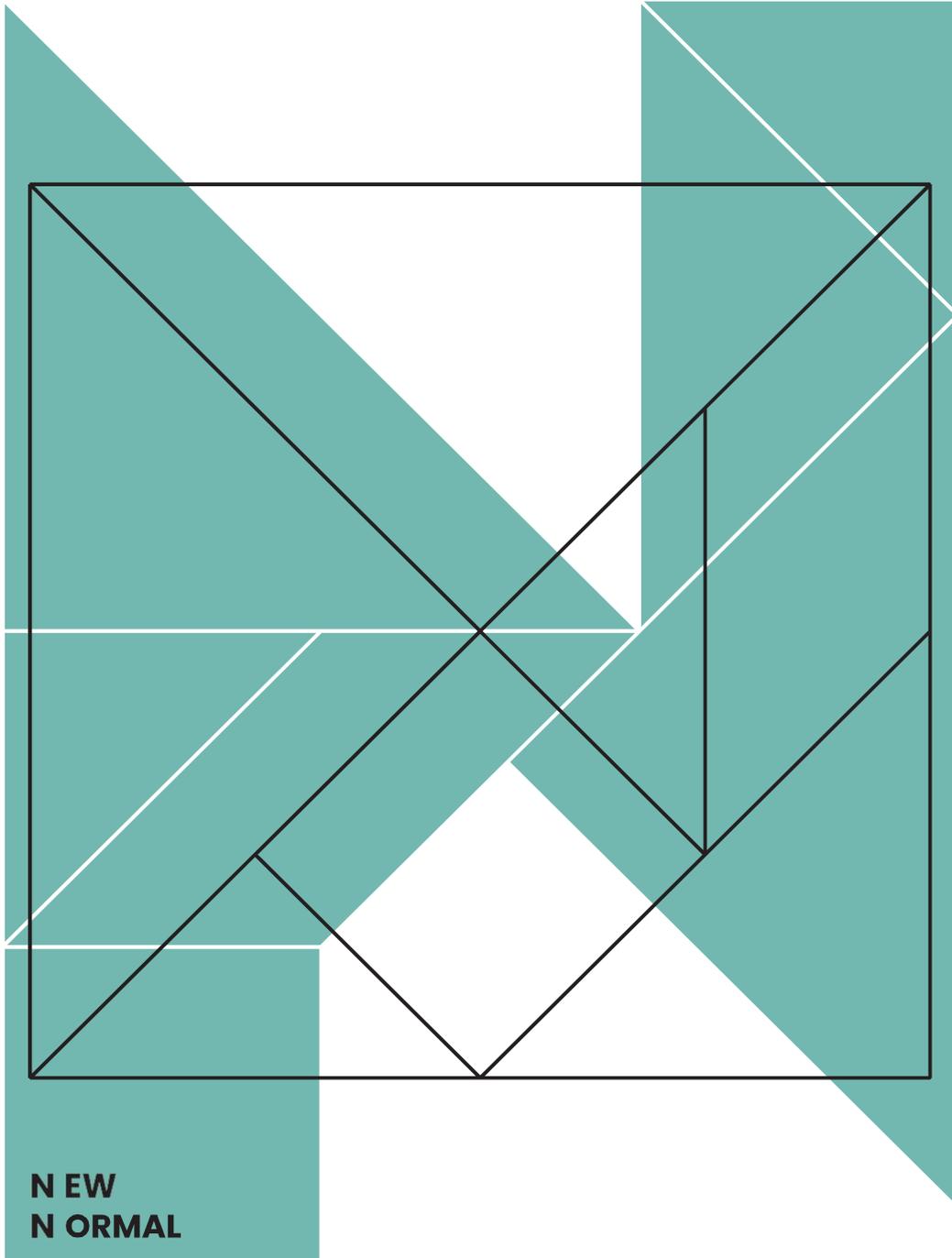


New Normal New Taipei



NEW
NORMAL

NEW

TAIPEI

Taipei City's Post-pandemic
Industrial Digital Transformation Policy White Paper





New Normal _ New Taipei

New Normal New Taipei

Taipei City's Post-pandemic Industrial Digital Transformation Policy White Paper

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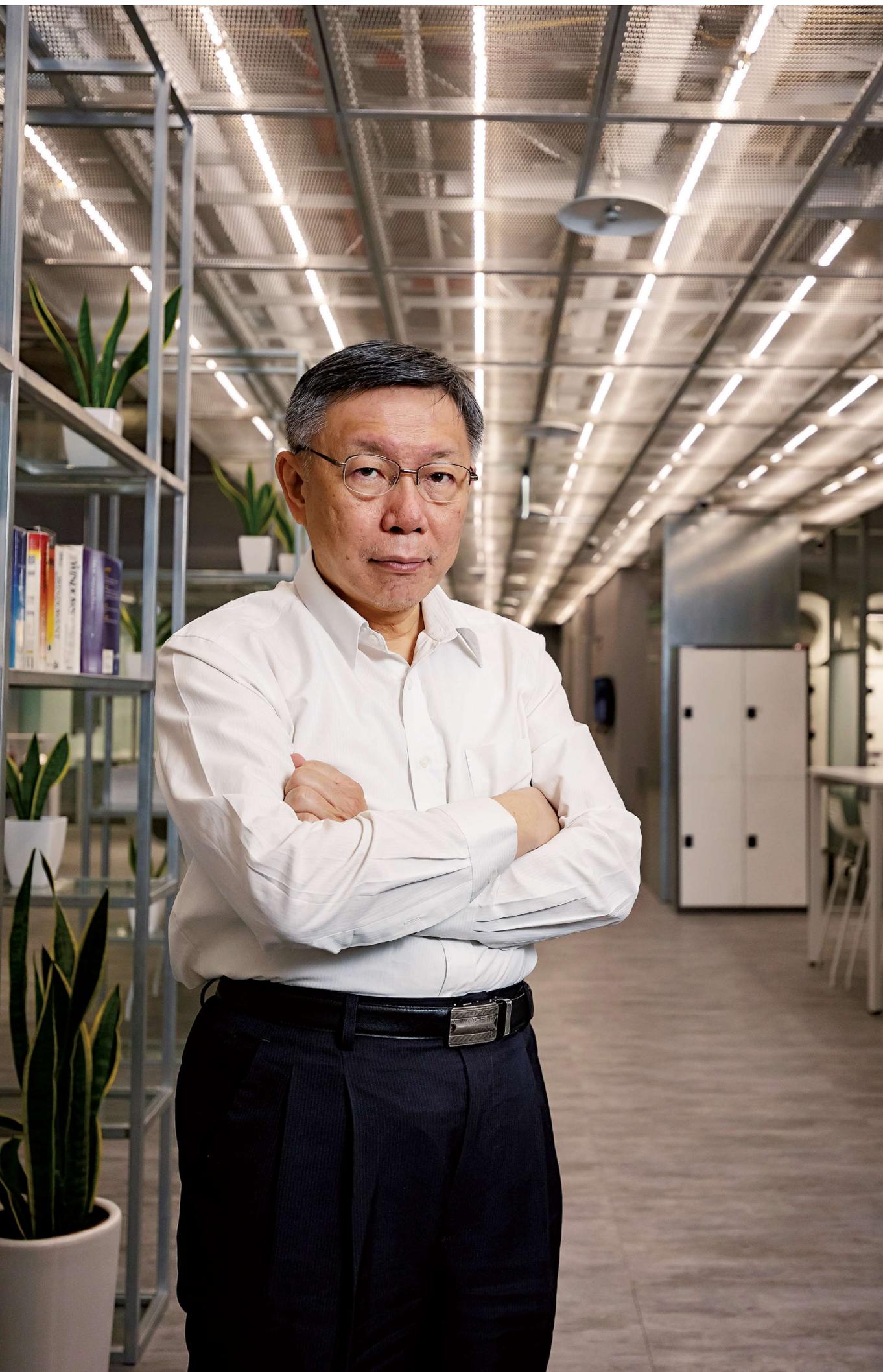
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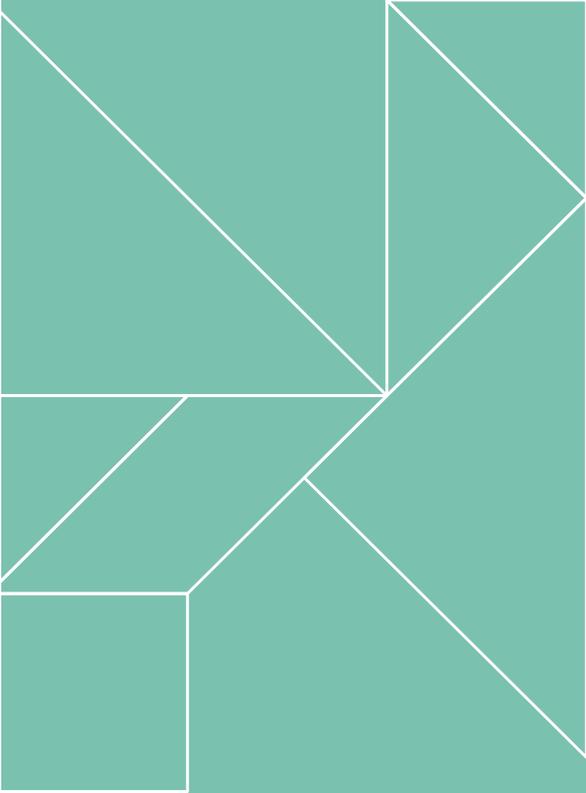
Based in Taipei, surpassing the World

Because industry stakeholders understand the market more than the government does, the government must establish a platform where industry and individuals can effectively operate. In response to the new normal, the government should strive to upgrade digital infrastructure to guide industrial digital transformation.

Taipei City Mayor

柯文哲





**Embracing
the
new normal**

01



Every crisis is an opportunity: Transforming and learning to coexist with the pandemic

In the early stage of the pandemic, people often wondered when the pandemic would end and life return to normal

One year since the start of the pandemic, its spread has only worsened. Because the end of the pandemic is uncertain, citizens must change their attitude from rejection of the virus to adapting and learning how to coexist with the pandemic while also maintaining a healthy and stable lifestyle in the risky pandemic environment.

Taiwan has exhibited outstanding pandemic prevention efforts in 2020 has ensured a relatively safer lifestyle in Taiwan in comparison to other countries

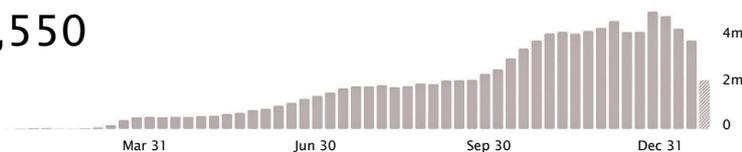
However, from a historical turning point, post-pandemic risks have gradually emerged

The urgent demand for the digital transformation of the industry has been ignored.

Global Situation

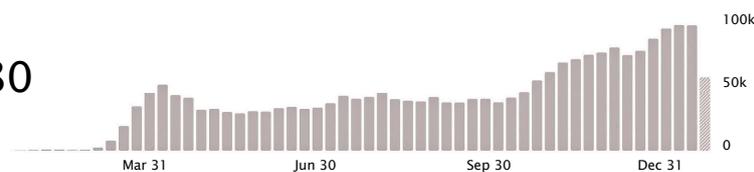
104,370,550

confirmed cases



2,271,180

deaths



Source: World Health Organization website. Retrieved on February 6, 2021

Crisis

In a post-pandemic world, many changes that occurred worldwide in 2020 cannot be undone, including changes in globalization- and zero-inventory-based business operation models. Additionally, the rise of sovereign states and an increase in risk control activities by governments or businesses have changed the social interactions between people. Without question, the world has entered a new normal.

Individuals

As part of the pandemic prevention safety net, individuals are required to adopt a new pandemic prevention lifestyle, which includes wearing masks in public spaces, practicing frequent hand hygiene, and avoiding physical contact with others by avoiding payment in cash, queuing, or attending large gatherings.

Businesses

Businesses must keep pace with the changes in consumer lifestyles so that they will not fall behind in the competition to meet new consumer demands and grasp new commercial opportunities in digitized industries.

Government

The government should plan how society can gainfully coexist with the virus and determine the post-pandemic new normal, grasp opportunities and take preemptive actions, promote industrial innovation and transformation, and exploit new economic development opportunities.

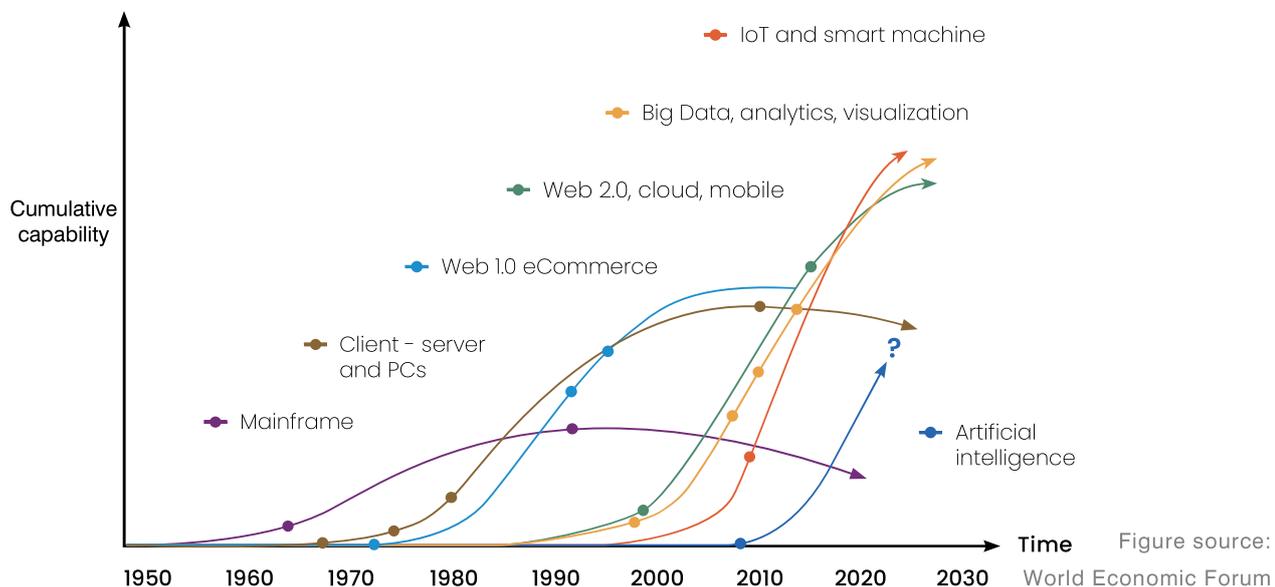
No Crisis
Should Go
to Waste.

Each crisis
is an
opportunity
for
improvement

Opportunities

The challenges posed by the pandemic, namely demand for telemedicine technologies, online learning, remote offices, and zero-touch services, have accelerated digital transformation in various countries. This transformation, which typically requires numerous years, was completed within months, thereby highlighting humanity's extraordinary rapid risk response capabilities.

The pace of change is accelerating through the compounded effects of digital transformation.



Winston
Churchill

- According to the DHL Global Connectedness Index, global data flow increased sharply in 2020, compensating for the shortage of human and logistic flow caused by the pandemic, maintaining global connections.
- Andy Rowsell-Jones, outstanding research vice president at global research advisor agency Gartner, indicated that the global digital transformation trend has entered the mature stage of large-scale digitization. Industries that have embraced this change will exhibit advantages within 2 years; after 3 years, these industries will become top performers.
- The International Data Corporation (IDC) predicts that by 2021, the main focus of 50% of major businesses will be to create digital value; by 2022, 65% of global GDP will be driven by digitization; and by 2023, 75% of organizations will have comprehensive digital transformation implementation blueprints.
- Fortune 500 companies on average used to require 20 years to achieve an estimated value of US\$1 billion; this goal is now reached by unicorn companies in 4 years.
- In addition to creating industry value, digital transformation improves environmental sustainability, creates jobs, and provides safety benefits to society.

Leaving the old normal

Embracing the new normal lifestyle

The new normal originates from the demand for reducing physical contact. The new pandemic prevention lifestyle advocates social distancing and protecting each other by avoiding physical contact. This zero-touch interaction has become second nature.

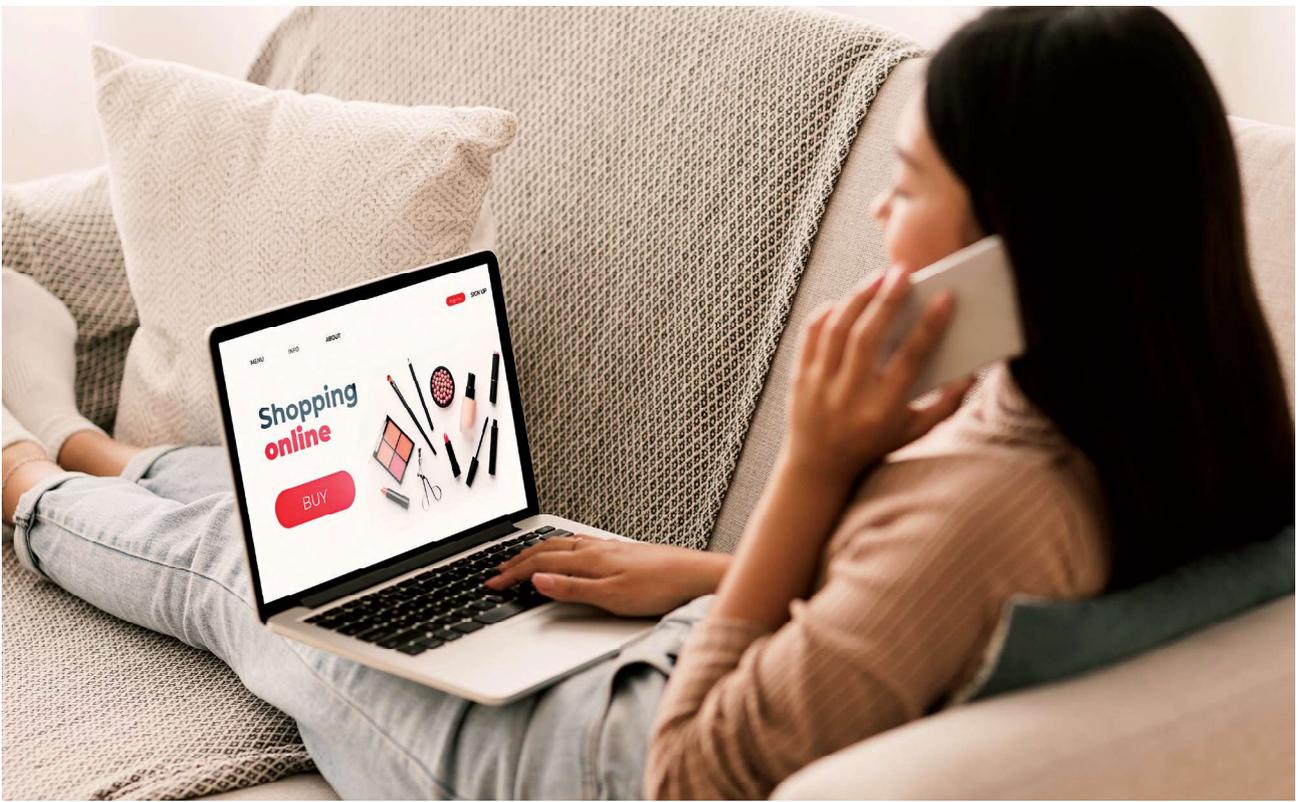
Zero-touch interaction requires people to stay at home as much as possible and avoid going out unnecessarily, prompting the rise of remote working, online education, and telemedicine services through digital channels. These new services constitute the novel stay-at-home economy. Moreover, zero-touch payment methods have grown in popularity among in-person shoppers. Such changes in consumer lifestyle influence the consumer market, driving companies to adopt digital transformation.

