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面對疫後新常態 適者為王

The New Normal After COVID-19: The Success of the Fittest

資策會善用防疫IT工具
遠距工作維持90%組織運作
The III Utilizes IT Tools to Combat COVID-19
Work-From-Home Plans Keep 90 Percent of Operations BAU

政策、醫療、產業攜手合作
智慧、遠距醫療「疫」展長才
A Collaboration Between Policies, Healthcare, and Industries
Smart Healthcare and Telemedicine Can Help

教育部數位基礎建設超前布署
科技防疫　遠距教學　停課不停學
The MOE Takes Preemptive Measures to Build Digital Infrastructure
Digital Technology in Distance Education

睿智通用醫護機器人為產業升級
科技防疫讓世界看見台灣
Aeolus Robotics Drives Industry Upgrade with Medical Robots
Taiwan's Epidemic Prevention Technology

目錄
Contents

科技會報辦公室執行秘書 蔡志宏

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因應影響全球的嚴重特殊傳染性肺炎（COVID-19，以下簡稱新冠肺炎）疫情風暴，由行政院與美國在台協會主辦，行政院科技會報辦公室承辦，外交部、衛生福利部、國家發展委員會、國研院國網中心協辦，資策會執行的「台

In light of the recent global outbreak of severe pneumonia with novel pathogens (COVID-19), the Executive Yuan and the American Institute in Taiwan (AIT) organized "The Taiwan-U.S. Epidemic Response Hackathon" and entrusted The Board of Science and Technology to host the event, with the Ministry of Foreign Affairs, Ministry of Health and Welfare, National Development Council, and National Center for High-performance Computing as co-organizers. In just eight days, 53 groups from seven countries signed up with proposals of innovative digital solutions, demonstrating the creativity of teams both at home and abroad.

After deliberation, five innovative epidemic response solutions were finally selected for their feasibility, innovativeness, and social impact. Four teams hail from Taiwan; Autonomy, LogBoard Front-line Support, Interdisciplinary Laboratory, and Digital Epidemic Prevention System (TeamsEP), WiAdvance, and one team from California, USA, Gemini Data. These five solution proposals not only cover pre-pandemic information accuracy, the perfection of joint efforts between public and private sectors to conduct TOCC surveys amid the pandemic, and the establishment of post-pandemic platforms to assist the public in returning to their normal lives, but also prove a solid demonstration of the implementation of information technology and data. These proposals can not only dampen the impact COVID-19 has on the world, but can also aid in developing a more mature public health system and further improve medical technology and related solutions.

As Taiwan gradually recovers from the effects of COVID-19, life slowly returned to normal little by little. First, pandemic-related restrictions were lifted on June 7, and limited

美防疫松 cohack」，短短 8 天報名期間，即吸引來自 7 國共 53 組提案參與，紛紛提出創新的數位抗疫解方，展現國內外團隊跨界集思的創意。

經過評選，最後決選出 5 組具可行性、創新性及社會影響力的抗疫創新應用方案，包括來自台灣的「Autonomy」、「LogBoard 前線支援」、「跨領域研究室」、「緯謙科技 TeamsEP 科技防疫管理系統」，以及來自美國加州的「Gemini Data」。這 5 項解決方案，不僅涵蓋疫前資訊精準掌握、疫中公私協力完善疫調管理，及疫後成立友善平台幫助民眾展開新生活，充分運用資通訊科技與數據的力量，藉以降低新冠肺炎疫情對全球所造成的影響，同時也發展出更成熟的公衛系統及科技醫療等相關解決方案。

台灣疫情趨緩，自 6 月 7 日起防疫解封，同時開始有限度地開放禁令，漸漸恢復過往的生活模式。回顧疫情爆發至今，台灣各行各業在政府超前佈署的情況下，安穩的渡過「期中考」，本期刊物特別針對遠距教學、遠距辦公、遠距醫療及智慧醫療，以及民間運用照護機器人提供科技防疫能量。透過精闢的分析，讓我們了解到疫情之下，台灣如何透過 AI、IoT 等科技，快速且無縫接軌，讓疫情的影響下，不論工作還是教育學習等，都能維持正常運作，讓民眾得以安心工作、學生安心學習。

