).

The initiatives of digital transformation are recently accessed to the platform-based business models, which enable the necessary proximity to potential supply customers (UNEP, 2020). This creating networks and interconnect individuals, organizations and resources into systems able to generate value and sustainable growth in the interactive digital environment. These business models are specific for their ability to provide competitive advantage by rebuilding the old paradigms based of the physical infrastructure. Even though these systems are of high practical relevance, there is a gap in systematic knowledge aimed at the problem of reasons why are platform-based business models able to overrun traditional companies and their systems (Rohn et al., 2021). The answer can be in the infrastructure of digital platforms since they were created in the ongoing phases: initiating, developing and growing. It has to be mentioned, that relevant capabilities of these phases are not interconnected and they can be effectively used together and separately as well. Also, this system based

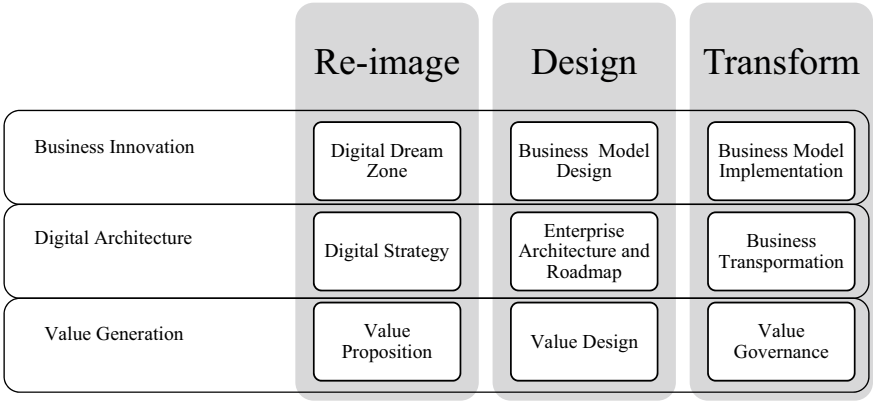

Fig. 10.3 The portfolio of the digital service (*Note* Own processing based on Schreckling and Steiger (2017))

on the existence of three pairs of key features (identification-nourishing, expansion-legitimizing and increasing embolism) that help balance the renewal and refinement of a digital platform over time (Montealegre & Iyengar, 2021) (Fig. 10.3).

Digital platforms are of key importance for small businesses despite widespread opinion of their usage mainly in large (mainly international) companies. Small business sector is characteristic by the ability of fast transformation and flexibility. Nowadays, these are not applicable without using of digital technologies of high efficiency. Also, the ability of implementing outcomes of latest research is of high importance for small players which highlighted the role sustainable development and application of digital technologies. Three different phases are presented by the framework of the development of the digital platform. (Fig. 10.4)The future of small business sector must be created under strict conditions and in line with the latest research.

For the opportunities and future in digital entrepreneurship, it is important to look in more complex way than just a dichotomy. Social and spatial contexts are more recommended for these special types of businesses. Human capital is being accompanied increasingly with the social capital and networks with the ongoing debate about the concepts as digital generations, ecosystems in the cities, entrepreneurial bricolage and spatial accessibility which are being held to propose more possibilities for the businesses. (Reuschke et al., 2021).

Small businesses use digitalizations and ICTs as the tools for dealing with the smallness by helping them mingle their freedom and the flexible advantage of being small among the range and approach of large businesses. Precisely, all the new digital technologies helped all the small companies which were geographically separated in better cooperation, collaboration and coordination (Matlay & Westhead, 2005; Warren & Fuller, 2010).

New technologies are confusing the business choices and stresses senior managers about the transformation of their industrial businesses (Ghosh et al., 2021 Nowadays, there are billions of devices which use or operate by computers and have a smart

