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REVIEW ARTICLE

A TREND ANALYSIS ON DIGITAL TRANSFORMATION RESILIENCE CAPABILITY: THE CASE OF MALAYSIA

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ABSTRACT

Digital transformation happens perpetually, albeit with macro and micro-level disruptions. Countries must possess strategic capabilities to counter disruptions caused by economic, technological, and health crises, enabling and halting digital transformation initiatives. The capability of countries to be digitally resilient is crucial in sustaining digital transformation. This research examined the digital resilience capabilities of nine selected countries with the Covid-19 pandemic as the disruption context. Using the Institute for Management Development's (IMD) secondary data, the research conducted a trend analysis on the digital resilience capabilities of nine countries (as denoted through the Human Development Index ranking 2021) over the period 2017 to 2021. With Malaysia being the focal point of the analysis, the result showed that Malaysia's high digital resilience capabilities had enabled sustained digital transformation. With a significant investment in knowledge, technology, and future-readiness, Malaysia has maintained its digital transformation initiatives across the pandemic's onslaught. A sustained level of macro and micro initiatives is necessary to keep digital transformation afloat. At a high level, this research has identified how Malaysia's concerted policies have enabled its digital transformation.

KEYWORDS

Digital Transformation, Resilience, Capabilities, Trend Analysis

1. INTRODUCTION

Businesses are facing rapid changes in their operating environment, fuelled by technological advancements. Millions of business entities are adapting to the digital transformation era, which integrates information, infrastructure, processes, and people with digital elements and procedures to boost productivity and efficiency (Brynjolfsson and Hui, 2019). Such phenomenon is increased during the recent Covid-19 pandemic. The pandemic as a crisis has facilitated digital transformation and shaken economies to the core. Enterprises with limited capability to survive and adapt to the new digital norm failed to survive (Palmer, 2021). The ability to withstand shocks that halt sustained digital transformation leads to the notion of 'digital resilience' (Kuppusamy and Muzanarwo, 2021).

Digital transformation proliferates the need for digital resilience through swift reaction to socioeconomic disruptions and thriving in a dynamic environment. The digital resilience characteristics entail the possession of pertinent capabilities to withstand shocks. Such capabilities exist across different layers of a country, with knowledge, technology, and readiness to embrace the future being the pinnacle of capabilities. This research examined the digital resilience capabilities of selected developed countries withstanding the Covid-19 pandemic disruption. Using the Institute for Management Development's (IMD) data, a longitudinal trend analysis on the digital resilience capabilities of nine developed countries was conducted from 2017 to 2021.

1.1 Resilience Capabilities

In late 2019, the emergence of the Covid-19 pandemic presented severe socioeconomic challenges to the survival of countries. The pandemic tested the ability of countries to wade through obstacles and adapt to the new norms, resulting in weak economic performance, increased unemployment, and disrupted the global supply chain, accentuating the recent global inflation (PwC, 2021; McKinsey, 2022). Countries responded to the pandemic-infused economic crisis through expansionary fiscal and monetary policies. Such policies concentrated on two things: social distancing and digital technology-led transformation. Some countries were already at the forefront of digital transformation, while others had to learn the behaviour and processes from scratch. Countries such as Hong Kong and Sweden are briefly cited as the use case examples. Hong Kong was ranked 6th out of 132 countries in terms of its technological infrastructure establishment by the Global Innovation Index 2021.

Hong Kong focused on four development areas in this context: Artificial Intelligence, financial technologies, smart cities, and biotechnologies. More than HK$130 billion was invested in building technological capabilities within the economy over five years (Fung, 2022). Sweden ranked 3rd among the 27 E.U. Member states in the Digital Economy and Society Index 2021, which concentrated on developing its citizen's digital skills in terms of enterprise and innovation, education and research, infrastructure, and employment (DESI, 2021). Hong Kong and Sweden's continuous investment in core capabilities enabled them to be digitally resilient even when the pandemic hit the world.