雖然疫情發展趨緩，但其所帶來的經濟衝擊甚鉅，許多專家學者均認為，2020 下半年度將進入「後疫情時代」，而疫情過後的「新常態（The New Normal）」已經是不得不面對的新議題。而本期的封面故事也將介紹疫情過後的「新常態（The New Normal）」將有哪些，數位又將扮演何等重要角色，配合「台美防疫松 cohack」5 項解決方案，讓業者搶先適應新常態，在未來的市場浪頭中站穩腳步！

新冠肺炎疫情的發生，已經是不可逆的現象，面對即將席捲全球的悲觀經濟數據，我們唯有一步一腳印的穩扎穩打，帶著敏銳的產業嗅覺、加速進入數位化和自動化，不斷提升自己實力，打一場不會輸的經濟硬仗。

relaxation of public gathering restrictions followed soon after. In retrospect, ever since the beginning of the pandemic, all sectors of Taiwan have passed the test of the virus thanks to preemptive planning from the Taiwanese government. This issue will focus on distance education, work from home, telemedicine and smart healthcare, and the usage of care robots by the private sector among other technological pandemic prevention measures. Through insightful analyses, we can better understand how Taiwan utilizes AI, IoT, and other technologies to swiftly and seamlessly maintain the normality of work and learning while still under the influence of the pandemic. Not only can people feel safe at work, but students can also focus solely on learning while at school.

The spread of the virus has slowed down, but the economic ramifications have just begun to rear their ugly heads. Many experts believe that the second half of 2020 will usher in the beginning of the "post-pandemic era" and that "The New Normal" after COVID-19 is a novel issue that can't be ignored. The cover story will also introduce what constitutes The New Normal and how digital technology will be a key player. By acting in concert with the five solutions from the Taiwan-U.S. Epidemic Prevention Hackathon, businesses can get a head start in adjusting to the new norms and to stand their ground in the face of future shifting markets.

The advent of COVID-19 is irreversible, and when facing the economic downturn that will soon sweep the world, we can build solid foundations and use acute business acumen to speed up the process of digital transformation and automation. By making proper preparations, we will be able to fight an economic battle that we just cannot lose.

面對疫後新常態 適者為王

The New Normal After COVID-19: The Success of the Fittest

因為嚴重特殊傳染性肺炎（COVID-19，以下簡稱新冠肺炎）肆虐，2020 年成為巨變的一年！隨著疫情發展趨緩，下半年度進入後疫情時代，「新常態（The New Normal）」已經成為熱門討論主題，牽動著企業發展、產業消長、每一個人的工作與生活，唯有最快調整步伐、緊扣最新趨勢，才能在後疫情時代生存、勝出！

2020 has been a year of great change, with the world affected by the severe pneumonia with novel pathogens (COVID-19). As the outbreak starts to slow down, the post-COVID-19 world will be focusing on the new normal in the second half of the year. This much-discussed topic will become the key determinant of business development, industry growth, as well as the pursuit of personal career and life. Within this context, change of mindset and operation strategies and adaptation to the latest trends are the only ways of survival and success in the post-pandemic world.

COVID-19 raged around the world during the first half of 2020, and global central banks placed downward pressure on interest rates in response. The pandemic turmoil, coupled with lockdowns, business shutdowns, oil price plunge, postponement of Tokyo 2020 Olympic Games, and supply chain disruptions, have brought about great change to global economy and many industries. As the outbreak starts to slow down in the second half of 2020, lockdowns are expected to be lifted in many countries, and business and society will get back to normal. However, in the post-pandemic era, the landscape and nature of everything has changed, and there is no returning to the pre-COVID-19 world.

New Economic Activity, Work, and Life Patterns

The outbreak of COVID-19 has severely affected global economic activities. To prevent cluster infection, people avoid going out for shopping or dining. The shrinking market demand has led to a sudden drop in orders and factory shutdowns, which in turn influence the number of customer orders for businesses in the second half of the year. Meanwhile, the new normal is starting to take shape in many industries. Take the manufacturing industry as an example. The pandemic has led to supply chain breakdown, drops in orders, and consequent business shutdowns, further causing challenges such as productivity crisis and widened gap between the rich and the poor.

