International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 6 Issue 4, May-June 2022 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Future of Digital

Matthew N. O. Sadiku[1], Uwakwe C. Chukwu[2], Abayomi Ajayi-Majebi[3], Sarhan M. Musa[1]

[1]Roy G. Perry College of Engineering, Prairie View A&M University, Prairie View, TX, USA
[2]Department of Engineering Technology, South Carolina State University, Orangeburg, SC, USA
[3]Department of Manufacturing Engineering, Central State University, Wilberforce, OH, USA

ABSTRACT

The digital revolution will redefine every sector of the economy. The pace of the change, as we move to more smart digital solutions, is predicted to be comparable to the Industrial Revolution. Although we not know for sure where the Digital Revolution will take us, but it holds massive potential to transform everything we do. We must be prepared to embrace new technologies, new business models, and new possibilities as they emerge.

In this paper we discuss the trends and insights that will help you make more informed decisions in the digital world in the upcoming years.

KEYWORDS: *digital, digitalization, digital technologies, trending topics, future of digital*

How to cite this paper: Matthew N. O. Sadiku | Uwakwe C. Chukwu | Abayomi Ajayi-Majebi | Sarhan M. Musa "Future of Digital" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-6 | Issue-4, June 2022, pp.1199-1206, URL: www.ijtsrd.com/papers/ijtsrd50289.pdf

IJTSRD50289

INTRODUCTION

From automated vehicles on roads and voice-activated technologies in our homes, digital technologies are changing the way we work, shop, travel and relax. Digitization has developed and impacted our society in ways that were not anticipated. It is likely that that will continue to be the case. Today, digital inventions are being used in each sector of life, whether it is home, educational institution, workplace, hospital, or automobiles. Looking to the future, organizations and business must adopt or plan to adopt a digital-first business strategy. By instilling this culture of experimentation, the organization will continually transform itself.

Today is known as the era of digital transformation. The word "transformation" is often used to describe the impact of digital technologies on the industry and society. The world is gradually being transformed to a place where everything will be controlled, monitored, and analyzed digitally. It is moving rapidly towards ubiquitous connectivity that will further change how and where people associate, gather, and share information. In response to the inevitable change, experts foresee an ambient information environment where accessing the Internet will be effortless. Humans have set an environment using digital technologies to bring ease and comfort into their daily lives. Digitalization is most widely used tool in human life [1].

FUTURE OF DIGITAL TECHNOLOGIES

Digitization has become integral to the response of organizations and also their future plans. Most organizations are going through digital transformation because the environments around them are already in motion. In order to make the greatest strides ahead of their competition, organizations need to stop “doing digital” and start “being digital.” Being a digital leader means embracing new tools and platforms to improve the customer experience. Digital leaders also need to collaborate with others, leverage data analytics, invest in the digital future, and make the most of the latest mobile technologies, AI capabilities, cloud computing, and other emerging technologies. Digital transformation leads to improving your service delivery through new

technological processes [2]. Figure 1 shows that China leads the world in digital metrics [3].

It is evident that digital technologies will continue to an important play role in ourstrategy and success. Perhaps the greatest impact of digitalization on the world will be universal access to all human beings. This will have a huge impact on literacy and lead to a more informed, educated world. Some of the trends in digital technologies are summarized as follows [4-6].