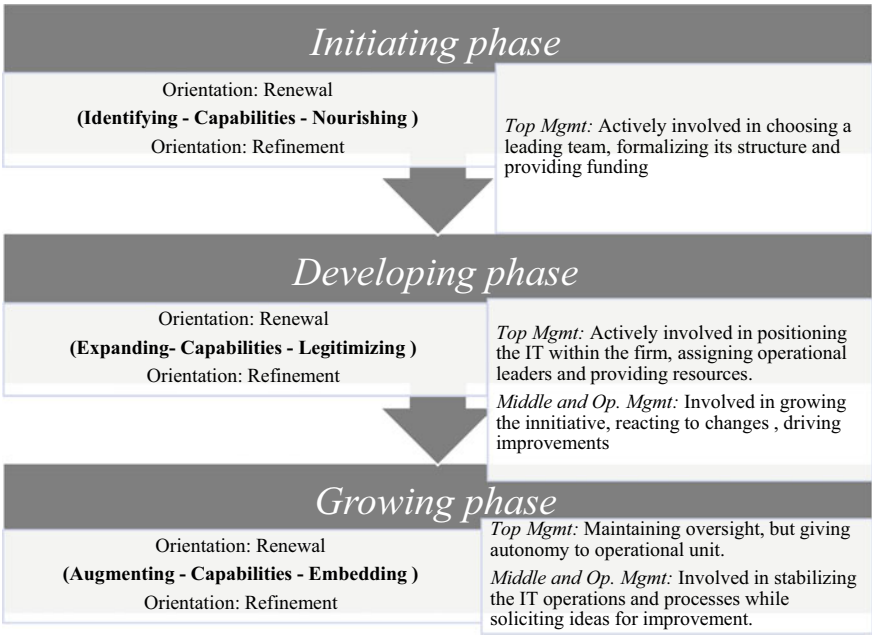

Fig. 10.4 Initiating, developing and growing phase in the digital businesses (*Note* Own processing based on Montealegre and Iyengar (2021))

sensors and available internet connection throughout the consumer market (Sestino et al., 2020)).

Digital transformation redefines the working companies and creates new paradigms as well as the IIoT. Regardless the discussions in academic environment on this topic, the industrial businesses are not succeeding much at the transformation to a digital manner (Tabrizi et al., 2019).

Goals of Sustainable Development (SDGs) in the Pandemic COVID-19 Situation

There were countless changes seen in people's daily life from 2000 when Millennium Development Goals were firstly described. Starting from the communication, gathering the data and generally—information, the way of consumption and purchase, as well as the daily movement and many others were described.

The community of the global health care continuously pushes the plans to of achieving the set goals. The agenda includes wide agreement about the health optimization of the population During the epidemiological transitions, with the rise of the risk of chronic diseases in lower- and also middle- income countries, building the

health system is very important and also to integrate the complex, multidisciplinary interventions (Alkire et al., 2018).

The United Nations and other international organizations should be consistent in the support of changes in health organizations and should continue with sustaining the healthcare systems and make them more effective by the using the innovations. This can be done through the continuous development in the digital health care and its understanding which can make easier fining the solutions and exchange the knowledge between countries. This includes convincing the managers to accept such a model which will be easy to utilize also in 10 years and not only purchasing a new feature to upgrade the already updated model (Novillo-Ortiz et al., 2018).

The agenda of 2030 described overall 17 goals. The third one- (Good health and well-being) focus on health and has 13 issues. A good leadership and strong management will be needed to achieve the goals among the partners dealing with the health care; academic institutions have a crucial role. Cancedda et al. (2018), argued that, even the SDGs are not perfect; there are still ways to achieve set SDG 3 goals.

On the behalf of better future transformation to the digital technology reflects on the global healthcare organizations to provide the sustainable needs, which would be oriented on the achievement of the particular socio-cultural goals. This urges the adoption of the digital system for a better help of pushing forward SDG to the particular need of every country (Novillo-Ortiz et al., 2018) (Fig. 10.5).

To achieve SDG 3 healthcare goals, countries will have to strengthen investments into the heath system to have broader providing service but also those poorest countries would be able to reach certain level of universality. Every country will have

Goals	Description
Outcome/foundational: SDG 1 (No poverty) SDG 3 (Good health and Well-Being) SDG 14 (Life Below Water) SDG 15 (Life on Land)	Failure to meets these goals would have extensive consequences on human and ecological resources and the planetary system
Human input goals: SDG 2 (Zero hunger) SDG 4 (Quality Education) SDG 5 (Gender Equality) SDG 10 (Reduced Inequality) SDG 13 (Climate Action) SDG 16 (Peace, Justice and Institution)	Have the potential to help meet or undermine other SDG
Physical assets goals: SDG 6 (Water and Sanitation) SDG 7 (Affordable and Clean Energy) SDG 9 (Industry, Innovation and Infrastructure) SDG 11 (Sustainable Cities) SDG 12 (Responsible consumption and Production)	Infrastructure and service related goals
Enabling goals: SDG 2 (Decent Work and Economic Growth) SDG 4 (Partnership for Goals)	Necessary for investment in other goals