2020 年上半年，因為新冠肺炎肆虐，世界各國央行競相降息，加上鎖國、停工、油價暴跌、東京奧運延期舉辦、供應鏈斷鏈危機等變數，全球經濟巨幅震盪，產業遭逢巨變；2020 年下半年，隨著疫情發展趨緩，各國陸續解封，產業及生活逐漸回歸「正常」狀態，但是在後疫情時代，一切的樣貌與本質已然發生變化，再也回不去疫情前的景況。

經濟工作生活 全然翻轉改變

新冠肺炎的發生，對全球的經濟活動產生重大衝擊，為了避免群聚，人們儘量不出門購物、聚餐，市場需求萎縮牽動了訂單驟減、工廠停工，直接衝繫各產業下半年的訂單；在這一連串的變化下，產業已經展現新常態樣貌。以製造業為例，供應鏈斷鏈危機浮現，訂單需求明顯下滑，停工更引發生產力危機、貧富懸殊問題惡化等問題。

▲ 2020 年上半年因新冠肺炎肆虐，全球經濟巨幅震盪，產業遭逢巨變；隨著疫情發展趨緩，下半年度進入後疫情時代的「新常態（The New Normal）」模式。COVID-19 raged around the world during the first half of 2020, and global economy and industries were severely impacted. As the outbreak starts to slow down, "The New Normal" is expected to represent the post-pandemic world in the second half of the year.

「新常態」牽動著新的消費習慣與工作型態，以工作型態為例，傳統在辦公室超時加班的狀況，轉變為遠距工作（Remote Working）或在家上班（Work From Home）；為了避免人際接觸，許多醫院開始以機器人或人工智慧（AI）分擔醫護工作；大型零售業者紛紛走向「亞馬遜化」，引進大量自動化機器，應付實體店面日常運作與巨量的網購訂單；隨著社群媒體內容篩選的工程量越來越大，社群媒體管理層也引進 AI，成為審批平台內容的主角。

▲ 遠距工作或在家上班已經是未來的工作型態。Remote working and working from home have become the work patterns of the future.

The new normal has brought about new consumption habits and work patterns. For example, the convention of working overtime in the office has been transformed to remote working and working from home. To avoid direct contact between healthcare workers and patients, hospitals have relied on robots and artificial intelligence (AI) systems to provide some healthcare services. Many major retailers have learned from Amazon and introduced automatic machinery to support the operation of brick-and-mortar stores and handle the huge amount of online shopping orders. In addition, as the demand for content screening on social media platforms increases, management teams of these platforms have introduced AI to take over the task.

In the post-pandemic world, adaptation to the new normal is a key to survival. Companies aspiring to succeed in this new era must first recognize that the new normal is synonymous with new business as usual and new business opportunities. It is necessary to conduct in-depth analysis on potential impacts the new normal can bring to businesses and industries and take preemptive actions.

New Strategies for the New Normal

In the second half of 2020, the world is desperate to know details of the new normal in the post-pandemic world. Leading companies, such as McKinsey, Dun & Bradstreet, and IBM, have published research reports one after another. Meanwhile, the National Development Council of Taiwan (NDC) has consulted the industry, the academia, and think tanks since March to put forward opinions on industrial and economic development in the post-pandemic era. The report is published with the title of *Taiwan's Economic Development Strategies in the Post-COVID-19 Era.*

The report compiles views and predictions from various institutions with the following

在後疫情時代，掌握「新常態」是一大關鍵，企業未來若要成功，首先必須認知新常態即是新日常、新商機，及早進行深度的分析了解的細節，掌握新常態對於企業自身與所處產業造成的影響，進一步把握機會超前部署。

解讀後疫情新常態對策出爐

進入 2020 年下半年度，全球都想提前了解後疫情時代的新常態細節，麥肯錫（McKinsey）、美商鄧白氏、IBM 等領航企業紛紛發出研究報告，我國國發會也從 3 月起請益產業界、學界、智庫，針對後疫情時代的產業機會及經濟發展方向提出看法，研提「後 COVID-19 台灣經濟發展對策」報告。