The IMD World Digital Competitiveness Ranking of 2021 showed that Hong Kong had leapfrogged from 11th in 2018 to 8th in 2019 and 5th in 2020. Sweden has also constantly maintained its 3rd rank from 2018 to 2021. In some other countries, however, the pandemic-led crisis became a wake-up call to be better prepared to float their economies positively, fueling the debate to be digitally resilient against crises (Pak et al., 2020). The ability

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of a country to withstand shocks and crises that will affect its current and future transformation is determined by its digital resilience capabilities. The notion of digital resilience is associated with a country's innovativeness gained through investment and management of policies on knowledge, technology, and future-readiness resulting in high digital transformation resilience.

2. Research Methods

This research examined the digital resilience capabilities of nine selected countries vis-à-vis the Covid-19 pandemic disruption. The primary motivation here is to compare how Malaysia has fared against eight other countries in terms of its digital transformation resilience capabilities over 2017 – 2021. The capabilities were measured using three indicators: knowledge, technology, and future readiness. The knowledge factor refers to the intangible infrastructure that underpins the digital transformation process through discovering, comprehending, and learning new technologies. These characteristics are recorded through measures that evaluate the quality of the country's human capital, the number of investments in education and research, and the consequences of these efforts (e.g., registered patent awards in high-tech domains or scientific articles in academic journals). The Technology factor evaluates the enabling environment for the growth of digital technologies. This comprises measures that assess the extent to which innovation-friendly policy encourages private sector innovation, the availability of financing for investments, and the quality of the existing technical infrastructure. The future readiness factor assesses the degree to which governments, businesses, and society adopt the technology. This factor's indications include the proliferation of Internet retailing (e-commerce), industrial robotics and data analytics tools in the private sector, and e-government services, among others.

Data for the three indicators were accessed from the Institute for Management Development's (IMD) World Digital Competitiveness Ranking Yearbook. The nine countries were selected as part of the comparative research sample. based on the Human Development Index (HDI) ranking of Very *High Human Development 1990 – 2021*. The HDI measures the growth of a country holistically by including people's capabilities in developing a country apart from the economic growth criterion. The HDI enable the evaluation of national policy decisions by examining how nations with the same per capita G.N.I. can have disparate human development results (Human Development Reports, 2022). In essence, the capabilities of a country to possess digital transformation resilience are associated with the capabilities in developing knowledge, technology, and future-readiness of its people in sustaining digital transformation. The nine countries are selected based on the change in the HDI rank (2015 – 2021). The change rank value of 1– 2 was used to select the sample countries. The rank value indicates a non-volatile HDI rank over the years, suggesting a sustained human capabilities-building trajectory.

The sample nine countries are:

1. Chile (*2015 – 2021 HDI rank of 1*)
2. Hungary (*2015 – 2021 HDI rank of 1*)
3. Latvia (*2015 – 2021 HDI rank of 1*)
4. Lithuania (*2015 – 2021 HDI rank of 1*)
5. Malaysia (*2015 – 2021 HDI rank of 1*)
6. Portugal (*2015 – 2021 HDI rank of 2*)
7. Qatar (*2015 – 2021 HDI rank of 1*)
8. Saudi Arabia (*2015 – 2021 HDI rank of 2*)
9. Slovenia (*2015 – 2021 HDI rank of 1*)

A trend analysis was conducted on the given data using Tableau software version 2021.4. A trend analysis generated Malaysia's digital transformation resilience dynamics vis-à-vis the eight countries. Using IMD's ranking computation, a low-valued index represents a higher resilience trend and vice-versa.