- Sustainability and automation are trending up to deliver sustainable competitive advantage. As sustainability becomes more core to enterprise strategy, integrating this into digital transformation efforts will become key. Using artificial intelligence will bring increased automation to processes.
- Data will play a huge role. Organizations and enterprises are becoming all about data. Leader must think differently about how to manage data from cradle to grave. They should be able to properly capture, manage, and use data. Data gathering and storage will have to become more intelligent. The availability of real-time data enables companies to offer customers more personalized products and customized solutions. The future is data-rich.
- Increasing the use of digital technologies also increases the risks of cyber-attack. Cybersecurity concerns have been at the forefront of digital transformation. Organizations and businesses are under pressure to deliver secure information. Security is becoming an integral part of each stage of the IT lifecycle. National governments must scale up and invest in national cyber defense programs that will protect critical infrastructure. The infrastructure industry must take cyber risks seriously and be proactive in handling them.
- With high economic growth and fast-growing populations leading to significant urbanization, the demand for new infrastructure is predicted to see massive growth in the near future. Digital infrastructure will continue to grow in volume and complexity. It will be the underlying platform for all IT and business automation initiatives everywhere.
- The infrastructure and construction industry is at a crossroads. The digital technologies used to operate and maintain construction will continue to evolve. Construction will get faster using 3D and 4D printing (additive manufacturing).
- The emerging digital infrastructure ecosystem will increasingly be built on cloud-centric technologies. Adopting cloud technologies is a key component for many organizations. The cloud can impact an organization's operations, products, and services, and it changes the way their people work.
- In the future, robots will work in teams to build complex structures, with no human involvement. Drones flying overhead will scan a construction site constantly, inspecting the work and using the data collected to predict and solve problems before they arise.
- Self-learning technologies will eliminate the risk of human error and replace humans in repetitive, unskilled roles. Traditional industries such as manufacturing are likely to decline as new industries emerge.
- The Internet of things will power smart buildings built in smart cities, which are able to model the future and adapt instantly to changing circumstances.

FUTURE OF DIGITAL BUSINESS/MARKETING

We are facing a potentially disruptive digital change in the business world. Business is changing with increasing speed, mainly due to digital technologies. The pace of change is so rapid that most businesses can no longer be certain who their competitors will be in the future. Proactive organizations will invest in innovation and embrace digital change. If digital is fully integrated into an organization's strategy, it can benefit all employees and help secure the future. Digital transformation will dominate business. More than never before, it is more important to keep up with the latest trends and future-proof your business. Every business needs a digital technology strategy. This activates the employees as both creators and the most effective distribution of content. Various trends that are already transforming the world of digital marketing include the following [7]:

- Digital is already shaping business strategies and data is increasingly being used to drive business decisions. The business landscape will become less defined and predictable and there will be more cross-industry competition.
- When a business makes strong investment in the right digital technology and right talent, the rewards from digital disruption can be limitless.
- Skills, capabilities, tools, and business practices need to change, evolve, and develop for their customers to capitalize on them.
- Relying heavily on big data, analytics and artificial intelligence (AI) to improve the

customer experience, digital banking also automates every banking activity including deposits, withdrawals and transfers, loan management, and bill payments. Digital banking applies technology to every banking activity, making the customer's experience simple, easy, and convenient. Some benefits of digital banking are shown in Figure 2 [8].

- The global pandemic has significantly affected digital marketing worldwide. Marketers focus how to provide helpful information and solutions to customers during a difficult time and how to be more relevant.
- Marketers turn to virtual events, videos, and digital marketing channels to connect with customers, while many consumers are spending more time online. Social media, email marketing, mobile, websites, blogs, webinars, etc. offer various means to engage with customers.
- Artificial intelligence has been in trend from some time. AI and ML technologies will continue to be a colossal force in the business world. AI powered tools intend to enhance the customer experience and have been trending for some time. AI has the ability to transform each and every aspect of digital marketing.
- The use of the Internet and social media (such as Facebook, Snapchat, Twitter, etc.) have changed consumer behavior and the ways companies conduct their business. Social media message characteristics are important for advertisers. Social media will continue to make its presence known in every area of our lives and become truly integrated with both on and offline services.
- Big data can offer huge competitive advantages to marketers. It helps them better understand their customers and gain more insights into how to solve their problems. It can also help forecast the weather, suggest movies, songs, and books for consumers.
- Marketers must pay attention to their audiences, who is visiting their website and blog. You might find much untapped potentials in expanding it or accommodating for different regions, languages, and cultures.
- Empathy has come vital as marketers put themselves in their customers' shoes and ask how they can help.
- Content creators must strive to be more relevant and catch people's attention. The content must be informative, helpful, and easily digestible. To win in competitive environment, they must strive for clarity and substance.
- A key aspect of good marketing is to persevere in spite of failure. Failure is not traditionally popular in business, but it truly can be the greatest teacher. The key is to remain agile, flexible, and adaptable. We must both remain cautious and be ready to experiment more.
- The shift to remote work has created a significant increase in cybercriminal activities that are now attacking homes and small businesses with little to no cybersecurity protection. Small businesses are the number one target for cybercriminals.
- Marketing is becoming more conversational and personalized and chatbots enable you to take advantage of this trend.
- Consumer behavior has significantly changed due to technological innovation and ubiquitous adoption of hand-held devices. They are constantly looking for the easiest, quickest way to shop.
- Digital advertising and content creation are two of the most in-demand jobs in marketing.
- The future will come with the incubation of technology, purpose and balance that drives people growth and business strategies