01 Cashless payment

- **Mobile payment**
 - Social distancing requirements have accelerated the development of cashless payment services, such as replacing physical cash with mobile and AR/VR payment methods; these methods reduce the risk of infection and increase payment efficiency.
- **Artificial and virtual reality (AR/VR)**
 - The Economist reported that the share of cashless transactions has jumped to levels they had expected to see in 2 to 5 years' time.
 - Statistics from Taiwan's Financial Supervisory Commission reveal that between January and September 2020, the number of electronic payment users in Taiwan exceeded 10 million, representing a 78% increase over the 2019 number.

02 Remote work

- **Corporate meetings**
 - Given the pandemic context, businesses have broken the boundaries of office space and discovered the benefits of remote working, including saving fixed office costs, hiring more diverse employees, and achieving higher employee satisfaction.
- **Online seminars**
 - The McKenzie report indicated that over half of corporate CEOs anticipated that the trend of remote working as well as cloud-based and digitized operations will not end with the pandemic. Furthermore, 15% of CEOs expressed willingness to allow over 10% of their employees to enjoy at least 2 days of remote working weekly, thereby indicating progress toward a future that features a mix between remote and office working.
- **Product launches**
 - In response to the changing work style, human resource management has changed from time management to performance evaluation.



03 Smart education

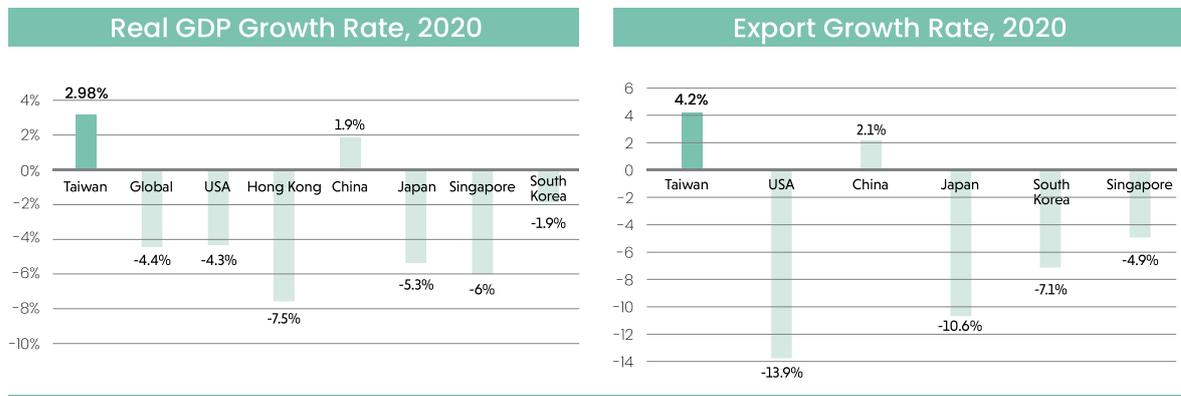
- **School education**
 - The closing of national borders has accelerated the development of online platforms and proven the feasibility of large-scale remote learning given suitable equipment and support.
- **Corporate training**
 - Instead of merely replacing the conventional education model of on-campus learning with classmates, smart campuses will improve learning outcomes, enhance the students' technological literacy, and contribute to pandemic prevention.
- **Telemedicine technology**
- **Legal consulting**

04 Recreation and shopping

- **Social media influencer streaming**
 - In May 2020, the McKenzie report indicated that the level of consumption of digital applications by consumers and businesses increased within 8 weeks to levels they expected to see in 5 years. Even grandmothers in Italy have discovered the joy of online shopping.
- **E-commerce streaming**
 - Stay-at-home policies have stimulated exponential growth in the online business model of delivery platforms. According to a financial report by Delivery Hero, the parent company of Foodpanda, the number of delivery orders from the Asian market leapt by 44% in the second quarter of 2020.
- **Social media**
- **Real time sharing**
 - The emergence of digital entertainment has reshaped conventional recreation activities. In April 2020, the popular video game Fortnite collaborated with the US hip-hop singer Travis Scott to hold a game-themed virtual concert. This concert was praised by attendees as the best live performance concert in the unusual year of 2020.
- **Interaction with family members and friends**
 - The introduction of indoor exercises for home environments has increased consumption of exercise-related applications and online workout videos. Moreover, frequent interaction with family members or friends through online voice or video calls has become commonplace.

First half of the pandemic: Taiwan demonstrated excellent pandemic prevention performance but might miss digital transformation opportunities

Given Taiwan's outstanding pandemic prevention performance in the first half of the pandemic, the country maintained its economic growth; however, opportunities for digital transformation might have been missed. In 2020, the global real GDP contracted by 4.4%, whereas Taiwan's real GDP grew by 2.98%. Furthermore, the export growth rate of Taiwan and China increased by 4.2% and 2.1%, respectively, from January to November 2020; the export growth rate of other countries was negative.



Sources: IHS Markit (Retrieved on July 15, 2020); Directorate-General of Budget, Accounting and Statistics, Executive Yuan; and Department of Statistics, Ministry of Economic Affairs

Pandemic prevention through the digital transformation of global industries

The changes in consumer behavior and high-risk market environment have accelerated the digital transformation of businesses worldwide, particularly those dependent on physical channels to operate; for example, companies in the retail, medical, and tourism industries. These companies have experienced drastic changes in their business models.

■ Retail service industry :

Because of zero-touch and stay-at-home economy trends, consumers have replaced offline consumption with online consumption behavior, thereby directly impacting the retail industry. The latest McKenzie report indicated that in the future, the sales per unit and profit per unit of retailers will drastically decrease. Retailers who solely operate using conventional retailing methods, only provide services using offline channels, and reject digital transformation are expected to have only 1% growth by 2024. Therefore, future growth in the retail industry is dependent on the industry's digital transformation.

■ Health care and medical industry :

Given the pandemic conditions in 2020, rapid growth was observed in telemedicine-related services and applications. In that year, the number of telemedicine service users in the United States doubled relative to that of the previous year. By 2023, this figure is expected to be over triple that of 2019. Additionally, the digitalization of the United Kingdom's National Health Service reached levels within the span of 1 week that administrators expected to see in 10 years.

■ Tourism industry :

2021 has been a stellar year for domestic travel industries worldwide. During this year, top tourism countries promoted domestic traveling to compensate for the shortage of overseas tourists. Accordingly, US tourism operators invested in Hawaii, Singapore's government issued S\$100 (equivalent to US\$75) tourism vouchers to its citizens to stimulate tourism at domestic landmarks, and Airbnb encouraged travelers to consider domestic accommodation options.

To foster resilience against the worst conditions, Taiwan's industries must undergo digital transformation

Relative to other countries that have started digital transformation because of pandemic risks, such as lockdowns, Taiwan's digital transformation process has fallen behind because of its successful pandemic prevention efforts.

Retail service industry :

The McKenzie report suggested that online channels will play a leading role in the future growth of the retail industry. Digital transformation is an urgent matter that will determine the survival of the retail industry. The Taipei City Government has not only assisted retailers in digital transformation and developing zero-touch operation modes but also helped increase the competitiveness of international retailers and collaborated with retailers in mitigating the impact of the pandemic.

Health care and medical industry :

Despite Taiwan residents' convenient medical access, the pandemic has changed people's medical-seeking behavior. In 2020, the number of inpatient visits decreased, resulting in many hospitals sustaining financial losses and requiring government aid. Some patients with chronic diseases postponed their hospital visits out of fear of being infected. Therefore, remote health care has become a desirable option. In addition to guiding health care institutions in maintaining remote health care quality, remote health care can be combined with Taiwan's excellent communication and information technology industries to develop solutions for international remote health care services.

Tourism in Taiwan :

The US travel website Agoda indicated that the Asian tourism industry recovered faster than its Western counterpart, with Taiwan's tourism industry exhibiting the fastest recovery. In an Agoda survey regarding tourists' "dream vacation" location, Taiwan was the top country. Accordingly, improving the tourism experience once borders reopen and international tourists return to Taiwan involves tourists' revisiting and recommending intentions. In addition to facing the volatile changes of the pandemic in Taiwan, industries should prepare for worst-case scenarios and plan for digital transformation.

The decisive point for digital transformation in Taiwan: Digital talent :

Digital talent is key to the success of digital transformation. The IMD World Digital Competitiveness Ranking published by the International Institute for Management Development in Lausanne, Switzerland, ranked Taiwan as fourth, outperforming both China and Japan. However, Taiwan ranked 18th in professional digital knowledge (talent, education, and training), a key indicator in digital transformation, suggesting that Taiwan has advantages in technology but disadvantages in digital talent training.

西亞	MA911	T1	取消	Cancelled
航空	BR2224	T2	取消	Cancelled
航空	HA5402	T2	取消	Cancelled
航空	AA8490	T2	取消	Cancelled
航空	CI9904	T2	取消	Cancelled
航空	VJ 909	T1	取消	Cancelled
航空	VJ 845	T1	取消	Cancelled
航空	MU2038	T2	取消	Cancelled



Second half of the pandemic : Learning from global digital transformation strategies





Seoul : Establishing the Korean New Deal to embrace digital lifestyles and applications under the new normal

- In July 2020, the Korean government proposed the Korean New Deal.
- Seoul will invest KRW1.1 trillion (approximately US\$1 billion) to cultivate talents in the big data, Internet, and artificial intelligence (AI) fields to accelerate development of the four main high value-added innovative industry clusters of Seoul.



Tokyo : Creating a citizen-first city from the aspects of safety, diversity, and smart technology

- The Japanese government has focused on digital transformation in the following fields: smart energy, environmental protection, transport and logistics, tourism, urban environment, global finance, urban diversity, and art and culture.
- Tokyo City Government has released over 2,096 public data sets that citizens can use to address relevant problems.



Shanghai : Promoting the online economy and establishing a prospective smart city

- In April 2020, Shanghai City Government proposed the Shanghai Online New Economy Development Promotion Action Plan 2020-2022 and established 12 remote office fields as the development focus.
- Shanghai City Government established new infrastructure to support the implementation of the initiative and accelerated construction of 5G-based smart Internet infrastructure to support industry chain development.



Singapore: Adopting digital transformation to help small and medium-sized enterprises survive the pandemic

- In addition to their current SMEs Go Digital Program and Start Digital Program, the Singapore Government implemented the Stay Healthy, Go Digital campaign to support retailers in completing digital transformation.
- The Singapore Government recruited 1,000 “digital ambassadors” to assist 18,000 traditional market vendors in setting up digital payment options.

A New Market Ecology after Industrial Transformation—Two Pros and Three Cons Industries Face in the Post-pandemic Era

In the post-pandemic era, rapid growth is expected in the stay-at-home economy, which is driven by the contactless trend; communication technologies, which are developed in response to the pandemic; and industries involved in safety and pandemic prevention methods. The government should play an active role in supporting industries and the public in jointly facing future impacts and changes caused by the pandemic and also in creating new opportunities and possibilities in the post-pandemic era.

Zero-touch and stay-at-home economy

- Innovative technologies including 5G, AI, AR/VR, blockchain, information security technology, cloud technology, remote platforms, big data, and automated technology have driven accelerated development in remote technology services and the online economy, further minimizing the distance in international trade.
- Online commerce, delivery logistics, online entertainment, booked taxi services, and mobile convenience stores, which have continually developed through the pandemic, are expected to become popular new business models.

The demand for zero-contact operation modes because of the pandemic has accelerated transformation in fields resistant to change. Data have indicated that the four main remote service industries, namely telemedicine, remote learning, remote working, and delivery industries, experienced an 80% growth in output value in the past 5 years, indicating the possibility of achievements previously assumed impossible.

Health care and safety measures

- Safety measures are crucial to preventing the spread of the pandemic. These measures include providing sanitization services for those entering or exiting buildings and implementing digital crowd face recognition devices for crowd management to ensure a safe work environment and protect employees.
- Given the increased awareness of personal health, personnel specialized in diagnosing basic medical conditions will be in high demand in the future. Future consumers will expect to receive immediate treatment from suitable institutions near their homes. Innovative teams have developed novel products and services that enable physicians to provide remote, virtual diagnosis for patients, including through the use of VR headsets.
- The Ministry of Health and Welfare designated 2021 as the first year of remote health insurance payments and has introduced telemedicine facilities at ophthalmology, dermatology, and otorhinolaryngology clinics in 50 townships. Furthermore, the Ministry evaluated the feasibility of including home-based medical care and long-term care services in the scope of telemedicine to alleviate shortages in health care personnel, reduce hospital visits, and improve health care quality and convenience.

2

Pros

Industries hardest-hit by the pandemic

The transition from the pandemic prevention phase to the pandemic coexistence phase has caused permanent changes to the conventional business models of physical store-based industries. These industries cannot solely rely on government bailouts; therefore, they must consider embracing digital transformation to overcome challenges in the post-pandemic era.

Taipei City Government has established digital infrastructure in preparation for the future and adopted digital transformation to help industries establish new consumer service modes under the new normal.

Physical stores

Wholesale and retail
Commercial district and night market
Department stores and restaurants

Experience consumption

Tourism and accommodations
Traffic and transportation
Conferences and exhibitions

Group activities

Arts and culture
Sport competitions
Education
Recreation and entertainment

3 cons

Reconsidering the government's mission under the new normal

The digital transformation trend has entered the maturity phase, in which explosive development is realized. Abrupt changes to the market environment or trends pose diverse risks and challenges to all market players, be they leaders or followers. IDC research suggests that in 2021, the main focus of 50% of global corporations will be creating digital value-added products, services, and experiences.

Digital transformation is inevitable

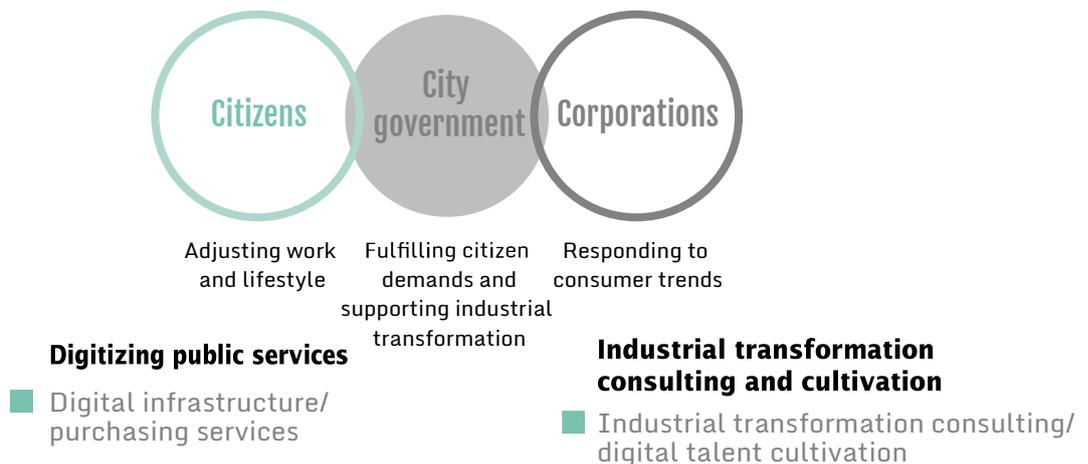
Despite appearing to be a simple task, digital transformation has a steep learning curve and requires substantial financial investment. Although some businesses can easily produce digital products or services, they are still far from successfully achieving digital transformation. Complete digital transformation requires thoroughly overturning and adjusting internal company culture, strategic thinking, human resources organization, and key performance indicators, thereby requiring the transformation of each employee's thinking capabilities and the overall company operation process.

Throughout this transformation process, Taipei City Government provides businesses with digital transformation experimental environments. These environments enable businesses to attain the fastest experimental results and accelerate the construction of new innovative environments at the least expense. Additionally, the city government has invested resources in industry counseling and cultivating digital talents to facilitate the industrial digital transformation process.