3. Finding

The trend analysis focused on identifying the trends of knowledge, technology, and future-readiness capabilities over the years in concern. At a macro level, knowledge is measured via talent, training & education, and scientific concentration investments. The pool of available skills and abilities are talents in a given nation, together with the extent of education and training (Savage et al., 2017; Mayeko, 2019; Zafar et al., 2020). For an economy to embrace digital transformation, there needs to be widespread scientific concentration leading to the creation and diffusion of science, engineering, and technology activities (Rokichi and Stepniak, 2018; Ismatov et al., 2019; Giroud and Ivarsson, 2020). Technology is measured via investments to build regulatory, capital, and technological infrastructures. The regulatory framework promotes corporate activities and innovation, while the quantum spectrum of technology capital investments facilitates growth (Boutilier, 2017). The future-readiness capability entails the readiness to face changes through innovative strategies and processes, product creation, and the identification of new markets. These three capabilities integratively enable countries to robustly mitigate disruptions to their digital transformation initiatives.

Figure 1: Trend analysis of digital resilience capabilities 2017-2021

Figure 1 shows the trend analysis of the nine countries' knowledge, technology, and future-readiness capabilities over 2017 – 2021. Higher digital transformation resilience capabilities are identified through a low-valued knowledge, technology, and future-readiness (KTFR) index. The index ranges between 0 – 64 points as computed by IMD World Digital Competitiveness ranking. As the country in focus, Malaysia's KTFR capabilities are higher than their counterpart eight countries. In 2017, Malaysia recorded a knowledge index of 17 points while technology stood at 18. The future readiness was 27 points vis-à-vis the other eight countries. In 2018, Malaysia recorded a knowledge index of 17 points while technology stood at 22. The future-readiness was 29 points vis-à-vis the other eight countries. In 2019, Malaysia recorded a knowledge index of 19 points while technology stood at 19. The future readiness was 28 points vis-à-vis the other eight countries. In 2020, Malaysia recorded a knowledge index of 19 while technology stood at 20. The future readiness was 32 points vis-à-vis the other eight countries. In 2021, Malaysia recorded a knowledge index of 22 points while technology stood at 26. The future-readiness was 29 points vis-à-vis the other eight countries.

Table 1: Ranks of Countries from 2017-2021

Countries	2017			2018			2019			2020			2021		
	Knowledge	Technology	Future-readiness	Knowledge	Technology	Future-readiness	Knowledge	Technology	Future-readiness	Knowledge	Technology	Future-readiness	Knowledge	Technology	Future-readiness
Chile	52	34	33	47	35	31	50	41	37	49	40	39	49	35	36
Hungary	48	40	58	44	36	57	44	36	57	44	39	60	44	39	61
Lativa	34	32	41	34	32	39	32	45	45	36	34	42	34	34	42
Lithuania	21	29	31	23	30	33	26	25	32	25	29	30	26	29	31
Malaysia	17	18	27	17	22	29	19	19	28	19	20	32	22	26	29
Portugal	31	37	35	27	36	32	31	38	34	33	38	41	32	38	38
Qatar	35	31	19	37	27	16	45	33	22	45	25	24	44	19	23
Saudi Arabia	39	41	32	40	50	38	39	40	42	46	24	28	50	24	32
Slovenia	26	40	36	26	38	35	27	35	36	29	35	37	30	39	40

Table 1 showcases Malaysia's KTFR index has been consistently below the midpoint of 64 maximum index value. In comparison, Malaysia stands out of the nine countries as a country with higher digital transformation resilience capabilities.

A review of pertinent macro and micro policies suggests Malaysia has implemented consistent strategies and action plans to build and sustain its KTFR capabilities. For example, Malaysia focused on building capacities for digital transformation strategic policies on Industry 4.0, Internet of Things (IoT) roadmap, blockchain, and smart city structures. Implementing the 12th Malaysian Plan, Shared Prosperity Vision 2030, and the Malaysian Digital Economy (MyDIGITAL) Blueprint complemented such capacities. The MyDIGITAL framework primarily accelerates digital transformation in the public sector across agencies, ministries, and other entities through people and infrastructure. Digital skill development initiatives in Malaysia focused on enhancing digital learning skills, access to information and communication technology (ICT) facilities and services, and digital skills for professionals.