FUTURE OF DIGITAL HEALTHCARE

Healthcare has become a very complex market. It will always remain highly regulated, regardless of the enthusiasm generated by an industry transformed through digital innovation. Healthcare and technology go hand-in-hand. The biggest technological advances in the healthcare industry over the past decade are impressive. The imperative to constantly improve health and safety and the need to deliver high quality infrastructure demand that the industry continues to innovate and embrace new ideas. The goal is to modernize the healthcare industry by enhancing safety while maintaining the same level of accessibility. The expert predictions on the future of digital healthcare can be summarized as follows [9,10].

- **Digital Technology:** Technology can help transform unsustainable healthcare systems and provide cheaper, faster, and more effective solutions. Digital technology can keep us connected and digital health enables healthcare providers to engage directly with their patients, irrespective of the physical location. Greater use of digital will transform the recruitment, training, and retention landscape for healthcare staff. The

COVID-19 pandemic has catalyzed a massive shift toward a more aggressive leverage of digital technologies in healthcare. This crisis has accelerated the advent of telehealth and there is no going back. People want a seamless digital experience to schedule appointments, get medication, and receive essential communication and advice on their health. This desire can be met by telehealth.

- **Digital Health:** This drives health equity, which is about making healthcare more accessible and affordable for everyone. It may also be regarded as the absence of unfair differences in health among population groups. The digital health industry is booming. Digital health trends like telemedicine, IoT devices, big data, artificial intelligence, business intelligence, chatbots, wearable devices, and virtual reality will continue to attract huge investment. They are predicted to change the future of medicine. Digital health enables healthcare providers to engage directly with their patients, regardless of the location. Digital health industry faces some challenges such as hesitation to take risks, pace of innovation, data security and privacy concerns, and interoperability.
- **Artificial Intelligence:** In the future, AI and other emerging technologies will be crucial to helping medical professionals. AI is on its own one of the most potent accelerators of innovation and emergent capability in healthcare. It is the key technology for enabling this extraordinary potential of precision medicine. Explosive innovation by healthcare manufacturing companies has been made through delivery of additive manufacturing, sometimes known as 3D printing. IoT is one of the fastest-growing digital health trends. Medical IoT is a rapidly growing field that uses wearable devices. Cloud computing is ripe with opportunities for healthcare. In healthcare, virtual reality (VR) and augmented reality (AR) technology help both surgeons and patients to get more comfortable with surgical procedures.
- **Innovation:** Digital technologies tend to foster innovations. Harnessing technology to drive innovation is important in healthcare. New technology can be harnesses to re-invent customer's experience, simplify, and streamline internal processes. However, healthcare executives do not encourage innovation because they are afraid of failure, of doing something new, of internal battles, of taking new responsibilities, and of plunging into the unknown. They need to understand that innovation and digitization are fast becoming the survival kit.

The focus has shifted away from treatment to prevention and early intervention,

to help optimize wellness and health. Healthcare will become increasingly distributed, connecting patient data from the hospital to the home and community care settings. In healthcare, data storage and security are paramount. Patients must be able to trust healthcare providers with sensitive personal information.

FUTURE OF DIGITAL EDUCATION

The digital landscape is changing the our education systems. Education systems around the globe must respond to the challenge of teaching students the skills to solve problems that have not occurred or even been imagined. The following trends in digital education are worth keeping an eye on [11].

- Multimedia learning is already being embedded into training across a diverse range of sectors, such as healthcare and engineering. There has been a trend towards digitally-enabled learning experiences in schools.
- Emerging technologies, such as gamification, augmented reality, interactive textbooks, and networks, offer distinct possibilities.
- Some professionals fear that technology will replace tutors, but learning is fundamentally a social process.
- There will be a greater need for more skilled individual. It will begin with a dramatic increase in competition for "digital natives," who can combine digital skills with creativity and new ideas.