Fig. 10.5 *Classification of SDG goals and their description* (*Note* Own processing based on Cernev and Fenner (2020); Sachs et al. (2020))

to take equitably as priority and plan strategically, and cost realistically to reach the SDG 3 and implement the system (Stenberg et al., 2017). After the 1918 Flu pandemic, the COVID-19 is the biggest test human's face in the present time and it causes a huge challenge for achieving of SDGs. There is a difference in the context of development of countries. The research in dominant for the developed ones, but the pandemic is worse to adapt to for the developing ones (Wang & Huang, 2021).

This pandemic hinders reaction to other happenings worldwide and the emergency systems are radically changed and adapted to the present state of the development in the world (Fenner & Cernev, 2021). WHO and other agencies deal mostly with the pandemic of COVID-19, so there is not a focus on progress to continue on reaching the agreed goals (Nature, 2020).

COVID-19 pandemic had a negative influence on unemployment, which has risen, for the reason of closing the manufacturing and other industries. Since recession and depression emerges nowadays in global economies, there is a need to restore own economies for the countries and deal with the issues connected to the pandemic problems before dealing with SDGs, in particular foreign aid ones (Fenner & Cernev, 2021). Organizations need to understand the importance of the adoption of the systems of digital innovations after the pandemic which caused many problems in social and school life for people. These factors out of many more created are reason to have a higher request for a digitalization in the business. Internet connection became a normal and mandatory need and created a specific model of business (Coskun-Setirek & Tanrikulu, 2021).

Influence of Pandemic on Sustainable Development of Digital Enterprises

Higher coordination between stakeholders who are looking more for the resource sharing models is needed and the digitalization is particularly for them very important to understand. Enterprises need to survive the bad periods of pandemic COVID-19 and those who are able to utilize information systems, get the needed resources, easily lead employees and business through the pandemic time by consulting and coordinating them can overcome this time the best and sustain the financial cash flow (Jaeger et al. 2007) (Fig. 10.6).

It is much easier for the marketers to communicate and interact with the consumers using digital technologies, such as social networks. Because of the lockdown, there is a dramatic economic activity decline (Luo, 2021). Facebook, Instagram and Twitter can be used as a platform through which goods and services are being distributed and advertised (BalaAnand et al., 2015) (Fig. 10.7).

If the platform is supposed to be effective, its use must bring the customer closer to the supplier. Industries using these platforms will have access to customer data, be able to analyse it to better anticipate customer needs, and improve and develop new

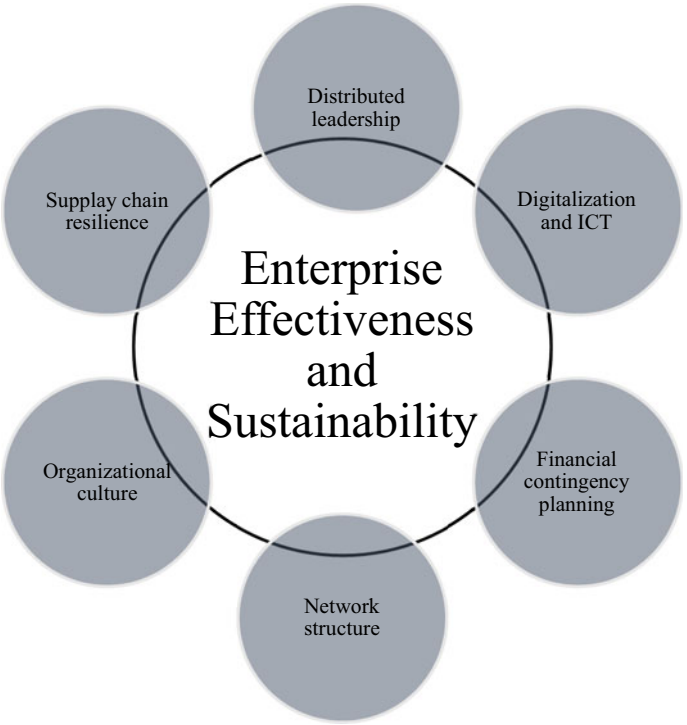

Fig. 10.6 Effective and sustainable model for the companies during the crisis of pandemic *Note.* Own processing based on Obrenovic, et al. (2020) (*Note* Own processing based on Obrenovic et al. (2020))