Transformation from consumer-centric to citizen-centric service models

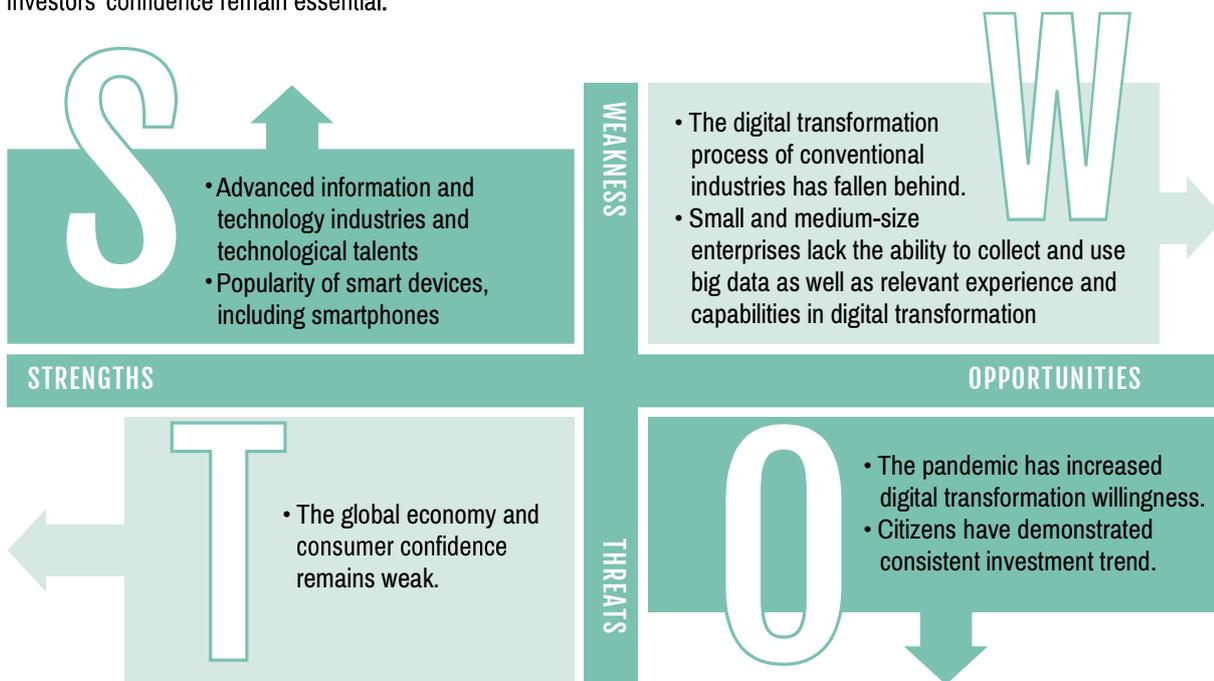
Digital technology obviously relies heavily on technology. In the maturity phase of digital transformation, which focuses on the services provided, digital technologies and techniques only serve as instruments to achieve digital transformation, rather than the goal. The true core of digital transformation is the user. By first considering citizens as consumers, Taipei City Government provides citizens with assistance in adapting to their work and lifestyles and in meeting health care and lifestyle demands for weathering the pandemic. Next, by considering businesses as consumers, the city government has promoted the digital transformation of companies and assisted businesses in following consumer trends, thereby supporting corporate competitiveness and the urban economy in the new economy.

The Taipei City Government planned and constructed digital infrastructure by setting itself as the largest procurement company in the overall economic system. Additionally, the city government has invited businesses as participants to provide solutions to relevant problems encountered in the process and promoted digital transformation by procuring relevant services. Accordingly, Taipei City Government leads the city in reigniting its development and in creating a new citizen-centric service model.



SWOT analysis of Taipei City's industrial digital transformation

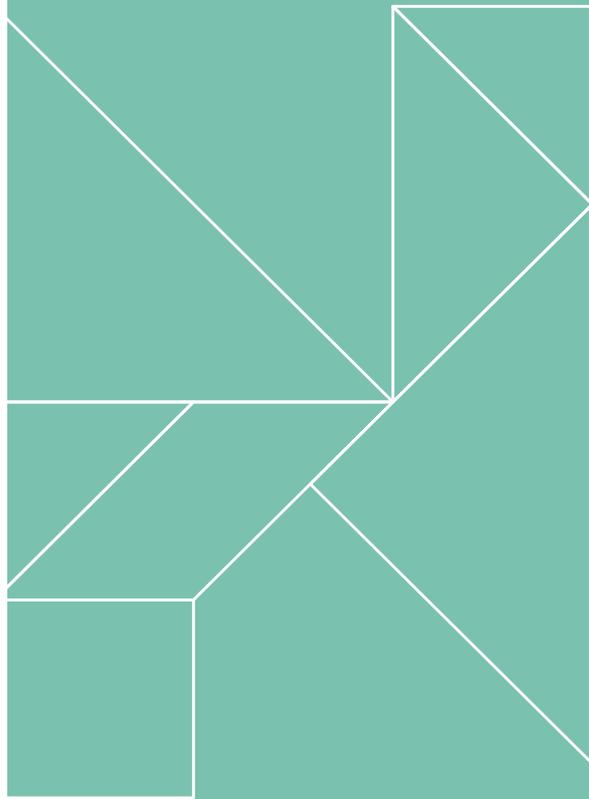
Relative to other cities, Taipei City possesses advanced information and communications technology (ICT) industries and technological talents. However, the digital transformation of conventional industries in Taipei City has fallen behind; these industries lack the ability to collect and use big data resources as well as digital transformation experience and capabilities. From a macroenvironment perspective, Taipei citizens have demonstrated a consistent trend in making investments. However, given the slump in the global economy and low consumer confidence, the government's efforts to enhance investors' confidence remain essential.



Taipei City's industrial digital transformation strategies

- Strengthen the connection among the industries.
- Improve digital infrastructure and provide citizens with zero-contact services.
- Provide counseling for industrial digital transformation, particularly regarding topics on the stay-at-home economy and zero-contact services, for industries greatly affected by the pandemic.
- Enhance digital talent cultivation and provide big data resources through the Taipei City Digital Service Platform
- Research and discuss the issuing of government bonds to support digital infrastructure.
- Implement technology-based pandemic prevention measures to meet domestic demand and maintain daily work productivity.

Rebooting Taipei City Industries



02



Vision and strategies for Taipei City's Industrial Digital Transformation

Digital technology has guided global industries into a new competitive environment. The pandemic is an opportunity for Taiwan's industries to embrace digital transformation. Taipei City Government invites industrial cooperation to "reboot" the industry with the aim of accelerating digital transformation, obtaining competitive advantages in the post-pandemic era, learning to coexist with the pandemic, and reconstructing the economy and our daily lifestyles.

Vision

To establish a citizen-centric, smart Taipei City through innovative governance

In the post-pandemic era, Taiwan must transition from the current situation to the new normal, thereby requiring all Taiwan industries to reconsider their status. Because every corporation has the potential to become a technological company and join the digital industry, the government must collaborate with nongovernment sectors to anticipate the lifestyle and industry conditions in the post-pandemic era and propose transformation strategies accordingly.

Taipei City is a testing ground with limitless possibilities. To create a citizen-centric smart city, the Taipei City Government has strengthened efforts to provide innovative citizen services and adopted an "inside-to-outside, public to private sector" policy promotion strategy. Moreover, the city government has constructed digital infrastructure to promote digital transformation and collaborated with private and corporate sectors to provide innovative services that meet citizen needs and enhance city government service efficiency.

With an open attitude and steady progress, Taipei City endeavors to evolve into a citizen-centric smart city through innovative governance.

Strategies

■ Dynamic transformation :

Digital transformation does not start with large-scale changes but through the accumulation of experience and competitiveness through a series of small adjustments. By rapidly implementing a series of small projects, the Taipei City Government guides citizens and industries in embracing digital transformation in their lifestyles and operations, respectively. In addition, the government must make dynamic adjustments to the digital transformation process to ensure positive outcomes.

■ Resilience adjustment :

To adapt to the volatile environment and overcome future challenges, the establishment of a resilient smart city is the primary mission of the Taipei City Government. Therefore, the city government has cultivated digitally literate citizens and industry talents, continually enhanced its digital services, and assisted industries in research and development; in this manner, the government leverages digital commerce opportunities and provides new digital services.

■ Software and hardware infrastructure :

The digital transformation of software and hardware infrastructure in the post-pandemic era requires the rapid establishment of cloud software service platforms for government and individual citizen use. By implementing various digital technologies, including public crowd face recognition management devices, big data platforms, and telemedicine technologies, the city government ensures the sustainable lifestyles and health care of citizens.

Taipei City's Industrial Transformation Action Plan

Under the new normal that has emerged after the pandemic outbreak, the level of digital transformation of businesses will determine their future survival and competitiveness. Entities in both the public and private sectors have understood the urgency for digital transformation. In addition to investing in pandemic prevention and digital transformation efforts, the city government must collaborate with companies in redesigning the new business model to ensure citizens maintain their pre-pandemic quality of life during the digital transformation process.

After assessing the developmental trend of global cities and Taiwan in general, Taipei City Government proposed the Taipei City's Post-pandemic Industrial Digital Transformation Policy White Paper. In the paper, the government's stated vision is "To create a citizen-centric smart Taipei City through innovative governance" and to implement the three main strategies of "dynamic transformation, resilience adjustments, and software and hardware infrastructure." Accordingly, the city government has prioritized 15 action plans as the main focus for digital transformation; these action plans are divided into three themes, namely foundation (digital infrastructure), complementary measures (digital talent cultivation and industrial transformation consulting), and development (stay-at-home economy development and zero-contact services).

In the face of the new economic environment of the post-pandemic era, Taipei City Government will implement transformation strategies to accelerate digital transformation, increase Taipei City's competitiveness, and shape the new industrial era.



15 Action Plans – Taipei City is Ready!

Vision	Strategy	Theme		Action Plan	Plan Content	1-Year	3-Years		
To create a citizen-centric smart Taipei City through innovative governance	Software and hardware infrastructure	1 Foundation	Digital infrastructure	1. Taipei Pass	<ul style="list-style-type: none"> Integrate card/pass services with public services 	●			
				2. 5G infrastructure/big data centers	<ul style="list-style-type: none"> Open 5G experience regions in Taipei City Establish big data centers Publish open data 	●			
				3. Taipei Free Wi-Fi hotspot coverage	<ul style="list-style-type: none"> Provide a safe digital service environment Establish Taipei Free Wi-Fi Hotspot coverage in public spaces 	●			
	Resilience adjustment	2 Complementary measures	Digital talent cultivation	4. Corporate digital applications	<ul style="list-style-type: none"> Cultivate corporate digital application talents 		●		
				5. Theatre management	<ul style="list-style-type: none"> Cultivate theatre management talents 		●		
				6. E-sports industry	<ul style="list-style-type: none"> Cultivate e-sports talents 		●		
			Industrial transformation consulting	7. Stay-at-home smart retail/smart traffic management	<ul style="list-style-type: none"> Digital transformation of commercial retailers and districts Implement cross-platform e-commerce and online promotions Promote smart parking technology 	●			
				8. In-depth tourism/new cultural opportunities	<ul style="list-style-type: none"> Facilitate cross-industry cooperation with the tourism industry to develop new operation modes Improve digital applications of over-the-top medical services Strengthen Taipei City's brand as the capital city 	●			
				9. New worker rights	<ul style="list-style-type: none"> Promulgate remote working-related regulations and complementary measures Adopt performance evaluation-based personnel management methods 		●		
			Dynamic transformation	2 Development	Stay-at-home economy development	10. Online entertainment	<ul style="list-style-type: none"> Create new experiences for cultural and sport events, large-scale tourism, and AR/VR activities. 		●
						11. Online learning/smart campus	<ul style="list-style-type: none"> Taipei City Cooc-Cloud/VR-integrated parent, teacher, and student platform Smart campus 4.0 	●	
						12. Health care industry	<ul style="list-style-type: none"> Establish community-integrated sports centers and virtual gyms 		●
	Zero-contact services	13. Smart payment/public cashless payments			<ul style="list-style-type: none"> Allocate public funding to support the pay.Taipei smart payment platform Assist older adults in developing the digital habit of using EasyCards Provide cashless payment services at public venues including campuses, parking lots, public markets, and public housing 	●			
		14. Online city government services/borough-implemented digital infrastructure			<ul style="list-style-type: none"> Integrating online city government services Making the digital lottery process transparent Establishing digital service systems for borough offices 	●			
		15. Telemedicine			<ul style="list-style-type: none"> Promoting telemedicine and transition care at health care institutions 		●		

1

Digital infrastructure

Digital infrastructure is the foundation for societal digital transformation; a steady basis is crucial for society to enjoy the benefits of digital transformation.

Prior to digital transformation, government infrastructure investment primarily focused on physical facilities, including highways and telecom services. In addition to tangible infrastructure, digital infrastructure is starting to take center stage in the current era. Despite not immediately and directly observable to the naked eye, such infrastructure provides benefits to citizens comparable to those provided by tangible infrastructure. In contemporary society, digital infrastructure is in higher demand than idle physical infrastructure.

In the digital infrastructure construction framework, the government should play the role of constructor and provide the public and businesses with dependable core services, such as enabling smartphones to use fast central processors along with spacious memory storage and effective sensors. Additionally, the government can establish digital infrastructure to enable the establishment of application store platforms that offer basic services in payment, disseminating information, information security, and search functions to meet user demands.

Transformation from vending-machine government to platform-based government

The past operation mode of the government is comparable to a vending machine; citizens pay taxes to the government in exchange for fixed services. However, under such a vending-machine operation mode, only a few suppliers helped stock the vending machine, thereby limiting the choices of the government and resulting in higher prices. That is, if the government has few supplier options, prices rise.

The government should serve as a platform to provide vital basic services, incorporate the newest technology, and allow for public participation. With its role as the cornerstone of the basic infrastructure platform and by providing open data, the government invites corporate and citizen participation in the platform to create more applications for citizen services.

From smart city to smart governance

Smart governance is the goal of Taipei City's smart city vision. The core of smart cities is not simply technological facilities but instead the use of 5G and Internet of Things (IoT) technologies to horizontally connect government agencies and vertically connect the government with industries and citizens. This enables the creation of a city that connects every industry and individual, thereby achieving data-driven smart governance.

From online firewalls to data governance

Big data, a product of the digital era, concern the personal data and privacy of citizens

The Economist ranked Taiwan 11th globally in The Democracy Index 2020. Taiwan rose 20 spots from the previous year and boasted a higher ranking than some Asian countries, including Japan and South Korea, and even surpassed major Western countries, such as the United Kingdom, France, and the United States. However, the report also highlighted that Taiwan has yet to establish relevant institutions to monitor how the government uses citizens' anonymized personal data, thereby suggesting room for improvement in the data protection measures of the Taiwan government.

Government management of private data is a crucial part of Taipei City Government's digital infrastructure. In addition to using suitable protection measures for the basic safeguarding of citizens' digital information, the government should employ adequate safety monitoring mechanisms to create a digital environment that ensures the safe use of citizens' private data and facilitates innovative commercial behavior.

Digital infrastructure: Taipei Pass

In the cyber-physical world, people’s online and real identities are of comparable importance. The Taipei Pass application developed by the Taipei City Government serves as a digital ID for Taipei citizens as well as a means to deliver city government services.

KYC-driven city government service

Taipei Pass is the key to the Know Your Citizen-driven service aimed at providing a convenient service portal. The pass employs a two-factor verification mechanism to establish citizen digital IDs and effectively protect citizens’ personal data.

Taipei Pass was derived from Taipei Card 3.0 and was redesigned by employing a citizen-centric service approach to combine a personal ID with various city government services. Because the application is connected to Taipei City Government services and facilities, it serves as a bridge for communication and interactions between citizens and the city government in the use of digital infrastructure.

The application features a simple and smooth interface, provides citizen-centric service content, and integrates diverse, convenient services, including card certification, online registration, the “Hello Taipei” simple petition system, welfare estimation, and e-payment services for public fees to provide a one-stop application.

- Integrates 15 card certification functions and 21 online services.
- The trial application was released in September 2020, and it was downloaded 150,000 times within 3 months.
- Taipei Card has accumulated 1,305,439 members, with 233,405 registered for Taipei Pass. (Statistics accurate as of January 20, 2021)





Using the Taipei Pass application to support technological pandemic prevention measures

Taipei City Government has implemented real-name registration systems at public venues. When entering, citizens with a Taipei Pass can quickly scan their personal QR codes to save time waiting in line, avoid indirect contact by touching a pen and paper, and protect themselves. At the date of writing, citizens have used the Taipei Pass application over 4 million times to provide their details in real-name registration systems when entering large exhibition venues or public venues, including the Taipei Arena or Taipei Music Center, thus effectively preventing possible gaps in pandemic tracking.

During the 2021 New Year's Eve countdown, Taipei City Government implemented pandemic prevention mechanisms based on pandemic risk management strategies and required citizens to follow pandemic prevention regulations. The number of event attendees was limited, and each attendee was assigned a specific area and space in which to maintain social distance. More importantly, the Taipei Pass real-name registration system was used to track the attendees, providing assistance to the pandemic prevention efforts at this large-scale event.

In development: Taipei City citizen digital ID

Taipei Pass represents the digital ID of each Taipei City citizen. In the future, the Taipei Pass real-name registration system can be employed for the online application of i-Voting and i-Drawing (a lot-drawing application for determining access to public kindergartens, public housing, and public parking spaces) as well as for ticket-purchasing services to public venues. Therefore, Taipei Pass can provide a convenient and safe digital medium for providing over-the-counter city government services. Furthermore, big data analysis results on users' application usage behavior and the service efficiency of the application may serve as the foundation for optimizing city government services.

Digital infrastructure: 5G network construction

The arrival of the 5G era in 2020 has opened the door to various innovative technological applications. While accelerating the development of 5G smart city hardware infrastructure, Taipei City Government has also actively provided proof of concept to assist industries in developing innovative applications.

Embracing the 5G trend

In addition to providing a generally swifter Internet experience, 5G offers wider bandwidth, lower latency, and the function to connect to more devices. These features enable not only the realization of many emerging technologies, including the IoT, big data, AI, autonomous vehicles, smart city, and smart traffic management, but also greatly influence the government, industries and businesses, and every citizen.

The 5G transformation of the government and businesses along with the effective application of 5G technology may benefit citizens and consumers through convenience and smart technologies. For example, Taipei City's autonomous bus 001 requires the use of 5G technology to receive real-time traffic data from the smart grid upon approaching intersections.