FUTURE OF WORK AND WORKPLACE

Advances in digital technologies are reshaping business, economics, innovation, and nature of work. A successful, impactful, and sustainable transformation relies on how the business invests in and supports its people to pursue their own cloud-first futures. Figure 3 shows the future of digital work relies on people, not just technology [12]. Here we consider the following latest trends in work and workplace [13,14].

- Employees need soft skills, research skills, and other tech-oriented skills to gain employability in the 21st century. People need more than technical know-how; they also need skills in communication and collaboration, ability to code, entrepreneurial creativity, interest in lifelong learning, and proficiency in using English language.

- Women are entering the workforce in many disciplines (computing and engineering) that used to be predominant for men. Teenage girls are now using computers and other technology devices at the same rate as boys.
- The future of work is a moving target. The future of work is not rigid but is continuously moving, forcing us to adapt to the newly emerging technologies. Innovations are bound to happen, whether we like it or not. But as soon as we talk about digital platforms.
- We live in a world where technology is shaping the future of work. We need not panic but be willing to change. We need to create an inclusive, diverse, human-centered society that can adapt to an environment of technology and change. We need to determine mechanisms to make it fair for everyone. The goal is not to leave anyone behind.
- Employee's welfare will be at the forefront of the business agenda. Companies will need to adopt an employee-centric strategy around a distributed workforce to be successful. Distributed work has become the rule, not exception. The fundamental issue in the future is about how companies will rethink the definition of individual and team performance.
- Wearable technology will reduce worker injury and improve worker health while increasing productivity. Wearable health tech will become standard to be offered to employees. Workspaces have and will continue to evolve with the increasing involvement of technology. The workspace will attract the best talent and also help bring out the best in an employee. As the war to attract the future skills gets intense, it becomes important for companies to look like the future.
- New jobs will be created, while some jobs will disappear, especially those relying on repetition of tasks. The popularity of digital media's is spawning job opportunities across all facets of the sector.
- One cannot deny that hybrid work is here to stay with staff now alternating between the home, office and other locations for the foreseeable future.

BENEFITS

The rise of digitization will bring about a huge increase in productivity. It will increase efficiency, take the danger out of building, and making Zero Harm a reality. New technologies offer improved accuracy and reduce human error by increasing automation. Continued investment in new technologies will help address skills shortages and attract a more diverse, skilled labor force.

CHALLENGES

Cutting edge technologies and accelerating change will give us opportunities as well as challenges. The universal interconnectivity has created an increasingly complex and unpredictable environment for organizations. It also creates significant risk for the future resilience of these organizations. While harnessing the potential of new technology will bring significant benefits to the society, there will be hurdles to overcome. Common challenges include changing demographics, the increasing expectations of businesses, service users and the public, and the need to reduce carbon emissions and waste. Other challenges include the following:

- **Privacy:** Digitalization may lead to an erosion of privacy. Demands for regulation around privacy are likely to escalate. Digital transformation is a challenge for the lifecycle management of infrastructure, requiring designs to be future-proofed. Privacy issues and dangers, such hackers accessing the information needed to control or manipulate people, would need to be overcome, but the use of potential direct neural control for improving the safety of workers and improving efficiency of construction is significant.
- **Regulation:** To be able to embrace digital technologies as they emerge, nations need to be prepared with the various regulatory frameworks required. Regulators and policy makers need to upskill and ensure that they are providing frameworks which allow industry and digital solutions to thrive. For example, current regulation does not account for the different ways in which content is managed in the digital environment.
- **Ethics:** The ethical implications of social media marketing need to be critically and repeatedly considered. The ethics of marketing practices have been shaped by government policies and industry-governed practices. Consumerism continues to grow, with a particular focus on ethical and sustainability values. Most companies will bring AI ethics as a board agenda item. Embedding ethics from the start is an absolute must.
- **Individualism:** The rising individualism, demonstrated by a "me over we" mentality, presents new challenges and opportunities for employers. Organizations need to understand this shift in people's behavior.