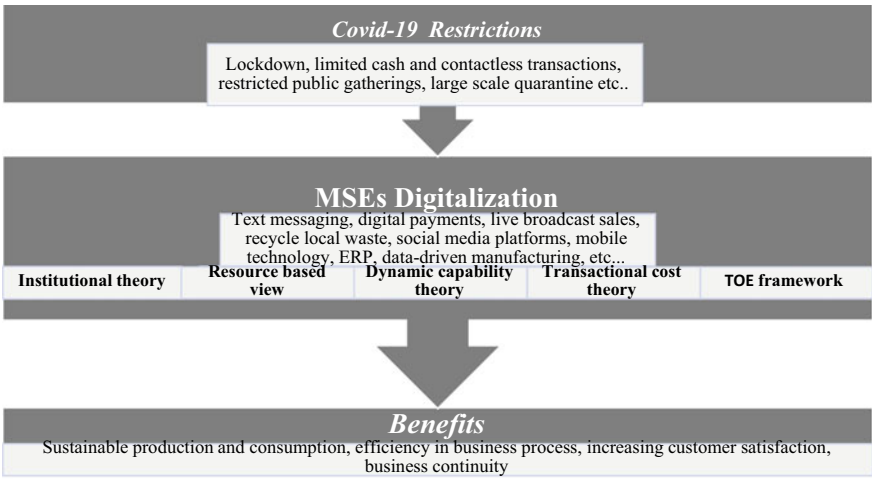

Fig. 10.7 MSEs Digitalization benefits after taking Covid-19 restrictions into account (*Note* Own processing based on Bai et al. (2021))

products. Such cooperation ultimately leads to the building of a digital ecosystem (Nicholas, 2018).

Conclusion

When related to digital technologies and their use different important and unusual solutions business alternatives are engaging. This paper finds that the COVID-19 pandemic is causing considerable change in every type of industry and also the digital companies have to adapt to a different approaches and lead businesses, lead to high digitalization. It also led to a great unemployment numbers and high manufacturing costs in many countries, but it also boosts the successful digital transformation at the same time.

Digital integration with the customer and new technological possibilities during pandemic helped to move production closer to the customer and allow greater individuality and customization of products. Most companies expect to strengthen their digital services offering, either by digitizing existing products or developing new digital products. It is an opportunity not only to respond more quickly and flexibly to customer requirements, but also to anticipate customer needs, which can help the customer move in the right direction.

International organizations should be promoting the healthcare systems to be sustainable and efficient by using and adopting the innovation and promoting changes in healthcare organizations. Enterprises need to mobilize crucial resources; track changes evolve and adapt to them and process in real time as well as to rely on crisis management and IT infrastructure to better plan.

References

Alkire, B. C., Peters, A. W., Shrime, M. G., & Meara, J. G. (2018). The economic consequences of mortality amenable to high-quality health care in low-and middle-income countries. *Health Affairs, 37*(6), 988–996.

Bai, C., Quayson, M., & Sarkis, J. (2021). COVID-19 Pandemic digitization lessons for sustainable development of micro-and small-enterprises. *Sustainable Production and Consumption.*

BalaAnand, M., Sankari, S., Sowmipriya, R., & Sivaranjani, S. (2015). Identifying the fake user's in social networks using non-verbal behavior. *International Journal of Technology and Engineering System (IJTES), 7*(2), 157–161

Cancedda, C., Binagwaho, A., & Kerry, V. (2018). It is time for academic institutions to align their strategies and priorities with the sustainable development goals. *BMJ Global Health, 3*(6), e001067.

Cernev, T., & Fenner, R. A. (2020). *The importance of feedback loops and tipping points in achieving the Sustainable Development Goals and reducing global risk*. Futures Journal Published on line November 2019. Article 102492, https://doi.org/10.1016/j.futures.2019.102492

Coskun-Setirek, A., & Tanrikulu, Z. (2021). Digital innovations-driven business model regeneration: A process model. *Technology in Society, 64*, 101461.