5G will also transform how Taipei City operates. In a 5G smart city, the real-time communication between traffic signals will be collectively sent to the information hub of the city government for meta-analysis and used as data for city governance.

5G private network applications

Corporate private networks are 5G applications that operate at medium- and high-frequency bandwidths. In the future, government agencies and science parks will employ 5G private networks to meet their internal data transmission demands. The use of technologies in new application fields may result in changes in the applications themselves or the ecosystem of the field. By constructing a new IoT platform and private network system and validating and launching the new 5G development plan, Taipei City Government continues its development toward a high service-quality 5G smart city. Moreover, the city government has collaborated with manufacturers to launch a 5G trial plan in an effort to offer a reliable and customizable 5G Internet environment, paving the way for emerging 5G industrial innovations.

Installation of IoT communication equipment: By collaborating with the central government and local industries, Taipei City Government has established a national standard for 5G smart poles. Setting Taipei City as a demonstration example, the city government has established small cell systems throughout the city to enhance the coverage of 5G Internet signals and adopted 5G as the foundation for IoT technology development.

5G private network applications: (1) Medical private networks, (2) administrative private networks, and (3) city grid. By matching private network applications with their corresponding environment, Taipei City Government has collaborated with various telecom operators in launching the 5G private network trial project.

5G private network applications in the verification of smart medical fields —Boosting pandemic prevention and innovation

The Taipei City Hospital network has successfully become the first city government service to use 5G technology in practical fields. In particular, the end-to-end 5G devices used were made in Taiwan.

Taipei City Hospital Renai Branch collaborated with Asia-Pacific Telecom to establish 5G private networks and employ 5G robots to assist in sanitizing areas, delivering meals, transporting medicine, and minimizing the risks of having medical personnel enter isolation wards, ushering in a new era in Taiwan's smart medical applications. Having achieved successful trial results, the technology will be promoted to other medical institutions to reduce medical personnel's burdens and risks.



Proof of concept open testing fields

Taipei City Government has promoted cross-department, cross-disciplinary technological collaboration between the central and local government and also the public and private sector. Additionally, the government established a task group comprising 1+7 fields, namely smart government, smart information security, smart construction, smart traffic, smart education, smart health, smart environment, and smart economy. The main purpose of the task group is to facilitate industry-academia collaboration, implement new technologies, and stimulate urban development.

Since 2019, Taipei City Government has promoted various 5G trial programs through collaboration between the public and private sectors, including the Neihu Smart Park 5G Test Project, the mobile smart bus demonstration in Xinyi Special District, the 5G field application during Taipei City's 2021 New Year's Eve, and 5G technology applications at the Taipei Music Center. The government has also assisted the industry in verifying possible solutions in the field, established a comprehensive industry ecosystem, and stimulated innovation in the industry.

Digital infrastructure: Big data centers

The key to a smart city involves not simply technology but also data-driven smart governance. Accordingly, big data has become a crucial strategy for governments to improve city governance and hasten digital transformation; it has been widely used by central and local governments worldwide for planning and implementation of initiatives. Taipei City Government established centers for big data and the Data Governance Committee to ensure that data play a central role in policy planning.

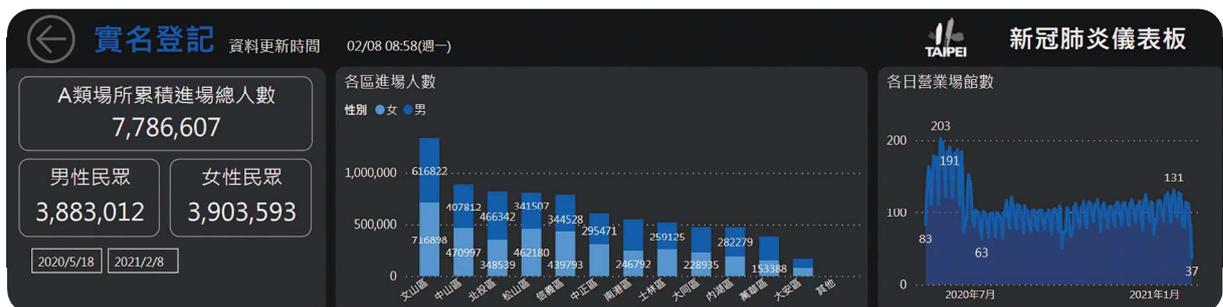
- Taipei City 4D city dashboard provides **598** city government dashboards and **215** business reports to assist in city governance management.
- The data.taipei platform integrates **87** partner agencies, **1,088** sets of open data, and has been used **1.8 billion** times.

Integration of Cross-field Data and Optimization of Municipal Administration Decision-Making

By integrating cross-agency and cross-field data, big data centers provide a comprehensive perspective on Taipei City through visualization dashboards and data analysis to support decision-making.



- The Taipei City Senior EasyCard provides adults in Taipei City aged over 65 years with a 480-point monthly quota. Older adults' Senior EasyCard usage records on the Taipei Metro System, for bus transportation, and at sports centers enable the Taipei City Government to track the daily trajectory of older adults. These trajectories can provide a reference for senior-centered city government policies.
- The COVID-19 Dashboard was established during the pandemic and compiles three core pandemic prevention information and tracing dimensions, namely risk alert, resource allocation, and outcome follow-up. The dashboard provides real-time integration of diverse data, including COVID-19 cases, quarantine data, COVID-19 screening data, home quarantine, quarantine hotels, the remaining masks in stock at pharmacies run by the Bureau of National Health Insurance, the population in a venue as recorded by the real-name registration application, and pandemic prevention-related topics, thereby assisting the city government in pandemic prevention-related decision-making





Data governance: Establishing personal data firewalls

The objective of data governance is to enhance the accuracy of city government decisions. To collect more comprehensive data, Taipei City Government has led the nation in establishing the Data Governance Committee to ensure the protection of personal data and the development of the digital economy. The city government also established relevant data use standards to ensure effective data use.

In addition to de-identifying and protecting personal data, the Taipei City Government established the Taipei cross-platform data encoding and exchange mechanism, in accordance with the European Union General Data Protection Regulations, to ensure that all government agencies protect citizen data. This approach increases the efficiency and quality of citizen-convenience services and protects citizens' privacy and personal data.

Digital economics is a key global development trend. In the digital information era, de-identified and nonprivate personal data collected by the city government can be employed to enhance citizen welfare and make policy improvements that benefit all citizens. For example, pandemic prevention-related statistics can be used to determine the pandemic status and assist in controlling the pandemic spread. Under the future guidance of the Data Governance Committee, sandbox experiments on the value-added applications of the data will be conducted to promote the industrial application of said data and increase industry competitiveness.

data.taipei: Promoting data openness and increasing governance transparency

To promote city government data openness and enhance governance transparency, Taipei City Government established data.taipei to integrate the open data collected by various Taipei City Government agencies, enabling institutions and citizens to perform data research and analysis. This data can be used for the development of value-added applications or mobile application services, thereby effectively using the data for societal advancement.

Data information is a key decision-making reference; as such, it should be effectively used in city government decision-making. As a smart government, Taipei City Government endeavors to establish policies based on rationality, practicality, and science to establish a governance culture that respects professionalism, data management, and data governance.

Digital infrastructure : Taipei Free hotspot coverage

In 2016, the United Nation passed a nonbinding resolution to list “Internet access” as a basic human right. When the Internet becomes a main source for obtaining data and receiving information, it becomes a basic human necessity similar to sunlight, air, and water.

The Taipei Free hotspot network employs major public venues in Taipei City as its foundation to achieve digital equality, enabling Taipei citizens to make digital connections and providing a safe and convenient service environment.

Taipei Free hotspot coverage

By the end of 2020, TPE Free comprised 2,904 hotspots across the city at the following locations:

Citizen-service areas	City government buildings, regional government centers, Taipei City Hospital, Taipei Public Library (i.e., Central Library and branch libraries), and waiting areas for health service centers in each administrative region
Public transportation stations	Smart bus stops and MRT information centers
Other areas	Disaster prevention parks, art venues, sports centers, MRT underground shopping streets (Longshan Underground Shopping Street, East Metro Underground Shopping Street, and the service station of Zhongshan Underground Shopping Street), and resident activity centers



Ensuring basic Internet privacy and safety rights

To ensure each citizen's rights to communication privacy and online information security, achieve optimal online quality, and effectively provide public services, Taipei Free referenced cases of public Internet services provided at domestic institutions and schools and established the necessary information protection measures. Additionally, Taipei Free ensures the protected and regulated use of users' personal data.

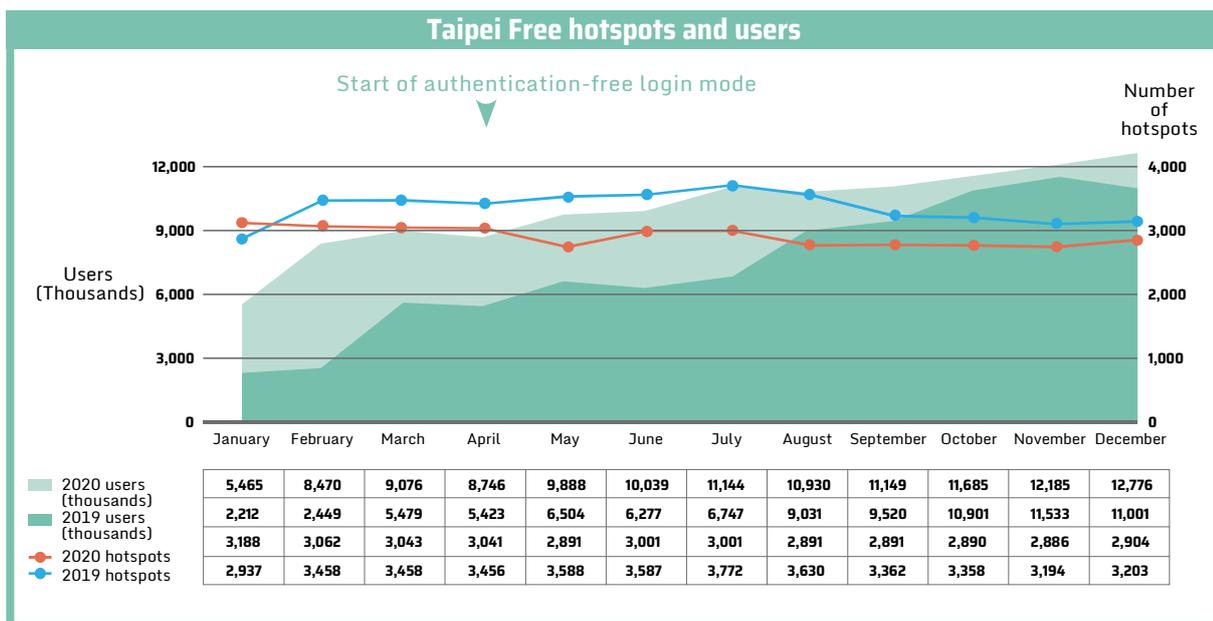


Providing convenient Internet access, using technology as the foundation for pandemic prevention

To meet the demand for timely pandemic news during the pandemic period, starting from April 1, 2020, Taipei Free launched its account-free login mode to further enhance convenience for citizens and tourists.

Shifting from increasing quantity to improving quality

Since its launch in 2011, Taipei Free has achieved complete coverage in most main public venues. In the future, Taipei Free will continue to expand its hotspot coverage and improve its service quality, regularly inspect the status of each hotspot, invest resources in regions with higher demand, and upgrade the Internet devices and bandwidth to provide users with more stable Internet signal quality.



2

Digital talent cultivation

Digital talents determine the competitiveness of governments and businesses in the digital era. Because digital talents are valuable assets in the future environment, businesses are more inclined to procure such talents than purchasing technology hardware. Therefore, businesses in various fields are increasingly competing for outstanding digital talents. In addition to recruiting new talents, employee competency cultivation is crucial to businesses. To help grow the economy, businesses must devise new methods to cultivate employee competencies, thereby equipping workers with relevant abilities to exploit new opportunities. However, school curriculums have struggled to keep up with the speed of technological advances. The ability of businesses to develop advantages through the use of new technologies is dependent on the employee training they provide and whether they are willing to change their work process to adapt to the new technology.

From “learning for practical application” to “learning from practical application”

Technology has provided opportunities for citizens to expand their capabilities. With the emergence of AI and autonomous vehicles, many citizens are concerned that their jobs will be replaced by robots or wonder whether their children will have a job in the future. From a historical viewpoint, the effective use of technology will not decrease but instead increase the value of humans; for example, ATMs replaced tedious and repetitive jobs, enabling employees to pursue more stimulating and high-value jobs. Furthermore, the overall number of bank employees has increased, but instead of performing repetitive jobs, these employees perform more valuable jobs, such as maintaining customer relationships.

This conversion, which is unique for each individual, is an essential part of digital transformation. For example, workers in conventional working environments must learn how to operate digital tools and become adept at digital approaches, whereas software developers must enhance their fundamental calculus skills to create algorithms for machine learning. Accordingly, the conventional notion of “learning for practical application” taught in schools should be changed to “learning from practical application” to prepare students for work and industrial demands where employees must rapidly learn and develop new skills. Therefore, a strong ability to assimilate knowledge is critical in future learning and employee cultivation.

Digital talents drive the urban economy and cultural advancement

On the basis of the principle of “learning from practical application,” Taipei City Government has integrated and emphasized the cultivation of digital knowledge and competencies in educational settings to meet industry demand for talents. In particular, the government has focused on talent cultivation to supply the needs of industries crucial for digital transformation, thereby stimulating the urban economy and cultural advancement.

Digital talent cultivation: Digital applications of businesses

The COVID-19 pandemic has accelerated digital transformation worldwide, prompting industries to embrace and accelerate their digital transformation and recruit digital talents; this has resulted in competition between industries for digital talents. The McKinsey Global Survey revealed that 87% of top management personnel reported experiences or expectations of a shortage of digital talents in the digital transformation process.

In the digital transformation era, the recruitment of digital talents is more critical than procuring physical technology. Therefore, Taipei City Government has promoted collaboration between the public and private sectors to cultivate digital technology and application talents; by recruiting these talents, businesses may obtain a competitive advantage.

Cultivating talents through diverse training courses

- In accordance with industrial trends, Taipei City Government implemented the Small and Medium-Sized Enterprise Knowledge Course to support enterprises and innovative entrepreneurs in digital transformation and provide them with cutting-edge technological knowledge on e-commerce and programming languages.
- Taipei City Government collaborated with businesses and small and medium-sized enterprises in the city by holding relevant courses to instruct manufacturers on the effective use of digital tools and online platforms to expand the operation scope of these enterprises. Through this course, attendees could also obtain international certificates or licenses pertaining to digital software design.
- Taipei City Government collaborated with Taipei higher education institutions to hold the Industry and Human Resources Connections Course, thereby supporting graduates in acquiring international certificates and licenses. Industry meetups were also held to stimulate connections and collaboration between professionals.



Empowering Taipei businesses with digital applications to cultivate digital transformation potential

- By collaborating with themed shopping districts in Taipei City through the Small and Medium-Sized Enterprise Knowledge Course, Taipei City Government supports businesses in learning about and effectively using online platforms and tools to expand their operation scope. Additionally, the course nurtures digital industry talents, thereby accelerating industrial progress.
- Taipei City Government has also held seminars where businesses share their viewpoints on current trends in commercial, technological, and industrial applications.

Establishing 22 innovative bases in Taipei City to cultivate digital innovation talents

- Taipei City Government has established various types of industry clusters and planned 22 innovative industrial bases. By the end of 2020, 14 of these bases had started operation and opened for the entry of businesses; the remaining eight bases are scheduled to open their doors before 2024.
- In addition to inviting the participation of innovative businesses, these innovation bases provide industrial innovation research and development centers, innovation incubation acceleration centers, and talent cultivation centers to guide Taipei City industries in completing digital transformation.

Industry–academia collaboration to cultivate future skills

To strengthen industry-academia connections and communication, Taipei City Government has promoted various collaboration projects. The government has signed 14 memorandums of understanding, established five technique teaching centers, and collaborated with major global manufacturers—Siemens (Germany), Hitachi (Japan), and LG (South Korea)—to establish education centers. Since 2018, Taipei City Government has received approximately NT\$44 million in corporate donations for teaching facility equipment and scholarships.



Taipei City high schools have established strategic alliances with top Taiwan universities. Through these alliances, university professors are invited to hold microcourses at high schools and research camps on quantum computers and AI, thereby initiating talent cultivation to fulfill future technology development demands.

Digital talent cultivation : Theatre management



The establishment of professional large cultural exhibition venues has long been a foundation for cultural competitiveness of major cities. In Taipei City's cultural transformation plans, cultural facilities not only represent cultural equality but also play a central role in the arts and culture industry.

Given the technological trends in theatre transformation and technological theaters in the post-pandemic era, "talents" will become the key driver for development in the performance art field. With the introduction of technology in theatre management, performance technology, and public services, the cultivation of professional theatre management talents and their certification become increasingly vital.

Taipei City Government has included performance art venues in the theatre talent cultivation program. In particular, the Taipei Performing Arts Center was set as the base for the competency cultivation, training, and certification of professional talents. In accordance with global theatre technology trends and the education and training requirements for handling technological equipment in domestic theatres, the Taipei Performing Arts Center holds professional training courses for various levels of theatre talents. In terms of the technological aspect, the Taipei Performing Arts Center provides support in the research, development, and experimentation of innovative program performances, thereby enhancing the innovation skills of domestic talents. By implementing the talent cultivation project and holding art promotion activities, the Taipei Performing Arts Center connects stakeholders in the performance arts industry from the upstream to the downstream, systematically creates a professional theatre talents database, and proceeds toward its goal of becoming the center of cocreation in Asia.

Competency development and education training

In accordance with the opening schedule of the Taipei Performing Arts Center, the training program was divided into two phases:

- Education training and course planning phase: Complete the training of seed instructors, establish instructor assessment standards, and create official theatre education training materials.
- Education and training course execution phase: Planning of a series of courses on theatre audio equipment, lights, and stage supervision, and the establishment of a database on trained personnel. After completion of these two phases, according to the actual personnel development status, planning and training of various levels of theatre talents will proceed.