The GO-E-Commerce program, Global Online Workforce, and Cyber Security Skills programmes promoted a widespread acceptance and adoption of digitalised commerce skills leading to a sustained digital transformation within the economy. Additionally, a series of public-private partnership programs are initiated to enhance the digital skill of the workforce and citizens. For example, the collaborative effort of MDEC and Coursera in providing free online talent-building courses has enabled a sound transition to digital jobs. The Ministry of Education's Digital Educational Learning Initiative Malaysia (DELIMa) education system through Google Workspace and Classroom accommodates a hybrid learning platform across 10,000 schools and 2.5 million students. The public-private partnership initiative has been successful with the cooperation of Google. The "*Mahir Digital bersama Google*" programme offers free digital skills and tools for Malaysian small and medium-sized enterprises (SMEs) to learn and adapt to the online business environment.

Historically, Malaysia has moved away from a conventional economy to a knowledge-driven economy since the formation of the Multimedia Super Corridor (MSC) initiative in the early 1990s. One of the key pillars of such an effort was enhancing the infrastructure connectivity and access. The "Pelan Jalinan Digital Negara" (JENDELA) recently enabled quality broadband coverage throughout the country. In the most recent year, the Digital National Berhad (DNB) 5G diffusion agenda aims to increase access quality via 5G connectivity. An important future readiness element is establishing regulations and frameworks to support ethical transformation processes such as digital ethics and awareness, data protection, and fake information identification. CyberSAFE program is Malaysia's cybersecurity program intended at raising cyber and internet security awareness and cultivating a positive attitude towards the usage of the internet among Malaysians among everyone. SEBENARNYA.MY portal, designed by the Malaysian Communications and Multimedia Commission (MCMC), is a one-stop-shop for Malaysians to verify the validity of news items obtained online via social media platforms, instant messaging services, blogs, and websites before sharing. It is anticipated that this gateway would prevent the propagation of false news online, which can have detrimental effects on the population and the nation.

4. Conclusion

The emergence of COVID-19 presented governments with two significant challenges: a health catastrophe and consequent economic instability. The pandemic hindered a country's ability to adapt to a new, more isolated environment. A country that continuously invests in knowledge resources such as talent development, training and education, and scientific concentration would have a better platform to execute digital transformation. Technology is a significant contributor to innovation development within a country. Elements of technology include supporting regulations for technology diffusion, availability of financial resources such as venture capital, funding for technological development, and research and development grants that will ensure motivation and sustained interest toward transformation. In addition, technological resources such as bandwidth speed, Internet access, and high-tech applications will facilitate transformation acceptance and diffusion.

Lastly, the adaptive attitude of a country's population presents the future readiness for digital transformation. Adaptiveness is also part of the business sector's agility and ability to integrate technological services such as cybersecurity and high-end applications. The above research clearly showcased the significance of the core capabilities to sustain in a disruption. Malaysia's human development index is consistent over the years showcasing the investment in the capabilities. Malaysia ranked thirty in market sophistication in the Global Innovation Index 2021, showcasing the high investments in market capitalization, knowledge diffusion, and also protecting minority investors for the country's development and resilience. Investing in the capabilities for years though there is a disruption these countries could sustain their digital transformation. These three core capabilities (i.e., knowledge, technology, and future readiness) enable a country to be resilient in transforming its digital ecosystem. Lack of concentration on any of these will reduce the capability to face disruption in digital transformation.

References

Boutilier, R., 2017. Stakeholder politics: Social capital, sustainable development, and the corporation. Routledge.

Brynjolfsson, E., Hui, X., and Liu, M., 2019. Does machine translation affect international trade? Evidence from a large digital platform. Management Science, 65 (12), Pp. 5449-5460.

Digital Economy and Society Index (DESI), 2021. at https://digital-strategy.ec.europa.eu/en/policies/desi.

Doris, F., 2022. Innovation and Technology Industry in Hong Kong, research.hktdc.com https://research.hktdc.com/en/article/MzEzOTIwMDIy

Giroud, A., and Ivarsson, I., 2020. World Investment Report 2020: International production beyond the pandemic.