統整各方觀點與預測，有以下幾項重點，包括 (1) 透過數位做法重新聚焦在滿足客戶期望、(2) 使用全新數據與人工智慧改善業務運作、(3) 強化彈性和效率、(4) 從電子商務到非接觸式經濟，加速進入數位化和自動化；(5) 從線性、封閉式的工作型態，轉變為網絡化、團隊作戰；(6) 加速組織的敏捷應變能力……等，將成為未來企業決戰商場的王道。茲將上述重點詳述如下：

(1) 透過數位做法重新聚焦在對應客戶期望

許多公司正加速數位化，例如建構電子商務系統，串聯倉儲、銷售、行銷、客服等功能。然而，在數位化的進程中，顧客滿意度更是重點，企業必須從客戶的角度出發，思考整個消費體驗旅程，方能對應客戶期望。透過這樣的方式，汽車製造商可以自行提供過往委託經銷商的服務，例如舊換新折價、車貸、維修、送貨到府等。而受疫情重創的航空公司，也正全力研發非接觸式旅程，透過重塑顧客體驗、

▲ 透過 AI 及數位化科技，將大規模改變全球的經濟發展方向。Artificial intelligence and digital technology will change the pattern of global economic development.

守護旅客健康安全，擁抱新常態商機。

(2) 使用全新數據與人工智慧改善業務運作

對於每間企業來說，針對日、周、月、季、年度等時間點，應對人力調配、鎖定市場、後勤支援……等面向，都必須做出眾多營運決策。全新數據與人工智慧能夠優化決策與業務運作，以生醫產業為例，透過 AI 精準高效分析患者病理與醫學影像資訊，改變傳統醫療模式與醫病互動關係，實踐個人化的精準醫療；藥廠透過 AI 分析早期臨床試驗資料，早一步預測藥物分子通過臨床試驗的成功率，顛覆傳統新藥開發流程。[1]

(3) 強化彈性和效率

隨著疫情趨緩，各國開始逐步解封，企業必須提早研擬全新運作策略。如果相對於競爭對手，企業展現出更佳的彈性與效率優勢，在遭受疫情衝擊時可以有如變形蟲般快速應對、重整旗鼓，更能在後疫情時代確保生存、持續領先。以 2008 年金融危機為例，麥肯錫研究發現，到了 2009 年，具有彈性優勢的公司收益增長達 10%，非彈性公司則衰退近 15%！

具備彈性代表著提早在危機前做好準備，企業必須擁有更強大的資產負債表，並在疫情期間採取降低運營成本等有效行動。供應鏈的運作也至關重大，在疫情衝擊中面臨斷鏈危機的企業產生強大危機感，重新思考及時庫存與零件採購的供應鏈策略，開始建立備源等安全部屬。美商鄧白氏就特別提醒，針對供應鏈中的關鍵零組件，必須進行雙源採購（dual-sourcing）作法，在最短時間修復斷鏈的危機，例如蘋果公司已採取行動，未來將要求

[1] 資料來源 Source：https://reurl.cc/KkR39e

highlights: (1) Refocusing on customer expectations through digital practice, (2) applying new data and artificial intelligence to improve business operation, (3) increasing resilience and efficiency, (4) fostering digital transformation and automation, developing e-commerce and the Contact-Free Economy , (5) transforming from linear, closed work patterns to online teamwork, (6) enhancing corporate agility. These highlights will become the future determining factors for business success and are detailed below:

(1) Refocusing on customer expectations through digital practice

Many companies are accelerating digital transformation through measures, such as the construction of an e-commerce system integrating warehousing, logistics, sales, marketing, and customer service. Nevertheless, it should be noted that customer satisfaction is the most important factor in the transformation. Companies must consider the entire shopping experience from the perspective of customers in order to meet their expectations. Through such practice, automobile manufacturers, for instance, can provide services previously entrusted to dealers, including trade-in discounts, car loans, repair and maintenance, and in-home delivery. In addition, airlines that have been impacted by the outbreak are now focusing on the possibility of contactless journey, with the goal of embracing new business opportunities by reshaping customer experience and safeguarding passenger health.

(2) Applying new data and artificial intelligence to improve business operation

Businesses are constantly making operational decisions of

▲ 疫情衝擊全球經濟，非接觸商機成未來關鍵。As the outbreak impacted global economy, the contact-free economy will be the key to the future.