Management of the professional talent database and certification

- On the basis of the education training program results, Taipei City Government created and manages a database recording the professional theatre talents who have completed training at the Taipei Performing Arts Center. The government has also established certification management regulations to ensure the quality and responsibility-bearing abilities of professional talents.
- The Workforce Development Agency, Ministry of Labor, classifies theatre professionals into levels 1 to 6; the primary objective of the Taipei Performing Arts Center is to recruit theatre professionals between levels 3 and 5.



圖片來源：臺北市政府及 O.M.A 提供

Digital talent cultivation: E-sports industry

The popularity of the stay-at-home approach to life and work has resulted in explosive growth in the e-sports industry. In Taiwan, over 1.72 million citizens are e-sports viewers; within a few years, the global population of e-sports viewers expected to surpass 500 million.

In the face of this fast-rising industry, Taipei City Government has taken an industrial approach, in addition to the general sports approach, to develop e-sports. Currently, Taipei City Government supports the e-sports industry by designating e-sports as a formal sport and promoting e-sports competitions. In the future, the city government will adopt an industry chain-based approach, support the development of e-sports-related industries, and nurture e-sports talents.

In 2016, the viewership of the League of Legends (a popular e-sports game) World Championship exceeded the viewership of the NBA finals. The Southeast Asia Games have already classified e-sports as a formal sport, and the Asian Games classified e-sports as a demonstration sport. In 2020, the mainstream e-sports media platform Twitch revealed that the average viewership of e-sports increased from 1.4 million in the first quarter to 2.4 million in the second quarter. E-sports is a heavy-weight industry strongly promoted by the Chinese and South Korean governments. However, similar to how a concert requires numerous on-stage and behind-the-scenes workers in addition to the main performers, the e-sports industry requires coaches, commentators, and referees in addition to the players. To address Taiwan's shortage of e-sports talents, the Taipei City Government has increased its support of talents in the e-sports industry.

Support development of the e-sports industry

- Taipei City Government established Taiwan's first e-sports team named after a city—Taipei E-sports Team—as well as the e-sports championship title and Taipei J Team to support the development of Taipei City's professional and nonprofessional e-sports teams and promote the city's brand as an e-sports venue.
- In addition to cultivating talents and developing hardware, Taipei City Government will apply Taiwan's cultural advantages in the ethnic Chinese world to strengthen the research and development of e-sports gaming content, thereby establishing Taipei City as a benchmark city for e-sports development.



Strengthen training of e-sports coaches, referees, and management personnel

- Taipei City Government has held multiple training seminars for Class C sports (e-sports) referees and coaches. In 2021, the government will hold its first Class B e-sports referee and coach seminars and cultivation courses for e-sports industry talents, in addition to promoting the use of professional e-sports certificates.
- Retired e-sports players are encouraged to work as e-sports coaches, commentators, streamers, or entrepreneurs in the e-sports industry, thereby contributing to the development of a healthy environment for the e-sports industry.

Establish a rich talent pool to serve as the backbone of Taipei City's e-sports industry

- In the future, Taipei City Government will collaborate with faculty members of Taipei City higher education institutions and use the institutions' available venues to hold e-sports talents training courses, including courses on tournament planning, game streaming, and filmmaking.
- By guiding course attendees in adopting the tournament host perspective, Taipei City Government aims to provide attendees with actual experience as well as assist them in comprehensively understanding the operation of the e-sports industry chain and its players, including e-sports players and coaches.



3

Industrial transformation consulting

Data, algorithms, IoT, real-time software services, machine learning, and AI are some of the technologies that will drive future development and have become tools for global industries to survive in the pandemic, thereby accelerating the pace of digital transformation globally.

Business model transformations driven by changes in work and economic models

In response to technological trends and the post-pandemic new normal, corporate transformation must proceed in two dimensions, namely work model transformation and business model transformation, which are driven by changes in the economic model.

An example of work model transformation is remote communication. Given the frequent international transactions in the globalized economy, multinational corporations and international trading corporations have developed mature remote conference and communication models. By contrast, Taiwanese businesses have yet to complete similar transformations because of Taiwan's successful pandemic prevention efforts. This may lead to Taiwanese businesses becoming outsiders and being at a disadvantage when negotiating and attracting trade investments in online conferences. Accordingly, adapting to global changes is a crucial consideration for Taiwanese businesses.

Business model transformation is an extensive process. This transformation involves not only the use of digital technology tools but also the reconstruction of corporate culture and operational processes. The objective of business model transformation is for businesses to implement consumer-centric approaches, transform into resilient businesses, and develop abilities to respond to environmental change.

For example, the arts and culture industry appears to have sustained the greatest impact from the pandemic and from digital transformation in the short term. However, in the long-term development, the lowered costs of machine production products will increase the value of human-exclusive tasks, including sports and the creation of music, art, and crafts. In addition to serving as a survival strategy for the arts and culture industry during the pandemic, digital transformation supports the industry in meeting consumer demands and in creating richer and more diverse experiences. These experiences in turn allow for Taipei City citizens to enjoy the precious moments in life during the stressful pandemic era.

Provide adequate support and establish necessary regulations to meet future service trends

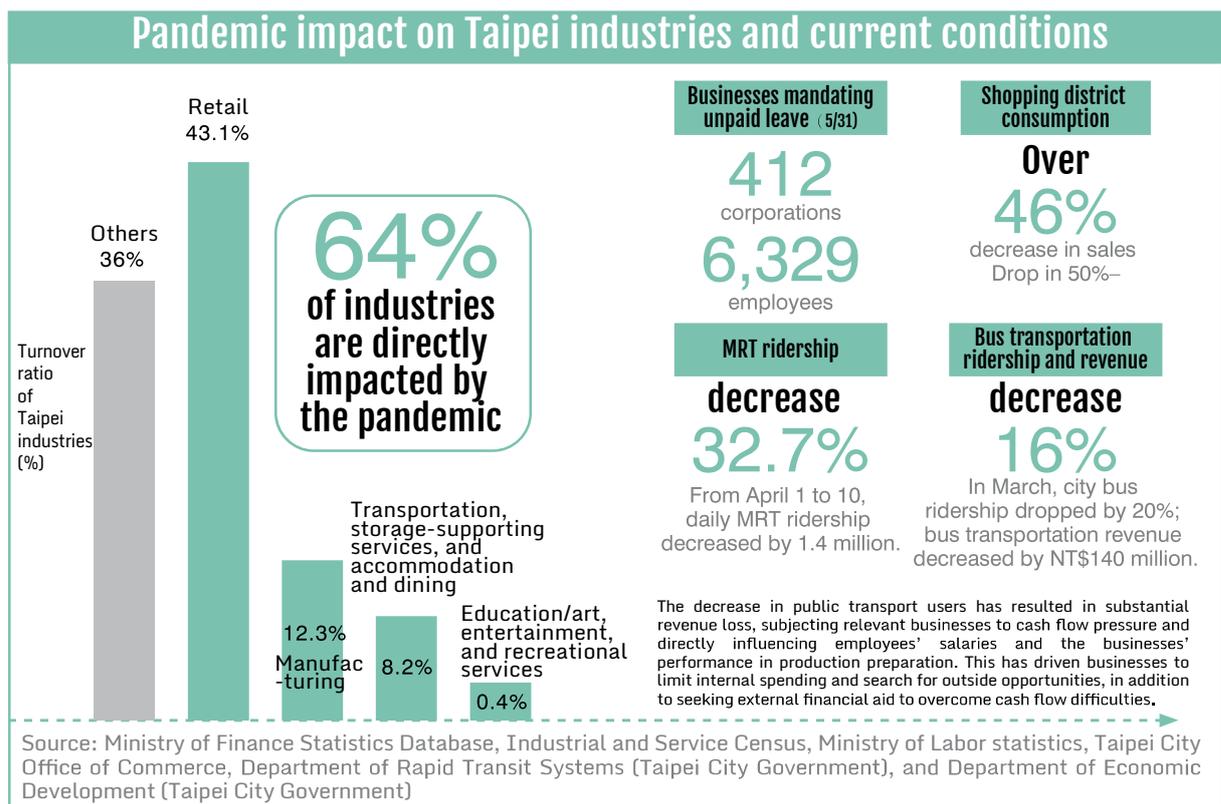
Digital understanding and city governance are inseparable. If the government limits its focus to the past, it will struggle to have an overview of society. Similar, if the government fails to understand the key factors in emerging business models, lawmakers may impose unsuitable restrictions that limit innovation. Government regulations for new technologies and business models are imperative. In the digital transformation process, Taipei City Government must employ industrial foresight, provide the required support (in cultivating, rewarding, and creating digital transformation-friendly environments), and implement the necessary regulations (establishing proper monitoring and management practices). For example, Taipei City Government should promote suitable management practices to encourage innovation to meet future trends and provide timely services.

In the post-pandemic world, constant change is the new normal. Accordingly, Taipei City Government has established industrial transformation consulting policies and adopted a comprehensive approach to construct a resilient city and collaborate with businesses to ultimately identify new opportunities in the digital transformation era.

Industrial transformation consulting : Smart retail transformation of domestic businesses

Because of the rise of e-commerce and the development of automation, big data, and AI (e.g., chatbots), digital technology has become instrumental in how consumers make purchases, how retailers market products, and how products and services are presented. The COVID-19 pandemic outbreak in 2020 further accelerated these changes in consumer habits, resulting in increased importance of digital transformation for retail service operators.

In response to the zero-contact and stay-at-home consumer trends in the post-pandemic era, Taipei City Government has assisted physical stores in implementing cashless payment methods and e-applications, held consulting courses, and guided corporation-platform matching. Through these initiatives, the city government adopts new ways of thinking and takes action to support local retailers to weather the pandemic and creating fresh business opportunities in the new economy.



The provision of online services and online product sales is only part of the retail service digital transformation process. The digital transformation of the retail service industry requires a comprehensive top-down corporate reconstruction. Once digital transformation is complete, retailers can employ cross-discipline digital technologies to improve internal operation procedures and service efficiency, thereby transforming their product-centered operation model into a consumer-centered operation model.



Industry revitalization and establishment of diverse digital courses

- To aid businesses in their digital transformation process, Taipei City Government provides consulting for Taipei businesses on digital and online marketing, training these businesses in using digital tools to improve their online marketing and e-commerce capabilities.

Basic environment optimization

- Accelerate implementation of e-payments: Promote retailer adoption of cashless payment methods (e.g., EasyCard and Easypay)
- When commercial district organizations apply for invoice write-off subsidies from the city government, over 50% of the documentary proof must be e-invoices. Taipei City Government has established the e-invoice consulting team to assist the National Taxation Bureau in holding seminars on the operation of e-invoice machines and continue to encourage retailers to implement e-invoice systems.
- Discuss the provision of subsidies for commercial districts, underground shopping malls, public markets, and individual vendors to install cashless payment equipment.



Cross-border e-commerce and online marketing

- Establish the Taipei City Cross-Border E-commerce Center to provide consulting services through video conference.
- Cultivate talents and promote industry-academia collaboration to stimulate corporate cross-border e-commerce business
- Promote digital market expansion: Convene video conferences to match domestic sellers with global buyers, organize online product launches, establish platforms to expand overseas markets, and help over 75 businesses in matching with international buyers to develop new market opportunities.

E-commerce and delivery channels

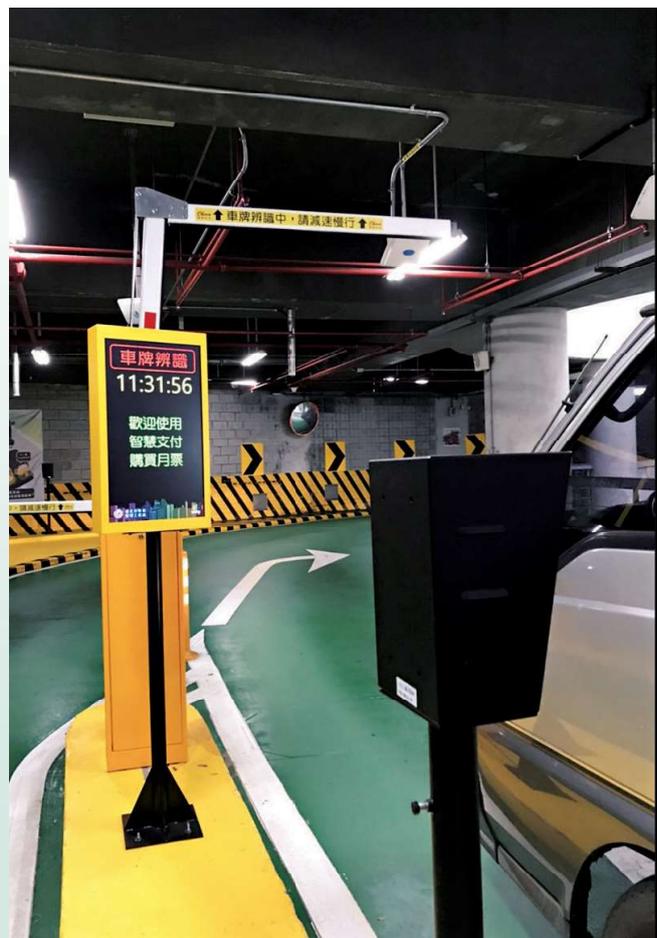
- Plan for Promoting E-commerce in Retailing: Support retailers in incorporating e-commerce services and opening diverse marketing channels.
- Promote collaborative marketing between eight major e-commerce platforms and thousands of physical stores.
- Match and promote collaboration between market vendors, delivery services, and e-commerce platforms and hold the World's Best Vendor competition.

Industrial transformation consulting : Smart traffic management

Smart traffic management is an indicator of smart cities. In recent years, smart traffic management has witnessed explosive growth. Both technologically groundbreaking autonomous vehicles and the innovative transportation model of shared transportation vehicles require complete smart city infrastructure to operate. Taipei City Government has held demonstrations of these technologies in public spaces and provided proof of business model to enable citizens to enjoy smart and convenient transportation services and support the transportation industry's smart transformation.

Expand the development of smart transportation applications

- Smart parking lot access systems: Since January 2019, Taipei City Government has installed the 3A smart parking lot access system at all public parking lots managed by the city government to facilitate automatic vehicle recognition, automatic parking lot access control, and automatic payment services.
- Monthly parking tickets and smart parking payments: Taipei City Government has established the online registration and lot-drawing system for the sale of monthly parking tickets. Additionally, diverse payment mechanisms for making automatic payment have been set up.
- Encourage electronic payment: The government continues to promote smart mobile payment discounts, including 10% off Taipei City roadside parking fees or NT\$5 off smart mobile payments of scooter parking fees billed using self-billing applications.
- The parking spaces of future public housing will be managed by the Taipei City Parking Management and Development Office and equipped with smart parking systems.



Enhance smart traffic management

■ Parking management:

- Taipei City Government has planned to establish electric vehicle priority parking spots, a smart management system that employs vehicle registration plate recognition technology and smart parking barriers for parking spot management. These parking spots are expected to be fully implemented in 2021.
- U-Parking shared parking space: Mayor Ko Wen-Je promoted the use of idle land in city government institutions and schools as parking spaces, releasing over 350 new parking spaces. Citizens may reserve these parking spaces using mobile applications, thereby mitigating the shortage of urban parking spaces.

- ### ■ Establish smart roadside parking spaces:
- Along the main roads of Taipei City , approximately 600 time-restricted parking spots are offered. Taipei City Government will establish vehicle detection devices to monitor the use of the parking spots, identify vehicle license plates, perform automatic billing, record violations of parking at restricted times, and provide on-site cashless parking payment functions, thereby achieving smart roadside parking management.



Industrial transformation consulting : In-depth tourism

In 9 New Tourism Trends for 2021, Booking.com reported that in-depth domestic tourism, in which tourists focus anew on local destination that they may or may not be familiar with, has become a top tourism trend. To follow this future trend, tourism operators must identify the features and advantages of local attractions and offer enticing tour packages that leverage the value of local attractions.

The eight cultural clusters of the Taipei City consist of five museums—each in a major city— along with Taipei Music Center, Taipei Performing Arts Center, and Songshan Cultural and Creative Park. By integrating tourism resources and promoting local cultural values, Taipei City Government will present a never-seen-before experience of Taipei City to attract tourists.

Because of the travel restrictions in response to the pandemic, most citizens have turned to domestic traveling. However, Taipei City tourism industries have not enjoyed the benefits of this rising trend because they mainly rely on overseas tourists; the tourism and accommodation industries of Taipei City have been the most impacted by the pandemic.

Consumers have changed their behavior to adjust to the pandemic. Government subsidies can only support the tourism industry in overcoming short-term obstacles; in the long term, the industry must embrace transformation and shift their focus to satisfy consumer demands under the new normal lifestyle. Taipei City Government will guide the formation of new cross-industry alliances to support the shift of the tourism industry to domestic in-depth tourism and revitalize business opportunities.

Promote the safe lodging plan

- Taipei City Government has established 16 items for the self-management inspection and 35 items for optimization of accommodation. Before October 12, 2020, 387 hotel operators in Taipei City were listed as safe lodging.
- Taipei City Government has held professional seminars for hotel operators to assist them in improving their hotel environment and service quality as well as in strengthening their market position; these initiatives have helped operators provide a high-quality accommodation environment for tourists.





Provide industrial transformation mechanisms

- In addition to holding tourism events to connect potential tourism attractions and unique local shops in Taipei City and neighboring counties, Taipei City Government has combined these events with tourism festivals and experience activities to provide tourists who visited Taipei City with a new traveling experience.
- Taipei City Government implemented a trial program to provide reward mechanisms for tour agencies who bring tourists to Taipei City. The program encouraged tour operators to plan tours with a focus on Taipei City's features and ultimately increasing tourist numbers.