Ismatov, R.O., Dadaboev, T.Y., and Karabaev, S.A., 2019. Investment possibilities in agricultural networks. Theoretical & Applied Science, (2), Pp. 350-355.

Kazantsev, 2020. Formation of the knowledge economy in Russia: the role of university science. IOP Conference Series: Materials Science and Engineering. 953012056.

Malaysia Cybersecurity Strategy, 2020. https://asset.mkn.gov.my/web/wp-content/uploads/sites/3/2019/08/MalaysiaCyberSecurityStrategy2020-2024Compressed.pdf.

Malaysia Digital Status, 2022. https://mdec.my/malaysiadigital/#-business.

Market Analysis Report, 2019. https://www.grandviewresearch.com/industry-analysis/qatar-smartphone-market.

Mayeko, L., 2019. Investment in education and development process in Congo. International Journal of Current Research in Life Sciences, 8 (1), Pp. 2983-2990.

Mgonja, C., 2017. Enhancing the university-industry collaboration in developing countries through best practices. International Journal of Engineering Trends and Technology, 50 (4), Pp. 216-225.

Pak, A., Adegboye, O.A., Adekunle, A.I., Rahman, K.M., McBryde, E.S., and Eisen, D.P., 2020. Economic consequences of the COVID-19 outbreak: the need for epidemic preparedness. Frontiers in public health, 8, Pp. 241.

Palmer, R.R., 2021. Age of the Democratic Revolution: A Political History of Europe and America, Pp. 1760-1800, Volume 1: The Challenge. Princeton University Press.

PWC, 2021. Available at: https://www.pwc.in/press-releases/2021/global-workforce-trends-amid-the-pandemic-pwc-survey.

Qatar ICT Plan, 2015. https://www.motc.gov.qa/sites/default/files/qatars_national_ict_plan_english_1.pdf.

Qatar International Trade, 2022. at https://www.trade.gov/country-commercial-guides/qatar-market-opportunities

Qatar Ministry of Transportation, 2022. at https://www.motc.gov.qa/en/cyber-security#:~:text=The%20Cyber%20Security%20Division%20works,monitored%20and%20risks%20are%20contained.

Roztocki, N., Soja, P., and Weistroffer, H.R., 2019. The role of information and communication technologies in socioeconomic development: towards a multi-dimensional framework. Information Technology for Development, 25 (2), Pp. 171-183.

Savage, J., Collins, D., and Cruickshank, A., 2017. Exploring traumas in the development of talent: what are they, what do they do, and what do they require?. Journal of Applied Sport Psychology, 29 (1), Pp. 101-117.

Saxon, S., and Sucharitakul., 2021. Reimagining trave: Thailand tourism after the COVID-19 pandemic, Micknsey.com https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/reimagining-travel-thailand-tourism-after-the-covid-19-pandemic.

Strohmaier, R., Schuetz, M., and Vannuccini, S., 2019. A systemic perspective on socioeconomic transformation in the digital age. Journal of Industrial and Business Economics, 46 (3), Pp. 361-378.

Tracy, C., 2022. 3 employee training trends to note for Hong Kong employers, Humanresourcesonline.net https://www.humanresourcesonline.net/3-employee-training-trends-to-note-for-hong-kong-employers

Twelfth Malaysia Plan., 2021. at https://rmke12.epu.gov.my/en.

World Bank Group, 2021. at https://www.worldbank.org/en/news/press-release/2017/05/23/russian-economy-moves-to-recovery-from-recession-says-the-world-bank.

World digital competitiveness ranking, 2021. at IMD https://www.imd.org/centers/world-competitiveness-center/rankings/world-digital-competitiveness/

Zafar, S., Lai, Y., Sexton, C., Siddiqi, A., 2020. Virtual Reality as a novel educational tool in pre-clinical paediatric dentistry training: Students' perceptions. International journal of paediatric dentistry, 30 (6), Pp. 791-797.