供應商必須具備兩個廠區、兩個國家的生產能力，降低斷鏈風險，為全球企業做了最佳的示範。[2]

(4) 從電子商務到非接觸式經濟

在國發會的「後 COVID-19 臺灣經濟發展對策」報告中，也特別提及「發展零接觸經濟」。在各國祭出隔離檢疫、封城鎖國等政策，前所未有的管制措施限制全球數十億人類的移動、徹底翻轉大眾的互動方式，也帶動零接觸式經濟的新商

[2] 資料來源 Source：https://reurl.cc/O1njm9

manpower deployment, market targeting, and logistics support on time scales ranging from day, week, month, quarter, to year. The convergence of new data and artificial intelligence facilitates decision-making and business operation. For example, in the biomedical industry, AI has made accurate, efficient pathological and medical image analyses possible, changing conventional medical care patterns and doctor-patient relationships and realizing personalized precision medicine. In addition, pharmaceutical companies are introducing AI to the analysis of early clinical trial data. The technology allows companies to predict the success rate of clinical trials as early as possible, subverting traditional drug development process.

(3) Increasing resilience and efficiency

As the outbreak starts to slow down, countries begin to lift lockdowns. Companies must develop new operational strategies in advance. If a company is able to outperform its competitors in terms of operational resilience and efficiency and respond to pandemic impacts quickly, it is more likely to survive and take lead in the post-COVID-19 world. For instance, research by Mckinsey found that after the 2008 financial crisis, the revenue of companies with better resilience increased by 10%, whereas that of companies in lack of resilience declined by nearly 15% in 2009.

Being resilient means preparing for crises ahead of time. It is necessary for companies to have stronger balance sheets and take effective measures to reduce operational costs during the outbreak. In addition, supply chain is also essential. Companies facing supply chain breakdowns due to the outbreak should be alert to the crisis and start to formulate new supply chain strategies regarding real-time inventory and parts procurement, through safe deployment practice such as

▲ 當疫情過後，工作、生活、消費、產業發展出後疫情時代的新常態，不論未來的經濟前景如何，提早準備、快速轉型的企業才能走更長遠的路。After the outbreak, work, life, consumption, and industries have all developed their new normals in the post-pandemic era. Whichever trajectory the global economy recovery may take, preparation beforehand and swift transformation are the keys to sustainable corporate development.

backup sources. Dun & Bradstreet recommended companies to adopt the dual-sourcing strategy for crucial parts to recover from supply chain breakdowns in the shortest period of time. For example, Apple has taken the said measure and required its suppliers to establish at least two factories in two countries to minimize the risk of supply chain breakdowns, a role model for global businesses indeed.

(4) E-commerce and the Contact-Free Economy

In Taiwan's Economic Development Strategies in the Post-COVID-19 Era by NDC, the contact-free economy is specifically mentioned. As countries conducted quarantine and lockdowns during the outbreak, the restriction of movement affecting billions of people has changed the way we interact forever, and business opportunities have emerged from the contactless economy. Prerequisites for embracing the contactless economy include better protection mechanism for personal information, user-friendly interface, and enhanced user experience. These improvements can be made through digital investments and O2O (online to offline) integration to further provide value-added services and create new industry values.

(5) From linear, closed work patterns to online teamwork

Corporate structures have changed in face of the COVID-19 outbreak. Traditional corporate structures will fade out; lengthy, inconclusive meetings will disappear; and members in the organization will no longer compete for power and profit. The convention of high-level executives as authorities will be eliminated, and the problem-solving process will be led by those with expertise in the corresponding areas. Furthermore, acceleration on decision-making and policy formulation, as well as taking decisive steps early, have become

機。擁抱零接觸式經濟有幾大前提，包括個資保護、友善的操作介面、提升用戶體驗等，都必須加碼數位投資、提升虛實整合能力，進一步提供加值服務，創造產業新價值。

(5) 從線性、封閉式的工作型態，轉變為網絡化、團隊作戰

因應新冠肺炎的衝擊，企業組織產生已經變化，傳統的組織結構將被打破，冗長而沒有結論的會議不再出現，組織中的成員不再爭權奪利，在解決問題時摒棄過往「非官大學問大」的思維，改採專業導向，而加快決策制定、強化執行速度、提早果斷行動等，更成為企業在後疫情時代的必備信仰！