Establish a safe reception and service chain for Taipei City's meetings, incentives, conferences, and exhibitions (MICE) community

- The Safe Travels stamp plan promoted by the World Travel and Tourism Council (WTTC) is aimed at helping travelers identify destinations and businesses that have adopted global health and hygiene standards, thereby ensuring that consumers and tourists experience a safe journey.
- To promote Taipei City's MICE industries, Taipei City Government established the safe reception service chain mechanism and supported related industries in connecting to the chain. Additionally, the government has applied to the WTTC for a Safe Travels stamp for Taipei City to ensure a safe traveling environment for tourists.
- Taipei City Government has assisted tourism attraction and accommodation operators in acquiring the Safe Travels stamp as well as Muslim-friendly tourism attraction and accommodation certificates.

Consultation on industrial transformation : Culture-based new business opportunities

In addition to serving as a crucial industry for Taiwan, the culture and arts industry is a key driver of continuous growth. Despite being adversely affected by the pandemic, which has caused closure of exhibitions and a reduction in performance sessions and audience numbers, Taiwan's arts and culture industry still has the opportunity to evolve through digital transformation and extend its cultural reach on the world stage to open up new business opportunities.

Cross-industry integration and connection with the world—Strengthening the over-the-top digital applications of the arts and culture industry

Research has revealed that the COVID-19 pandemic greatly increased people's participation in online and digital activities. In particular, the number of shows and movies citizens watched on streaming services increased, and substantial growth was observed in people's consumption of music and online games and use of mobile applications.

To assist the arts and culture industry in using digital platforms, Taipei City Government encourages creative talents and organizations to create through online-to-offline integrated platforms and use online-to-offline marketing models, respectively. In this manner, Taipei City Government assists domestic arts and cultural practitioners in completing digital transformation and enhancing their over-the-top digital application capabilities. Moreover, the city government has established a collaborative platform for the theatre of Taipei Performing Arts Center to lead the digital transformation effort.

- Taipei City Government continues to introduce new international program creation and technological theatre presentation models, propose innovative programs, and participate in international art markets to develop new potential programs.
- The city government has matched resources from private sectors with exhibition venues and art festival planning units. Additionally, investments have been provided for the subsequent development of programs throughout the program development process to ensure stability in supply of resources and future presentation opportunities.
- In cooperation with the program plans released by the Taipei Performing Arts Center, Taipei City Government planned research and development projects to develop remote- and virtual reality-based programs. According to the scale and positioning of the exhibition, the city government matches each program with suitable performance venues.





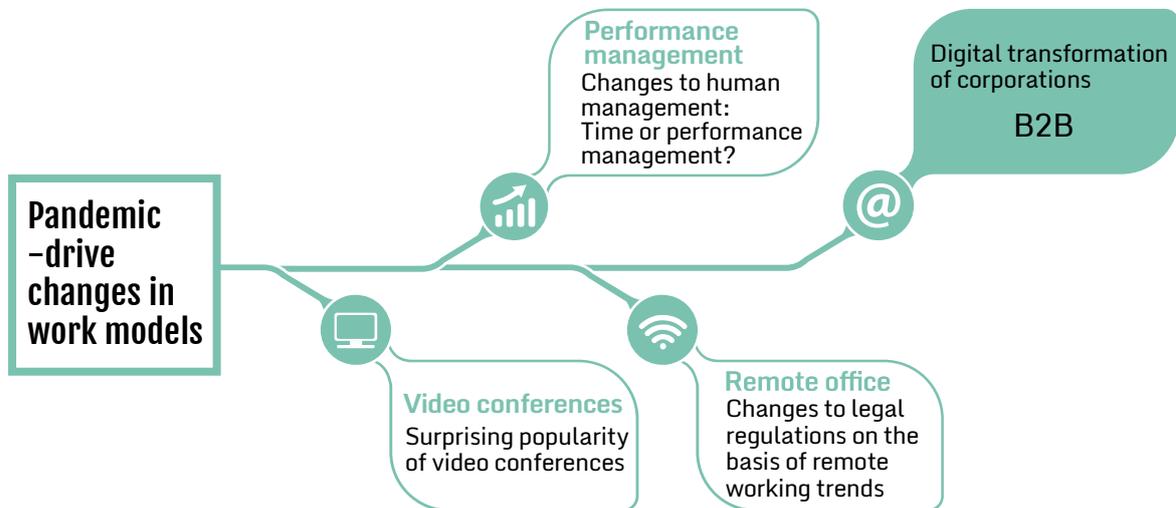
Establishing Taipei City's Brand as Capital City—Creation—Marketing—The Golden Path to Global Output

In the borderless online market, Taipei City Government assists Taiwan's arts and culture industry by promoting Taipei City's brand as Taiwan's capital. By establishing the values underpinning Taipei City's brand, Taipei City government creates a direct channel to help Taiwan art creations be output globally and compete on the global stage. After the art creations successfully hit the global market, the industry can obtain invaluable global experience and bring the experience back to the local and broader Chinese-speaking market, opening up more market opportunities.

- By promoting the one-source multi use approach to original intellectual property (IP), Taipei City Government strengthens the influence of art creation on the literature, comics, animation, and video media industries, thereby transcending the "one industry-one platform" limitation. Additionally, by matching innovation with corporate platforms, innovative applications and cross-disciplinary collaboration on original art content are stimulated.
- Taipei City Government has held global forums to share examples of the IP industry chain on business-to-business (B2B) collaboration platforms, trade partner matchmaking sessions, and held digital transformation workshops. Through these initiatives, the city government has established a B2B collaborative platform for the IP industry chain, reduced entrepreneurship costs, and driven the industry to achieve higher levels of development.
- Through case sharing and holding workshops to establish an online-to-offline integrated experiment model for the IP industry chain, Taipei City Government has developed the technology application of the industry and provided the applications to operation managers or corporate leaders of the industry. In this manner, the city government has optimized the transformation of innovative content and maximized the penetration and spread of culture.

Industrial transformation consulting : New employee rights

Pandemic-driven changes to the conventional work model have prompted global businesses to rapidly implement remote working models, greatly increasing demand for video conference and online personnel management services. This is similar to the changes before the industrial revolution, during which people struggled to imagine that most people would live in cities in the future. However, society made the necessary adjustments for development, which catalyzed the prosperous development of urban civilization and technology. The current wave of remote working represents a challenge for the government, businesses, and employees, but it also provides a new opportunity for urban evolution.



Government : Assess and adjust employee regulations to protect the rights of workers in the new work model

In a work-at-home model, how office hours should be determined, how personal information safety problems should be resolved, and what the relevance is of occupational safety regulations remain uncertain. Taipei City Government has preemptively established relevant policy regulations for operators adopting the work-at-home work model and provided them with labor rights consultation and labor rights inspection programs, thus ensuring the protection of labor rights of those working at home.

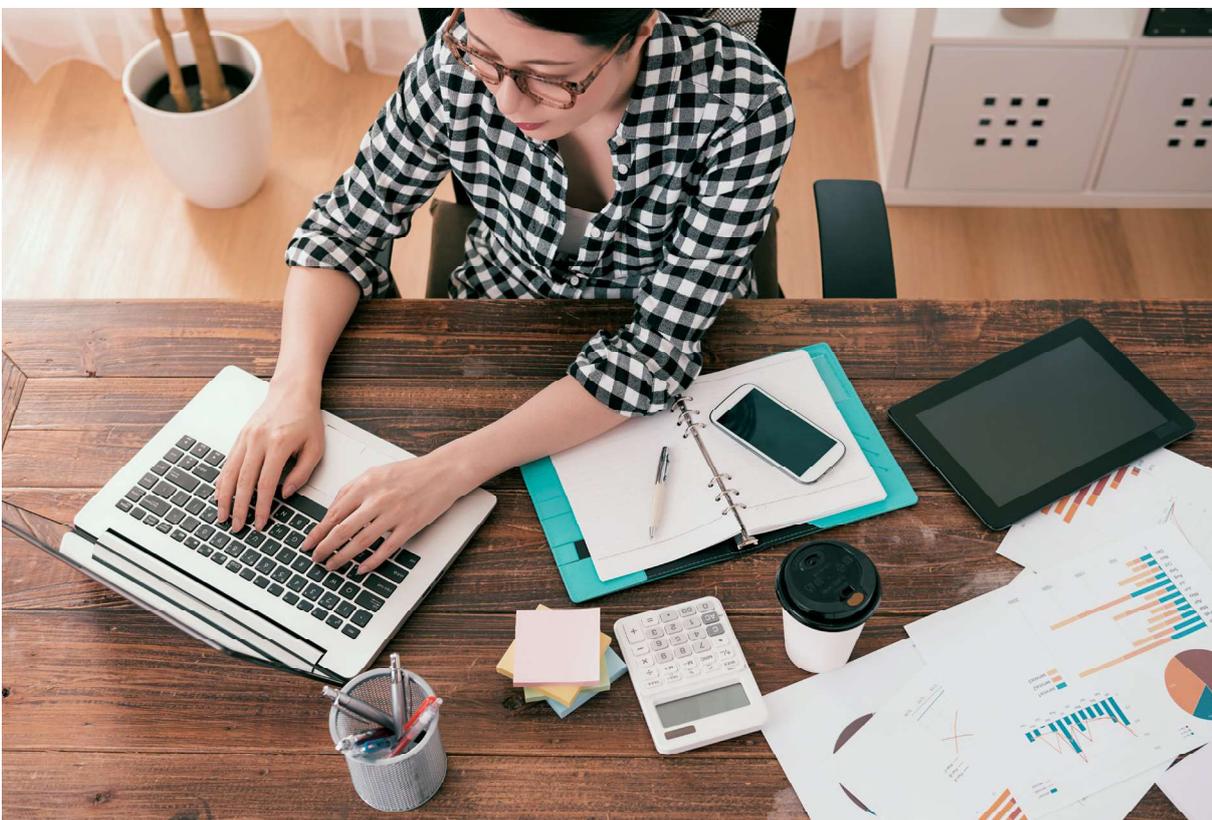
- To assist businesses employing the work-from-home work model in legally recording the attendance of employees, Taipei City Government inspected businesses that confirmed they required consultation and assigned labor rights inspectors to the businesses to provide consultation on administrative regulations, review the employee management methods, and recommend relevant improvement measures. Additionally, the city government ensures the implementation of improvements by performing labor rights inspections at each corporation. Businesses that failed to meet the expectations were penalized to ensure the labor rights of employees working from home are respected.
- To provide consulting for businesses or agencies adopting the new work model, Taipei City Government has updated the HOW Boss section of the Taipei City Government website to show relevant legal regulation information.

The rapid emergence of industries that constantly require workers in the new economic model (e.g., delivery service platforms) may help provide employment for the considerable number of unemployed citizens in the post-pandemic era.

- In addition to providing stable employment subsidies and training to specific unemployed citizens, Taipei City Government led Taiwan in establishing the Taipei City Self-Governance Regulations for the Management of Food Delivery Platforms, an act requiring food delivery companies to insure their delivery drivers, to protect the labor rights of these workers.
- Employee management and maintenance of labor rights under the new work model is a key mission of the Taipei City Government.

Renegotiation of employment conditions between businesses and employees

- Readjusting work regulations for work-at-home employees: Specify how work attendance and overtime is defined and adjust how commanding management is used in the workplace to prevent labor disputes in the work-at-home model.
- Complementary measures for the work-at-home model: Understand whether employees have the necessary tools and environment to work at home and whether they have sufficient support to perform remote work; enhance the digital working skills of employees, and support the physical and psychological health of work-at-home employees.



4

Stay-at-home economy development

The COVID-19 pandemic has changed our education, employment, and everyday lifestyles. Under the new normal and in consideration of social distancing and reduced time consumption, citizens have discovered that the stay-at-home economy, which incorporates remote communication technology, is highly advantageous. In response, businesses have attempted to shift to consumer-centric operating modes to meet consumer demands; similarly, Taipei City Government has adopted a citizen-centric operating mode.

Taipei City Government is responsible for protecting citizen' health, maintaining economic development, and ensuring stable lifestyles for citizens under the new normal. This responsibility concerns not only citizens' education but also their health and entertainment. Moreover, the offline city government services provided in the past must now be provided on online platforms. Throughout the process of transforming offline services into online services, innovative service models designed by private businesses could be instrumental in helping citizens achieve a more pleasant lifestyle. Therefore, the city government provides experimental venues and resources to support industries and the development of urban innovation.

Improve the stay-at-home lifestyle through disruptive innovation and reconstruction

In the past two decades, the term disruptive innovation has received increased attention in global commercial fields. Innovative business models enable small companies with minimal resources and smaller scale to compete with major businesses that have a stable grasp on the market, guiding the deconstruction and reconstruction of the market. The current large-scale destruction and subversion of the external environment provides optimal opportunities for change.

For example, the pandemic has changed conventional teacher-student teaching while opening ample opportunities for cultivating students' information literacy and ethics. Online learning, which has grown in popularity given the stay-at-home economy trend, is both a pandemic prevention method and an innovation that helps provide equal education opportunities. By implementing cloud education to promote digital equality, Taipei City Government provides equal educational access to each child and equal treatment to citizens regardless of their identity, gender, or occupation.

Taipei City Government also provides a standard application programming interface (API) through the Taipei City Parent-Teacher-Student platform for students to connect with third-party education software services. By providing the API on a public platform, the city government helps reduce the underlying system development costs of innovative education service providers and directly promotes the API service on a platform with approximately 800,000 users. In this manner, the government provides citizens with access to diverse learning resources and creates a digital learning ecosystem that benefits all parties.

Using a public ecosystem to support practical fields for industrial innovation

The objective of business model transformation, which is driven by digital transformation, is to convert data into cash flow and generate profit. With the aim of obtaining citizen approval and increasing the overall competitiveness of Taipei City, the city government has established abundant digital infrastructure and promoted digital transformation to provide citizen services and establish a new market ecosystem. In addition, Taipei City Government has prioritized industrial innovation in its efforts to provide citizen services and established a practical field for industrial innovation supported by the public ecosystem.

Stay-at-home economy development : Online entertainment

With the development of the 5G era entering the business model transformation phase, digital technology applications have been introduced to provide consumers with new experiences of conventional physical entertainment through online channels. In the international sports industry, combining competitive sports with technological innovations, such as multiple synchronized perspectives, interactive time slice displays, 360° real-time VR streaming, and VR panoramic pictures, has become a key development trend to provide audiences with new viewing experiences.

The international sports industry has strived to provide high-resolution, zero-latency broadcasting services to guide the industry proceed to the omnimedia era. With the prosperous development of over-the-top and video-on-demand technology, the industry has incorporated digital content to drive development in relevant industries and increase its economic output value.

Taipei City promotes the digital transformation of the arts and culture industry, sports broadcasting industry, and large-scale tourism activities and attractions to provide consumers with online experiences. To this end, Taipei City Government supports these industries in adopting an innovative entertainment production and creation approach and guides them in employing cross-disciplinary integrated technologies to create transformation opportunities, further driving the creation of a new 5G economy for the film and television entertainment industry.

Art and culture activities

- By planning digital arts and culture performances at large exhibition events, Taipei City Government increases the visibility and relevance of innovative programs.
- The city government has applied public resource platforms to attract private resource investments in the digital production field.



Sports events

- Apply digital technology in sports event broadcasting and design AR/VR interactive modes
 - The city government has referenced the digital broadcasting techniques (e.g., AR and VR) used by the NBA to upgrade the Internet connection and communication towers of sports arenas, providing citizens with a brand-new visual experience through digital transformation in the 5G era.
 - The Tianmu Baseball Stadium has completed its transformation into a 5G/AR/VR smart stadium. The stadium has made outsourced investments to construct a 360° LED screen, installed televisions and communication devices throughout the stadium, and imported high-speed cameras, tracking radars, and 5G stations, thereby becoming Taipei City's first sports arena to be equipped with cutting-edge media broadcasting technologies and equipment.
- Collaborate with large-scale sports events, such as the Taipei Marathon, and employ integrated marketing strategies to stimulate demand for the sports industry, thereby increasing the exposure of Taipei City's sports industry.

Digital experiences of tourism attractions

- Introduce digital technology to enable citizens to experience large-scale tourism events or tourism attractions:
The city government has incorporated digital technology with large-scale events, such as Taipei City New Year's Eve and Taipei Lantern Festival, to provide tourists with a new entertainment experience through technology. Similarly, AR guiding systems can be applied for tourists to experience offline-to-online integration.
- Employ digital technology to introduce Taipei City's tourist attractions:
The city government collects high-quality real-time images of Taipei City for tourism purposes and present these images on the Taipei Travel webpage or video platforms to introduce Taipei City to overseas tourists through 2K resolution, high-quality real-time images, stimulating their desire to visit Taipei.

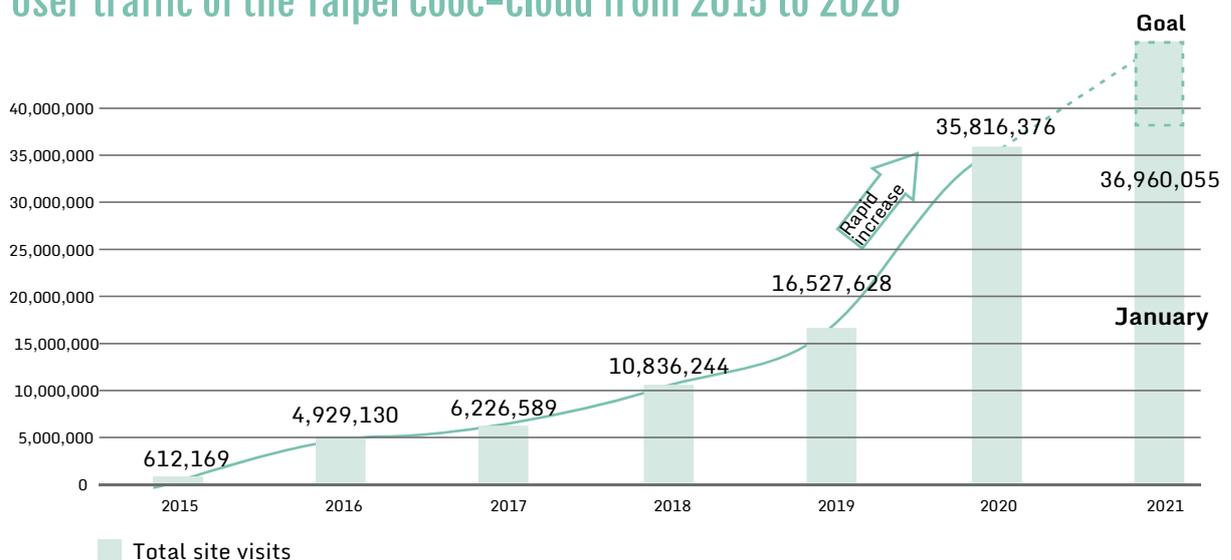


Stay-at-home economy development : Online learning

Besides being a pandemic prevention requirement, online learning enables the creation of learning models and achievement of learning outcomes more suitable for the future world. Taipei City Government has established a comprehensive online learning platform and content in addition to providing diverse learning channels, thus implementing the e-generation learning model of learning without spatial restrictions.