CONCLUSION

The technologies are continuing to mature. Digital technologies are making everything faster, more efficient and more cost-effective. The digital world has become an integral part of our daily lives. Today, the current trends mentioned in this paper may seem far-fetched. The digital technology will continue to improve every year to deliver more effective and efficient tools. Embedding the new technologies, operating models, behaviors, and mindsets as standard practice will lead to a step change in digital maturity and better outcomes for citizens in future. Individuals and organizations should enthusiastically embrace technologies, especially youngsters who are more geared for the future. More information about the future of digital can be found in the books in [15-27] and the following related journal: *Futures.*

REFERENCES

[1] S. Ramiel, "Forecasting the future of digitalization of the world," May 2020, https://www.legalreader.com/forecasting-the-future-of-digitalization-of-the-world/

[2] R. Suhr, "Four ways organizations can prepare for a digital future," February 2021, https://www.ey.com/en_us/digital/four-ways-organizations-can-prepare-for-a-digital-future

[3] "The future of digital innovation in China," ctober 2021, https://www.mckinsey.com/~/media/mckinsey/featured%20insights/china/the%20future%20of%20digital%20innovation%20in%20china%20megatrends%20shaping%20one%20of%20the%20worlds%20fastest%20evolving%20digital%20ecosystems/future-of-digital-innovation-in-china.pdf

[4] S. Overby, "Digital transformation: 5 future and 3 fading trends for 2022," January 2022, https://enterprisersproject.com/article/2022/1/digital-transformation-5-future-and-3-fading-trends-2022

[5] "IDC launches future of digital infrastructure practice to highlight the critical importance of responsive, scalable, and resilient cloud-centric infrastructure to digital transformation success," https://www.businesswire.com/news/home/20200921005113/en/IDC-Launches-Future-of-Digital-Infrastructure-Practice-to-Highlight-the-Critical-Importance-of-Responsive-Scalable-and-Resilient-Cloud-Centric-Infrastructure-to-Digital-Transformation-Success

[6] "Innovation 2050 - A digital future for the infrastructure industry," https://www.balfourbeatty.com/how-we-work/public-policy/innovation-2050-a-digital-future-for-the-infrastructure-industry/

[7] "5 mega-trends transforming the future of digital marketing: These five areas have changed the world for both B2B and B2C marketers," April 2021, https://searchengineland.com/5-mega-trends-transforming-the-future-of-digital-marketing-347639

[8] J. Thomas, "The future of banking," July 2019. https://theaseanpost.com/article/future-banking

[9] C. Mulcahy, "What is the future of digital healthcare?" https://www.jabil.com/blog/digital-health-infographic.html#:~:text=What%20is%20the%20Future%20of%20the%20Digital%20Health%20Industry%3F,bears%20this%20out%20as%20well.

[10] R. Richards, "Rising trends in digital health: 5 technologies that will define the future of healthcare," May 2022, https://masschallenge.org/article/digital-health-trends#:~:text=Medical%20IoT%20is%20a%20rapidly,usage%20with%20a%20mobile%20app.

[11] "The future of digital learning – our view," https://www.ymca.co.uk/education/comment/future-digital-learning-our-view

[12] "The future of digital work relies on people, not just technology," March 2022, https://policyoptions.irpp.org/magazines/the-future-of-digital-work-relies-on-people-not-just-technology/

[13] R. Abere and P. Constantinides, "The future of digital work depends on more than tech skills," February 2021, https://sloanreview.mit.edu/article/the-future-of-digital-work-depends-on-more-than-tech-skills/

[14] M. Banda, "The future is digital — We need to do more to unlock the hidden potential of this new age," May 2022, https://www.dailymaverick.co.za/article/2022-05-24-the-future-is-digital-we-need-to-do-more-to-unlock-the-hidden-potential-of-this-new-age/

[15] S. Livingstone and A. Blum-Ross, *Parenting for a Digital Future.* Oxford University Press, 2020.

[16] A. M. Jaffe, *Energy's Digital Future: Harnessing Innovation for American Resilience and National Security*. Columbia University Press, 2021.

[17] N. Dey, N. Das, and J. Chaki (eds.), *Digital Future of Healthcare.* Boca Raton, FL: CRC Press, 2021.