Feng, Z., & Marco, I. (2019). Why some platforms thrive and others don't. *Harvard Business Review.*

Fenner, R., & Cernev, T. (2021). The implications of the Covid-19 pandemic for delivering the sustainable development goals. *Futures, 128*, 102726.

Fryatt, R. J., & Bhuwanee, K. (2017). Financing health systems to achieve the health Sustainable Development Goals. *The Lancet Global Health, 5*(9), e841–e842.

Ghosh, S., Hughes, M., Hodgkinson, I., & Hughes, P. (2021). Digital transformation of industrial businesses: A dynamic capability approach. *Technovation,* 102414.

Gilchrist, A. (2016). *Introducing industry 4.0. in industry 4.0* (pp. 195–215). Apress.

Hagiu, A., & Altman, E. J. (2017). Finding the platform in your product. *Harvard Business Review, 95*(4), 94–100.

Health, T. L. P. (2020). Will the COVID-19 pandemic threaten the SDGs? *The Lancet. Public Health, 5*(9), e460.

Henfridsson, O., & Bygstad, B. (2013). The generative mechanisms of digital infrastructure evolution. *MIS quarterly*, 907–931.

Howe, P. (2019). The triple nexus: A potential approach to supporting the achievement of the Sustainable Development Goals? *World Development, 124*, 104629.

Jaeger, P. T., Shneiderman, B., Fleischmann, K. R., Preece, J., Qu, Y., & Wu, P. (2007). Community response grids: E-government, social networks, and effective emergency management. *Telecommunication Policy, 31*, 592–604.

Kapucu, N. (2006). Interagency communication networks during emergencies: Boundary spanners in multiagency coordination. *The American Review of Public Administration, 36*, 207–225.

Kraus, S., Jones, P., Kailer, N., Weinmann, A., Chaparro-Banegas, N., & Roig-Tierno, N. (2021). Digital transformation: An overview of the current state of the art of research. *SAGE Open, 11*(3), 21582440211047576.

Kumari, A., Behera, R. K., Sahoo, K. S., Nayyar, A., Kumar Luhach, A., & Prakash Sahoo, S. (2020). Supervised link prediction using structured-based feature extraction in social network. *Concurrency and Computation: Practice and Experience*, e5839.

Luo, C. (2021). Analyzing the impact of social networks and social behavior on electronic business during COVID-19 pandemic. *Information Processing & Management, 58*(5), 102667.

Matlay, H., & Westhead, P. (2005). Virtual teams and the rise of e-entrepreneurship in Europe. *International Small Business Journal, 23*(3), 279–302.

McArthur, J. W., & Rasmussen, K. (2018). Change of pace: Accelerations and advances during the Millennium Development Goal era. *World Development, 105*, 132–143.

Mitchell, T., & Harris, K. (2012). Resilience: A risk management approach. *ODI Background note*, 1–7.

Montealegre, R., & Iyengar, K. (2021). Managing digital business platforms: A continued exercise in balancing renewal and refinement. *Business Horizons, 64*(1), 51–59.

Muñoz, P., & Cohen, B. (2017). Mapping out the sharing economy: A configurational approach to sharing business modeling. *Technological Forecasting and Social Change, 125*, 21–37.

Nature. (2020). Time to revise the sustainable development goals. *Nature, 583*(7816), 331–332.

Ngang, B. J., & Kuo, B. C. (2010). *The use of information and communication technology in natural disaster management: The case of cameroon.* Master's Thesis, Jönköping International Business School, Jönköping University, Jönköping, Sweden, 2010.

Nicholas, J. (2018). *Lean production for competitive advantage: a comprehensive guide to lean methodologies and management practices*. Crc press.

Novillo-Ortiz, D., Marin, H. D. F., & Saigí-Rubió, F. (2018). *The role of digital health in supporting the achievement of the Sustainable Development Goals (SDGs).*

Obrenovic B, Du J, Godinic D, Tsoy D, Khan MAS, Jakhongirov I. (2020). Sustaining enterprise operations and productivity during the covid-19 pandemic: "Enterprise effectiveness and sustainability model". *Sustainability, 12*(15), 5981.

Omer, M. A., & Noguchi, T. (2020). A conceptual framework for understanding the contribution of building materials in the achievement of Sustainable Development Goals (SDGs). *Sustainable Cities and Society, 52*, 101869.

Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). *Platform revolution: How networked markets are transforming the economy and how to make them work for you.* WW Norton & Company.