(6) 加速組織的敏捷應變能力

「敏捷」代表著快速重新配置戰略、結構、流程、人力與技術，守護並創造企業價值。因為疫情的挑戰，趨動越來越多企業進行敏捷轉型，自上而下的命令與控制決策大幅降低，採用更扁平的決策結構，造就比傳統更快、更靈活的決策系統。

當全球都在期待新冠肺炎的特效藥與疫苗時，疫情期間按下 OFF 鍵的日常生活與經濟活動逐漸恢復。經濟學者展望世界經濟復甦的模式與進程，給出了 V、U、W、L 等 4 個英文字母，分別代表是觸底後迅速反彈、低谷持續時間延長、驟降驟升，或是最糟的蕭條狀態，長期陷入深度衰退。不論未來的經濟前景如何，提早準備、快速轉型的企業才能走更長遠的路。

當疫情過後，工作、生活、消費、產業發展出後疫情時代的新常態，一連串的挑戰牽動著轉型與龐大新商機，而數位扮演重要角色，唯有加速 IoT、AI 的運用，搶先適應新常態，就能在未來的市場浪頭中站穩腳步，為企業佔有一席之地，成為產業領頭羊！

the essential core values for companies in the post-pandemic era.

(6) Enhancing corporate agility

Agility stands for the ability to adjust corporate strategies, structures, processes, manpower, and techniques in time to safeguard and create new corporate values. Faced by challenges of the outbreak, more and more companies are seeking business agility transformation, where top down command-and-control decision-making is significantly reduced and flat management strategies are adopted, creating a more agile decision-making system.

While the world is still awaiting medications and vaccines to treat COVID-19, societies and economic activities are gradually recovering from the impact. Economists have put forward four English letters in forecasting the potential recovery trajectories and schedules of the world economy: V-shaped, U-shaped, W-shaped, and L-shaped. Each of the four letters represents a different trajectory: swift rebound from the bottom; a prolonged period of stagnation along the bottom; sharp declines and sharp rises one after another; and the worst scenario, a severe, prolonged stagnation. Whichever trajectory the global economy recovery may take, preparation beforehand and swift transformation are the keys to sustainable corporate development.

After the outbreak, work, life, consumption, and industries have all developed their new normals in the post-pandemic era. Following the consecutive challenges are the necessity of transformation and the emergence of business opportunities, and digital technology plays a crucial role within this context. In the future, only by accelerating the use of the IoT and AI technologies and adapting to the new normal can companies stand firm in the unstable market and take lead in the industry.

資策會善用防疫 IT 工具

遠距工作維持 90% 組織運作

The III Utilizes IT Tools to Combat COVID-19

Work-From-Home Plans Keep 90 Percent of Operations BAU

一場疫情打亂企業腳步，資策會因為嚴重特殊傳染性肺炎（COVID-19，以下簡稱新冠肺炎）疫情，決定讓員工在家上班，遠距上班期間如何兼顧資安、組織順暢運作與員工身心健康？

The COVID-19 pandemic has crippled businesses around the world. In response to the outbreak of COVID-19, the Institute for Information Industry(III) has allowed its employees to work from home. Under the circumstances, how does the organization ensure information security, business as usual (BAU), and the physical and mental health of employees?

資策會執行長
卓政宏
Dr. C.H. Cho,
the President of the Institute
for Information Industry (III).