[18] M. Pegrum, *From Blogs Tto Bombs: The Future of Digital Technologies in Education*. UWA Publishing, 2009.

[19] C. N. Davidson, D. T. Goldberg, and Z. M. Jones. *The Future of Thinking: Learning Institutions in a Digital Age*. The MIT Press, 2010.

[20] C. N. Davidson and D. T. Goldberg, *The Future of Learning Institutions in a Digital Age*. The MIT press, 2009.

[21] J. Ryan, *A History of the Internet and the Digital Future*. Reaktion Books, 2010.

[22] P. Dourish and G. Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing*. MIT Press, 2011.

[23] R. Rosenzweig, *Clio Wired: the Future of the Past in the Digital Age*. Columbia University Press, 2011.

[24] B. Williamson, *The Future of the Curriculum: School Knowledge in the Digital Age*. The MIT Press, 2013.

[25] J. Chester, *Digital Destiny: New Media and the Future of Democracy*. New York: New Press, 2007.

[26] K. Sutter, *Distribution Revolution: Conversations About the Digital Future of Film and Television*. University of California Press, 2014.

[27] A. McAfee, and E. Brynjolfsson. *Machine, Platform, Crowd: Harnessing Our Digital Future*. WW Norton & Company, 2017.

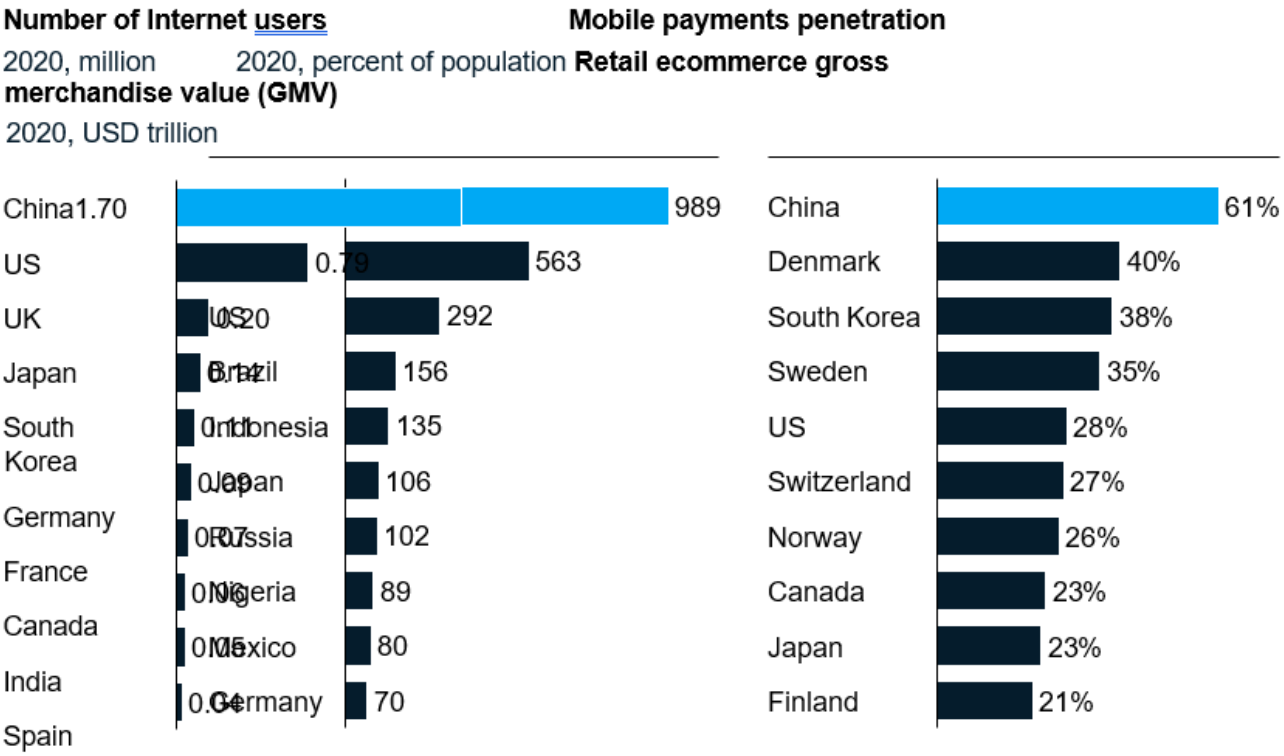

Figure 1 China leads the world in digital metrics [3].