Since their establishment in 2016, the Taipei City CooC-Cloud and CooC course management platforms have enabled learning without temporal or spatial restrictions. Additionally, the websites provide academic portfolio functions, learning outcome analysis, and review functions to help students prepare for the General Scholastic Ability Test and Advanced Subjects Test.

User traffic of the Taipei CooC-Cloud from 2015 to 2020



Taipei CooC-Cloud received high praise during the pandemic

- In 2020, the total site visits since the site's inception exceeded 30 million.
- The platform provides 11,064 online teaching videos, 43,821 test items for review, 78,106 online courses, 21 online databases, 19,669 e-books, and over 460,000 digital publications of resources from public libraries.
- The platform features resources of 2,052 self-published e-books and more than 330,000 books of Taipei Public Library.
- Taipei City is the only city in Taiwan to receive an IDC Smart City Asia Pacific Award in the education category for 2 consecutive years.

Collaboration between public and private sectors to enrich online learning

To optimize the efficiency of its online platform, Taipei City Government has continued to work with nonprofit organizations to enrich the online learning content.

- By incorporating private sector experience in producing online learning content and in broadcasting programs and collaborating with nonprofit online learning platforms, including Junyi Academy and Learn Mode Learning Bar, Taipei City Government produced online learning content and released animation videos and online course packages based on the 2019 curriculum to provide teachers with convenient and intuitive online teaching resources.
- With the assistance of nonprofit organizations, Taipei City Government has cultivated teachers' skills in designing teaching prompts for online courses and their ability to hold real-time synchronized courses. Additionally, teachers have been trained to consolidate 40-min courses into 10–15 min teaching videos.

In the post-pandemic era, Taipei City Government will further integrate the Taipei CooC-Cloud, Taipei City National Elementary School Digitization Diagnostic Evaluation, and the CooC course management platform and apply AI and big data technologies for learning diagnosis and remedial teaching purposes to optimize learning outcomes.

Cross-disciplinary collaboration to create a favorable online learning ecosystem

- In 2020, over 10 counties and 34 schools participated in the Taipei CooC-Cloud Cross-Campus Online Diverse Elective Courses, featuring 25 online courses. Through this initiative, the Taipei CooC-Cloud's digital technology was leveraged to bridge the urban-rural divide and provide equal education opportunities.
- To assist students in preparing for university courses, 35 open online university courses were introduced in collaboration with 10 universities.
- The city government signed memorandums of understanding with 13 counties to share the learning resources of the Taipei CooC-Cloud. In the future, Taipei City aims to collaborate with more counties and overseas universities to foster education equality.



Offline-to-online integrated parent–teacher–student platform

In 2021, Taipei City Government established the offline-to-online integrated parent-teacher-student platform using the fundamental framework of the Taipei CooC-Cloud to provide eight main services, including teaching and learning.

- Facilitate real-time online communication and interaction between parents, teachers, and students. Parents are able to see a summary of their child's academic performance, enabling parents to rapidly understand their child's campus lifestyle; this approach helps reduce the administrative burden of schools and helps them maintain high education quality.
- Invite digital teaching material and software manufacturers to provide free learning resources, establish a comprehensive smart education ecosystem, and develop more suitable teaching models to drive development in the education service industry.

Stay-at-home economy development: Smart campus

Schools are the keystone that drives societal development. Taipei City Government promotes smart education and has developed smart campuses in an attempt to keep pace with developments in future smart learning environments. The city government has invested resources to bridge the digital gap and cultivate future talents with digital capabilities.

Learning models in the smart era differ considerably from conventional ones. To facilitate students' interactive learning in class, classrooms must be equipped with smart technology facilities. Additionally, the increased autonomy in extracurricular learning has freed learning from temporal and spatial restrictions. Therefore, the implementation of campus digital technology has become a global trend.

In 2018, Taipei City Government invested NT\$1.6 billion into a prospective program aimed at comprehensively developing smart campus environments and integrating campus life with the parent-teacher-student platform to enable parents and teachers to more easily grasp students' academic performance.

- ✓ Construct 6,036 smart classrooms, with 3,765 equipped with an 85-inch touch-screen
- ✓ Set up high-speed fiber internet in every school and Free Wi-Fi in each classroom



Establish bring-your-own-device (BYOD) programs in schools to provide students with a personalized autonomous learning channel

- Access to mobile devices is the final mile in promoting mobile learning. In 2019, 236 schools in Taipei City implemented the Mobile Learning, Smart Education policy. Taipei City Government provided subsidies to equip a total of 69,140 students from third grade to eleventh grade with educational mobile devices, shifting from the previous “one device per group” to “one device per user.” In this manner, the city government promotes interaction in teaching and cultivates students’ abilities in using technology to solve problems, thereby enhancing their information literacy and autonomous learning skills.
- In consideration of long-term development, the implementation of BYOD programs is inevitable. Accordingly, the next stage of Taipei City’s smart campus development is to start trials of BYOD programs.



The next step of Taipei City’s smart campus: Develop smart campus 4.0 and cultivate smart talents

- Taipei City has constantly led Taiwan in smart campus development. In 2016, Taipei City Government employed the CooC-Cloud platform and the school administrative systems as the foundation for providing teachers and students a platform for remote learning, academic performance inquiry, and academic portfolio functions. In 2018, city government implemented additional functions to allow the use of Student ID EasyCards to make on-campus micropayments.
- Taipei City has completed the development of smart education hardware infrastructure. In the next stage, the city government will focus on developing smart education software and materials. Smart Campus 4.0 envisions the development of cashless, autonomous, simplified, and efficient services on campus. Through smart education, Smart Campus 4.0 prompts students to imagine future lifestyles and grasp opportunities in technological trends, thus enhancing the capabilities of Taiwan’s next-generation workforce.



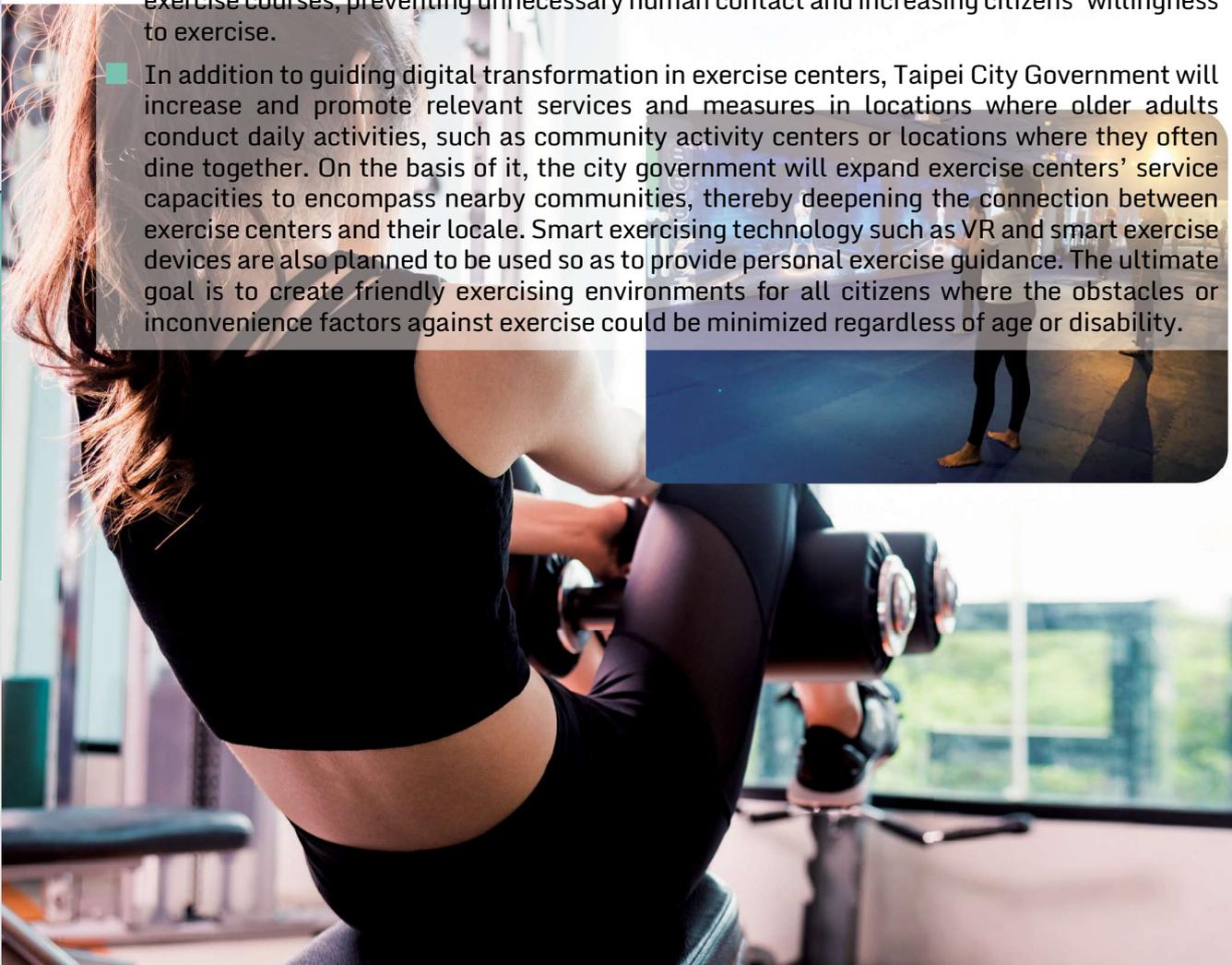
Stay-at-home economy development: Health industry

With the advent of an aging society and the trend of applying smart medical treatment, the era of integrated exercise, health care, and medical treatment is upon us. In this era, exercise prescriptions are part of health care. Monitoring data recorded by exercise sensing devices are synchronized and directly transmitted to hospitals. This timeliness characteristic is instrumental in preventative medicine.

To support development in the exercise and health industry, which is an irreplaceable part of national health care, Taipei City Government established the “community-based sports centers” and “virtual gym” initiatives to satisfy citizens’ exercise needs during the pandemic. Moreover, the city government employed public exercise centers to demonstrate the innovative transformation of the industry, developed customizable exercise guides for older adults, and provided information services on the sports industry, thereby creating new business opportunities.

Promoting digital technology exercise courses and transforming sports gyms into virtual gyms

- In consideration of crowd control during the pandemic, in 2020, Taipei City Government required exercise centers in Wanhua, Beitou, and Nangang district to offer digital technology exercise courses, preventing unnecessary human contact and increasing citizens’ willingness to exercise.
- In addition to guiding digital transformation in exercise centers, Taipei City Government will increase and promote relevant services and measures in locations where older adults conduct daily activities, such as community activity centers or locations where they often dine together. On the basis of it, the city government will expand exercise centers’ service capacities to encompass nearby communities, thereby deepening the connection between exercise centers and their locale. Smart exercising technology such as VR and smart exercise devices are also planned to be used so as to provide personal exercise guidance. The ultimate goal is to create friendly exercising environments for all citizens where the obstacles or inconvenience factors against exercise could be minimized regardless of age or disability.



Integrate exercise centers into the community: Promoting exercising as the new community socializing activity

- Exercise centers organize exercise guidance teams to encourage and guide community members to engage in physical activities to stimulate the popularity of exercise in the community and help develop exercising habits among the people.
- Develop digitalized exercise courses and physical fitness projects by utilizing simple exercise equipment (e.g., set up INBODY or digital exercising equipment at exercise centers for fitness examination purposes and allow citizens to use these devices by deducting points from Senior EasyCards).

Establish a LOHAS (i.e., lifestyle of health and sustainability) community particularly for older adults

- Active aging exercise centers can divide exercising services according to the level of exercise, course content, required exercising space, and services provided. Additionally, these exercise centers can create customized exercise services and equipment for older adults in accordance with the users' exercise characteristics and frequency.
- Taipei City Government will locate a suitable place for establishing Taiwan's first active aging exercise center specialized for older adults, which will serve as a one-stop service center and provide exercise guidance, health counseling, and tips to avoid exercise injuries.

Different levels of exercise locations and active aging fitness centers

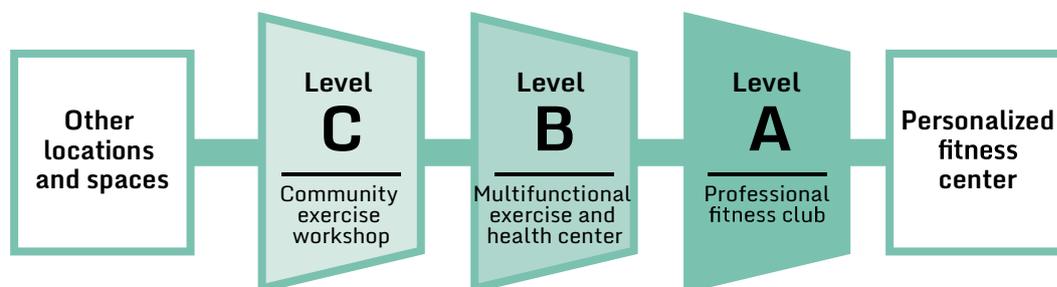
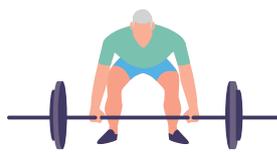


Figure translation (Text block on the left): Other exercising locations and idle space



Complex functional training



Free-weight resistance training



Machine-based resistance training

5_

Zero-contact services

In human history, substantial changes to human lifestyles are rare. Because humans are habitual creatures, we often experience discomfort when forced to change our lifestyle. Experts predicted that 2025 would be the year by which considerable development would become apparent in computer-based ICT technology (which occurs every 15 years) and communication-based mobile communication technology (which occurs every 10 years). However, the impact of the COVID-19 pandemic has resulted in an earlier turning point in our behavior models.

Leading change so as not to be changed by the world

Given the pandemic situation and rapid emergence of future trends, change is inevitable. Therefore, we must make those changes worthwhile; we must change to guide ourselves to a better future and develop more convenient lifestyles.

Some changes require the assistance of the government, including the implementation of zero-touch services and cashless payment methods. By establishing a well-developed system interface and providing incentives, the government can guide citizens in adapting to change and integrating zero-touch habits into their lifestyles. Through this approach, the government can fortify the pandemic prevention safety net, guide citizens in adopting zero-touch habits to coexist with the disease, and establish an invisible digital infrastructure upon which industries can develop innovative services. These changes in citizens' lifestyle habits will increase their acceptance of innovative digital technology services. From a long-term perspective, this transformation is meaningful to both pandemic prevention and economic development.

Maintaining close relationships through zero-contact services

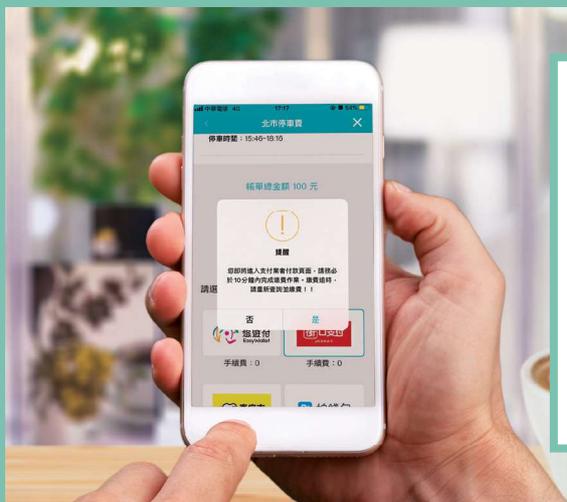
While guiding changes to the urban lifestyle, Taipei City Government also underwent large-scale internal changes. Each sector of the city government transformed from providing product-centric services to providing comprehensive citizen-centric services. By using the citizen service platform website as an example, Taipei City Government integrated more than 1,400 cross-agency services and established a one-stop citizen service platform. Throughout this process, the city government integrated and connected the cross-agency service procedures and completed cultural transformation. Similar to how design and user experience are considered core skills in developing commercial applications, the key to Taipei City Government's transformation is the decision-makers' ability empathize with Taipei citizens.

Zero-contact is not meant to extend the distance between people but to protect our daily lifestyles. Under the premise of protecting each other's health and safety, zero-contact services enable us to accompany each other in VR spaces and maintain close connections as part of our pandemic prevention lifestyle.

Zero-contact services: Smart payment

The reduced use of physical currency can mitigate the risks of physical contact. Taipei City Government strongly has promoted cashless payment behaviors in schools and to older adults, guiding all Taipei citizens in embracing digital transformation; thus, cashless payment services have been integrated into Taipei City’s digital infrastructure.

Using public resources to establish pay.Taipei smart payment, simultaneously achieving convenience, pandemic prevention, and economic benefits



- ☑ Can be used to pay over 40 types of regulatory fees and 200 types of fines
- ☑ Involves collaboration with 15 payment operators
- ☑ Has been used to pay over 7.79 million payment slips (bills)
- ☑ Transaction amount exceeds NT\$1 billion
- ☑ Saved the government NT\$35.59 million in processing fees

Convenience

- The pay.Taipei smart payment platform is Taiwan’s only payment system integrated with payment for city government regulatory fees; it enables citizens to inquire and pay regulatory fees in a timely manner without spatial limitations.
- Offer diverse payment choices: pay.Taipei is not positioned as a cash flow gateway but instead an information gateway. The system can be accessed using private payment applications. Currently, pay.Taipei has alliances with 15 other payment operators. Users may use TPQR (a shared QR code) to connect with other payment operators. It enables citizens to use their preferred cashless payment method to pay public fees. The system integrates the concept of connecting bill payment data to people’s corresponding memberships and serves as a digital ledger recording Taipei City citizens’ public fee payment.