Perelygina, M., Kucukusta, D., & Law, R. (2022). Digital business model configurations in the travel industry. *Tourism Management, 88*, 104408.

Reuschke, D., Mason, C., & Syrett, S. (2021). Digital futures of small businesses and entrepreneurial opportunity. *Futures, 128*, 102714.

Rohn, D., Bican, P. M., Brem, A., Kraus, S., & Clauss, T. (2021). Digital platform-based business models–An exploration of critical success factors. *Journal of Engineering and Technology Management, 60*, 101625.

Sachs, J., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2021). *Sustainable Development Report 2021.* Cambridge University Press.

SAP. (2015). *SAP white paper: Value creation in a digital economy—Adapt or die in a digital world where the consumer is in charge.* Available via SAP SE http://www.ciosummits.com/Digital_Business_Whitepaper_FINAL_external_09_08_15.pdf. Accessed 22 January 2015.

Schiavone, F., Mancini, D., Leone, D., & Lavorato, D. (2021). Digital business models and ridesharing for value co-creation in healthcare: A multi-stakeholder ecosystem analysis. *Technological Forecasting and Social Change, 166*, 120647.

Schreckling, E., & Steiger, C. (2017). *Digitalize or drown. In Shaping the digital enterprise* (pp. 3–27). Springer.

Sestino, A., Prete, M. I., Piper, L., & Guido, G. (2020). Internet of Things and Big Data as enablers for business digitalization strategies. *Technovation*, 102173.

Shneiderman, B., & Preece, J. (2007). 911 Gov: Community response grids. *Science, 315*, 944.

Stenberg, K., Hanssen, O., Edejer, T. T. T., Bertram, M., Brindley, C., Meshreky, A., & Soucat, A. (2017). Financing transformative health systems towards achievement of the health Sustainable Development Goals: A model for projected resource needs in 67 low-income and middle-income countries. *The Lancet Global Health, 5*(9), e875–e887.

Subramaniam, M., Iyer, B., & Venkatraman, V. (2019). Competing in digital ecosystems. *Business Horizons, 62*(1), 83–94.

Tabrizi, B., Lam, E., Girard, K., & Irvin, V. (2019). Digital transformation is not about technology. *Harvard Business Review, 13*(March), 1–6.

UN. (2015). Transforming our world: The 2030 agenda for sustainable development resolution adopted by the general assembly on September 25, 2015, A/RES/70/1. United Nations General Assembly.

UNEP. (2020). *COVID-19: Four Sustainable Development Goals that help future-proof global recovery.*

Wang, Q., & Huang, R. (2021). The impact of COVID-19 pandemic on sustainable development goals–A survey. *Environmental Research, 202*, 111637.

Warren, L., & Fuller, T. (2010). Capturing the dynamics of co-production and collaboration in the digital economy. *Leonardo, 43*(2), 200–201.

World Bank. (2018). *Pathways for peace: Inclusive approaches to preventing violent conflict*.

Yin, C., Zhao, W., Cherubini, F., & Pereira, P. (2021). Integrate ecosystem services into socio-economic development to enhance achievement of sustainable development goals in the post-pandemic era. *Geography and Sustainability, 2*(1), 68–73.

Zhu, F., & Iansiti, M. (2019). Why Some Platforms Thrives... and Others Don't What Alibaba, Tencent, and Uber teach us about networks that flourish. The five characteristics that make the difference. *Harvard Business Review*, *97*(1), 118–125.

Monika Hudáková is a university professor and a prominent figure in economics, management, international and crisis management. She participates in the creation of many textbooks, monographs, scientific papers, outputs from scientific research, which is documented by her rich internationally accepted publishing activities.

Jana Kozáková Is an assistant professor, concentrating her research activities in the field of international management and business. She has experience in teaching management subjects such as: management, business management, human resources management and production management. She is a co-author of several university textbooks and other teaching materials.

Mária Urbánová is an assistant professor, concentrating her research activities in the field of business economics and management. She has experience in teaching economic as well as managerial subjects in Slovak and English language such as business economics, economics of enterprises, logistics, and human resources management. She is also the co-author of university textbooks.

Index

S. R. Mondal et al. (eds.), *Sustainable Development and Innovation of Digital Enterprises for Living with COVID-19*,
https://doi.org/10.1007/978-981-19-2173-5