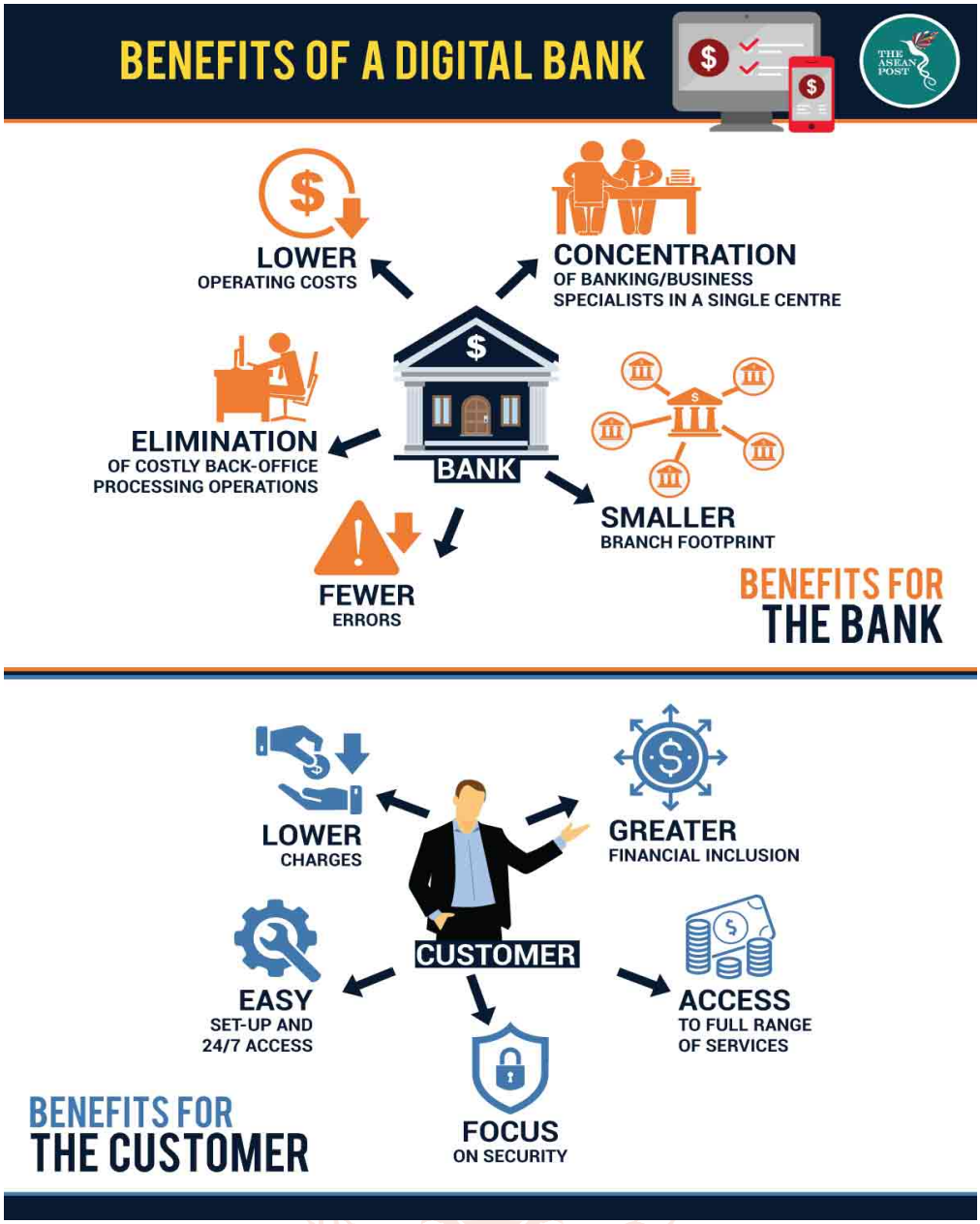

Figure 2 Some benefits of digital banking [8].

Figure 3 The future of digital work relies on people, not just technology [12]