Pandemic prevention

- Once the pandemic hit, the number of transactions made using pay.Taipei increased by 65%, indicating increased public demand for zero-contact payment services.
- By implementing government policies to guide the market, Taipei City Government, through pay.Taipei, has increased citizen acceptance of cashless payments and expanded the application field of third-party payments to prevent direct-contact risks and transform Taipei City into a cashless city.

Economic

- Within 3 years of its launch, pay.Taipei has saved the city treasury NT\$35.59 million in processing fees. Additionally, the number of payments on the platform increased by 82.4% in 2020.

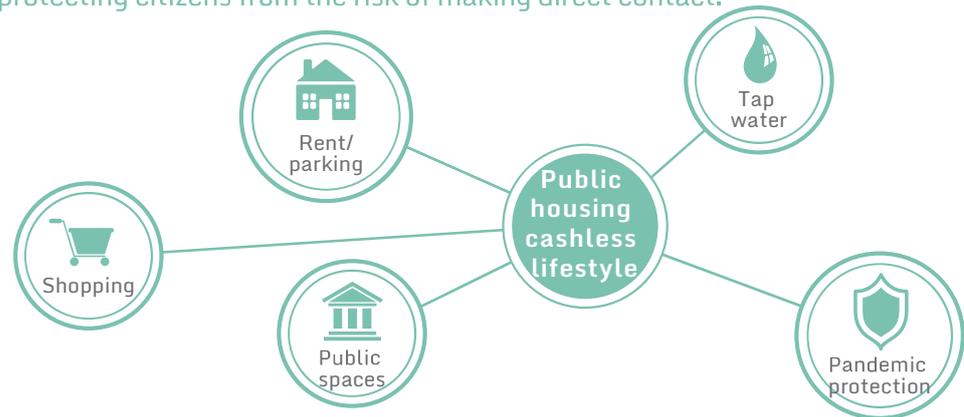
Revitalizing and increasing the value of Senior EasyCards—Providing Older adults with first access to cashless payment

- In 2020, Taipei City issued triple stimulus vouchers (a pandemic relief subsidy) and completed the digital transformation of Senior EasyCards, Charity EasyCards, and digital student IDs. Through this initiative, Taipei City Government encourages older adults and high school students to avoid contact with banknotes and cash, which may carry germs, and become used to using cashless payment.
- The promotion results revealed that among 550,000 issued Senior EasyCards, 40% were bound to Easy Wallets, successfully transforming 204,000 older adults into digital citizens. These older adults can access all forms of transportation by using their EasyCards, which is not only convenient and protects their personal data, but also has pandemic prevention effects.



Zero-contact services: Cashless payment services in public spaces

Taipei City Government has accelerated the development of management policies for the use of cashless payment services in public spaces and high-traffic areas. In this manner, the city government helps citizens avoid touching physical currency and making a trip to manned checkouts, thus protecting citizens from the risk of making direct contact.



Strategic digital transformation of public housing

- Taipei City public housing projects are designed on the basis of four strategies, namely housing justice, urban aesthetics, smart construction industry, and social patterns. Taipei City Government established the Minglun public housing community as Taiwan’s first cashless community demonstration project. Accordingly, the city government established comprehensive EasyCard, Easy Wallet, and Taipei Pass payment systems within the community. Citizens living in the Minglun public housing community can complete all forms of consumption and payments using one card.
- Taipei City Government used the Public Housing Cloud application to connect the resident services, logistics maintenance, and housing maintenance services to improve public housing management efficiency and quality. Residents may use the application to report repairs, deliver feedback, and receive timely alerts of major events, such as alerts sent by the smart community fire alarm system.



Campus

- Use of cashless payment to make on-campus payments, including miscellaneous fees, class fees, and lunch fees.
- In September 2020, Taipei City Government launched the online payment system for making school fee payments. This allowed parents to easily pay student's miscellaneous fees and use various digital services. Data has indicated that the percentage of student parents who have bind their online accounts to parent-child accounts is higher among elementary student parents than the parent of middle school or high school students, with those of middle school students being higher than those of high school students, suggesting higher acceptance among younger parents.

Parking lots

- To provide citizens with a convenient parking fee payment system, Taipei City has installed parking payment machines with diverse payment options, including cash, EasyCard, and mobile payment. those of middle school students being higher than those of high school students, suggesting higher acceptance among younger parents.
- By combining license plate recognition technology and smart payment, Taipei City parking lots provide drivers with a 3A smart entry and exit service, namely automatic recognition, automatic access control, and automatic payment. Vehicles are able enter and exit the parking lot within 3 seconds.

Underground shopping malls, public markets, and vendors

- The city government expects to complete installation of digital payment services for all public market vendors and shops in underground shopping malls managed by the city government by 2021.
- Digital payment services are promoted at night markets through bazaar marketing events. Market operators are encouraged to provide education training for market vendors. Following the successful example of digital payment service promotion in Dalong Market and Nanmen Zhongji Market the city government has requested that operators provide digital payment equipment for the vendors to increase their acceptance of digital payments.



Zero-contact services: Online city government and borough office digital services

The transformation from a digitized government to an online government involves not only the digitization of paperwork but also the reconstruction of the city government to provide citizen-centric procedures and instill a citizen-centric culture in governance.

Citizen service platform website

The digital transformation of the Taipei City Government enables citizens to complete over-the-counter errands at home through the Internet, replacing physical traveling with Internet navigation and providing one-stop city government services.



- ✔ Integrates 145 Taipei city government agencies
- ✔ Compiles over 1,400 legal requests
- ✔ Provides over 20,000 online forms
- ✔ Has received over 610,000 applications

In May 2020, the citizen service platform website launched an over-the-counter service reservation function, which operates similarly to medical service reservations. This function enables citizens to make online service reservations prior to arriving at the city government office, saving waiting time and avoiding crowds.



Increasing digital lot-drawing process transparency

To achieve transparency in the allocation of public resources and prevent crowds, Taipei City Government established an i-Drawing platform on which lot-drawing is performed select candidates for limited public services, including public kindergartens, public housing, public parking spots, and lottery events. This digital lot-drawing process saves citizens the inconvenience of spending nights waiting in line to register for lot-drawing.

- Reduce human errors and administrative costs in the lot-drawing process and achieve the zero-contact service policy goal.
- Employ the public ledger function of blockchain technology to announce the lot-drawing results and allow for public validation to guarantee citizens fair access to public resources.



Borough office digital infrastructure

Borough offices are the frontline of citizen services. The establishment of digital systems may alleviate the work burden of these offices and facilitate the delivery of city government services to citizens, seamlessly connect city government services and borough office services, and provide citizens services at the touch of a button.

Certain pandemic prevention measures have fast execution but require a tedious bureaucratic process. For example, the process of delivering vaccination shots is quick, but it requires a long data searching and file creation process. Similarly, allocating resources and holding events require the process of filing through paper documents to make registration records, which is both time-consuming and not environmentally friendly.

To reduce the burden of borough offices, Taipei City Government launched the Borough Office Digital Infrastructure Program and invited the participation of 19 borough chiefs to initiate the digital transformation of borough offices. During the trial phase, 88% of the borough chiefs expressed satisfaction with the results. By using feedback received from the borough chiefs, Taipei City Government continues to improve the functions and convenience of the digital system. The objective of the digital transformation is to equip borough offices with various services, including vaccination delivery, provide pensions for older adults, and deliver subsidies.

The program is expected to transform the services provided at 456 borough offices by 2021. In the future, borough offices will serve as grassroots institutions for citizens to connect with government agencies and make use of city government services, thus contributing to the overall government service network.

Zero-contact services : Telemedicine

Taiwan's aging population structure has resulted in problems in terms of long-term geriatric care, older adults' need to seek medical attention and make regular revisits, and workforce shortages in health care institutions. The pandemic has catalyzed demand for zero-contact medical services. Through telemedicine, health care institutions can extend their care services through cloud platforms to communities and citizen homes and consequently realize the hierarchy of medical care, improve workforce distribution of health care centers, and complement home-based long-term care services.

Taipei City Government has established a 5G medical private network and employed institutions under the city-governed medical system as examples to provide consulting to health care institutions in Taipei City in implementing telemedicine services and rapidly developing relevant applications. Subsequently, the city government can use its abundant medical care capacity to support other counties and cities and adopt telemedicine practices to satisfy the health care demands of citizens in outlying islands.

During the pandemic, Taipei City Government assigned 18 hospitals, 52 Western medicine clinics, 35 Chinese medicine clinics, and 5 dental clinics as designated telemedicine health care institutions in Taipei City (as of November 11, 2020).

Promote telemedicine to specialist clinics, including otorhinolaryngology clinics, ophthalmology clinics, pediatric clinics, and psychiatric clinics.

Telemedicine protects citizens' health and achieves the goal of social distancing.

Pandemic-driven changes in health care habits have increased the demand for telemedicine

Digital transformation progress in the health care field tends to be slower than in other fields. This is because both care providers and receivers have low confidence in telemedicine effectiveness and quality, lack telemedicine experience, and are not presented with sufficient examples of the telemedicine process; the lack of complementary measures is also a concern.

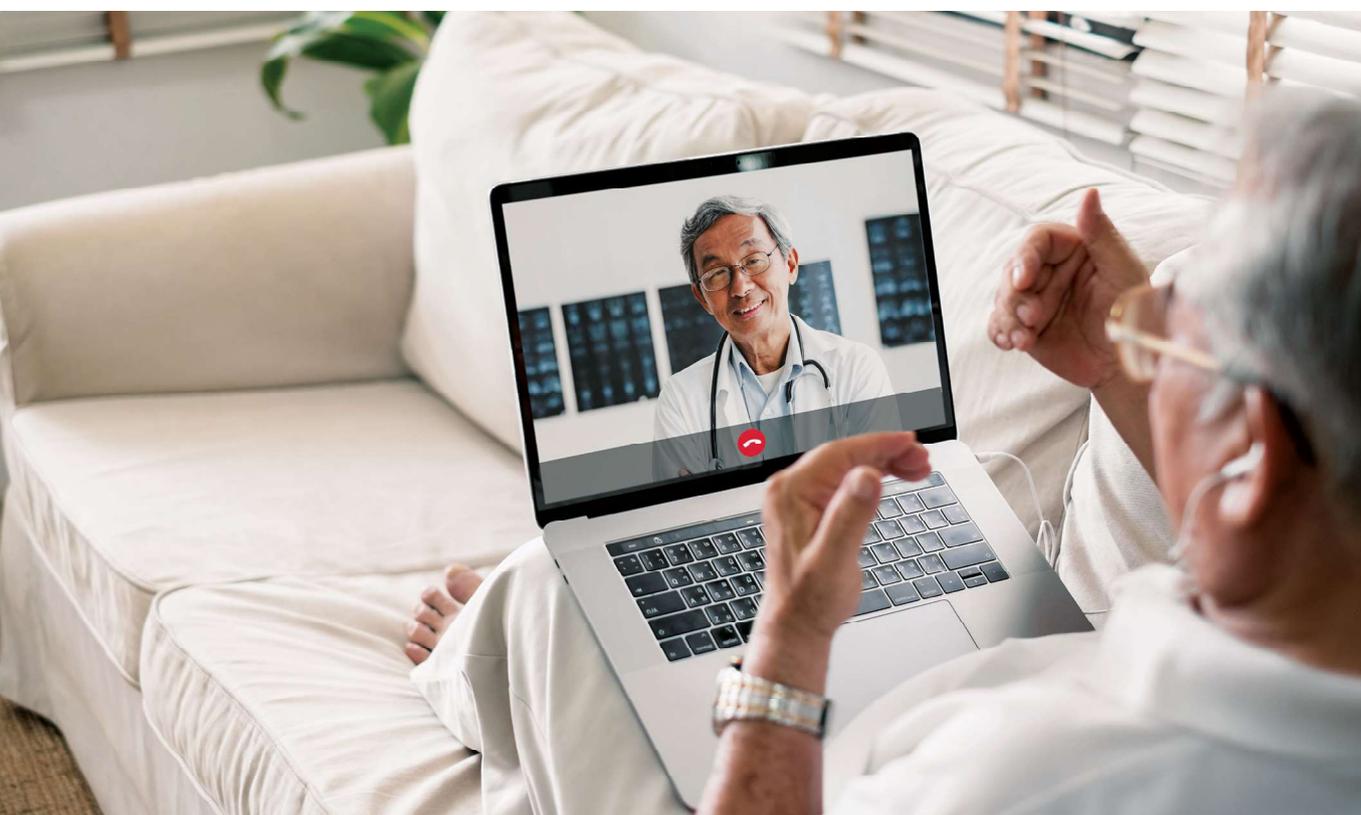
Given Taiwan's already-available universal health care resources and health care convenience, promoting remote health care services in urban areas was not an urgent task before the pandemic. However, changes to citizens' health care habits during the pandemic have resulted in fewer people seeking medical care, thus influencing hospital income. In the third quarter of 2020, the baseline reimbursement points reported by Western medical clinics dropped by 3.22 billion points from the previous year, indicating that most hospitals needed government bailouts. Moreover, for patients, delaying treatment to avoid infection risks may result in greater health concerns in the long term.

Telemedicine Treatment And Home Therapy

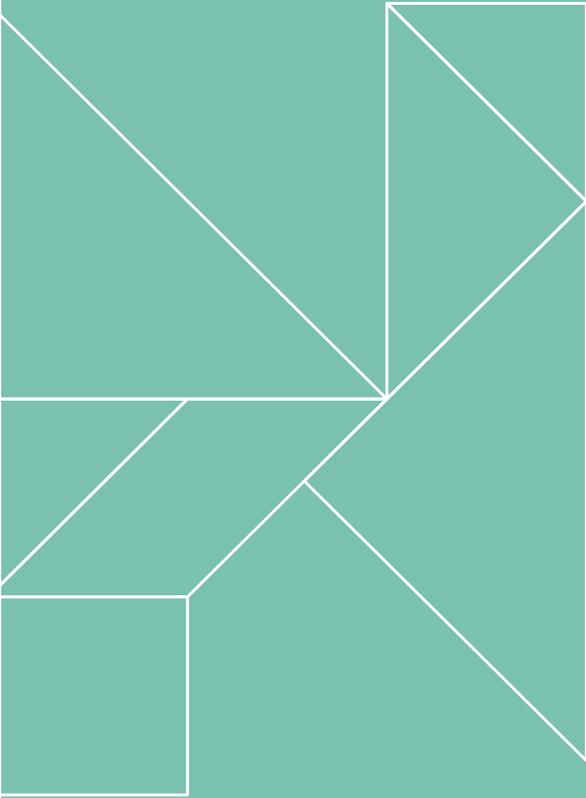
Taipei City's aging population is accompanied by other problems such as high chronic disease prevalence rate, demand for complicated care services, and necessity for extended care periods. Moreover, changes in family structures and health care workforce shortages have resulted in health care problems turning into social problems.

Accordingly, Taipei City has endeavored to strengthen health care coordination services in hospitals and clinics, increase service efficiency in the health care system, and revitalize community health care services. In addition, the city government has strived to remove transport-related obstacles for patients with chronic diseases whose conditions are stable, those who are required to make frequent hospital visits for follow-up, and those who have mobility difficulties.

- Establish a telemedicine demonstration site using 3,500 beds in the Taipei City Hospital. Establish personal health care networks by connecting health service centers, community clinics, pharmaceutical resources, and large-scale regional hospitals to provide citizens with preliminary telemedicine services in their communities and provide referrals if necessary.
- Establish 5G medical networks to provide a communication channel between health care providers and receivers, enable the high-speed low-latency transmission of preventative diagnostic imaging, and ensure the security of personal medical data.
- Promote the application of portable digital medical testing devices and home digital medical testing devices.
- Contributing to the Cross-domain and Cross-hospital Telemedicine Project launched by the Ministry of Economic Affairs, Taipei City Hospital provides remote clinic services to the four towns and five islands of Lianjiang County, allowing citizens to receive telemedicine diagnosis through the Internet.



Based in Taipei,
Surpassing
the World



03





Based in Taipei, surpassing the world

I have consistently pondered how the pandemic would influence Taiwan's industries. My conclusion is that Taiwan industries must undergo digital transformation. Taiwan's economic development must maintain a balance between practicality, traditional values, and modern practices.

Digital transformation is not only a solution to the current pandemic situation but also Taiwan's path to a reasonable, practical, and science-driven society. In addition, digital transformation drives the development of a trustworthy government and a regular-operating society. When faced with obstacles, the government should adopt a scientific and practical attitude and respect the advice of professionals to develop solutions. Throughout this process, providing citizens with freedom of choice and the right to participate is imperative to the establishment of an inclusive society.

Taiwan must step onto the world stage, embrace the world, and showcase Taiwan for a global audience.

As Taiwan's leading smart city, Taipei City is constantly experimenting with new methods and innovative ideas to solve problems. To this end, Taipei City Government encourages citizen participation, promotes public and private sector collaboration, and invites government-industry cooperation. My aim is to establish a citizen-government-industry platform to drive the globalization of Taiwan industries and obtain inspiration from other global cities to enhance Taipei's transformation.

Placing digital transformation as its top priority, Taipei City Government has implemented top-down digital transformation measures from the public sector to private sectors. In the future, the city government may issue digital infrastructure government bonds to invite citizen investors to contribute to Taipei City's digital infrastructure and the creation of a new innovative industry environment. Under the new normal, Taipei City will successfully maintain its strengths in pandemic prevention and continue development as an advanced city.

What should we leave for future generations? I wish to lead Taipei City Government in creating an equal society where people are not discriminated against because of their identity, gender, or occupation. Similarly, my standpoint toward digital equality is to bridge the educational and health care divides through digital transformation, reduce the poverty gap in Taiwan, and achieve my vision of digital culture.

Let us bid farewell to the past and embrace the future together.



New Normal New Taipei

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