中國去年底爆發嚴重的新冠肺炎疫情，與中國大陸距離僅180公里的台灣首當其衝，而這波疫情也讓不少企業被迫開始遠距或分流上班，財團法人資訊工業策進會（以下簡稱資策會）也是其中之一。「我們從過年期間就開始部署了，當時看到那個情況，你會變得很小心。」資策會執行長卓政宏回憶當時整個決策過程。

防堵疫情，快速採用遠距上班與分班分流

今年1月底，台灣出現了第一起新冠病毒確診病例，資策會為了保護員工不被感染，一方面避免疫情擴散，在過年期間幕僚就已線上密集討論，決定在年後上班時，凡是有感冒呼吸道症狀，或是在春節期間接觸到中、港、澳親友的員工，一律採取居家上班14天。

隨著確診病例逐漸增多，疫情升溫，資策會的遠距上班也依照疫情嚴峻程度滾動式修正，鼓勵員工遠距在家上班，或是分班分流。例如教育部延後開學，部分家長須在家中陪伴孩子，資策會立刻彈性讓員工改為家中遠距上班。4月5日的清明連假旅遊熱點事件，以及4月19日敦睦艦隊接觸史也為了避免疫情擴大，資策會都縮緊了到班人數，讓員工盡量居家工作，將所有可能的風險降到最低。在確診數最多的那一週，到資策會上班的人數史上最低，當時約有九成員工，將近1,550人的員工都在家上班，但是仍然維持著整體組織的運作。

「針對疫情，我們所思考的是，萬一必須封城（lockdown），如何維持組織至少80%到90%的運作？員工要知道，我不能來公司上班時，我要怎麼樣正常工作？」為了達到這個目標，資策會不得不修改了很多作業規定，例如原本還有一些實體簽核都改為線上作業，開會使用視訊會議等等。

The COVID-19 outbreak started in China at the end of last year. With only 180 kilometers separating the two, Taiwan was expected to bear the brunt of the outbreak due to its proximity to China. The pandemic has forced businesses, including the Institute for Information Industry (III), to implement work-from-home plans or split operations. "The III started to take preemptive measures during the Lunar New Year. Expecting the worst case scenario, the III tried to be as cautious as possible," the president of the III Dr. C.H. Cho recalled his decision-making process.

Work-From-Home and Split Operation Schemes to Combat COVID-19

At the end of January this year, Taiwan had the first confirmed case of COVID-19. To protect its employees from infection and contain the spread of COVID-19, the III staff convened online meetings during the Lunar New Year and decided that employees who fell into the following categories would have to work from home for 14 days: those who have developed flu-like or respiratory symptoms and those who have had contact with individuals coming from China, Macau, and Hong Kong during the Lunar New Year.

As more cases were confirmed in Taiwan, the III made rolling adjustments to its remote work policies and encouraged employees to work from home or implement split operations. For instance, since the Ministry of Education postponed the start of the 2020 Spring Semester to prevent cluster infection, many parents would have to stay home and take care of their children. Therefore, the III gave employees more flexibility by allowing them to work from home. In addition, in response to the crowds flooding tourist hotspots during the Tomb Sweeping holidays and the cluster infection involving crews of Navy's training squadron fleet, the III reduced the need for employees to work in the office and encouraged

▲ 資策會在疫情一開始就推動遠距辦公，滾動式調整擴大規模，讓員工很快就營塑良好工作環境與習慣。 Ever since the start of the outbreak, the III has promoted work-from-home plans and made rolling adjustments, creating great working conditions for employees to get started easily.

科技軟體工具協助取得資安與企業運作平衡

為了讓分散各地的員工能夠彼此順暢溝通，資策會對內使用了自行開發的人資軟體 iHR APP、企業通訊軟體 Teams、E-mail，虛擬會議室等工具，對外則依不同客戶需求，使用如訊連科技 U Meeting 等視訊會議軟體，維持良好溝通管道。而資安部分，資策會要求員工連入企業內網時，使用 VPN，筆電或載具也都先經過資安部門確認安全無虞，「有時其實只是觀念一個轉換，員工在哪裡上班，其實跟來公司上班一樣，沒有什麼差別。」卓政宏說。

them to work from home to mitigate the risks. During the week with the most confirmed cases in Taiwan, the III had the fewest employees working in the office in history. At that time, about 90 percent of the staff, which were roughly equal to 1,550 employees, worked from home while maintaining business as usual.

"In response to the COVID-19 pandemic, the III needs to keep at least 80 to 90 percent of operations BAU if a lockdown is imposed. Employees have to know how to work outside the office." To achieve this goal, the III had to change many procedures. For example, paperwork was moved online, and meetings were convened through video conferencing tools.

New Technologies and Softwares to Strike A Balance Between Information Security and Business Operations

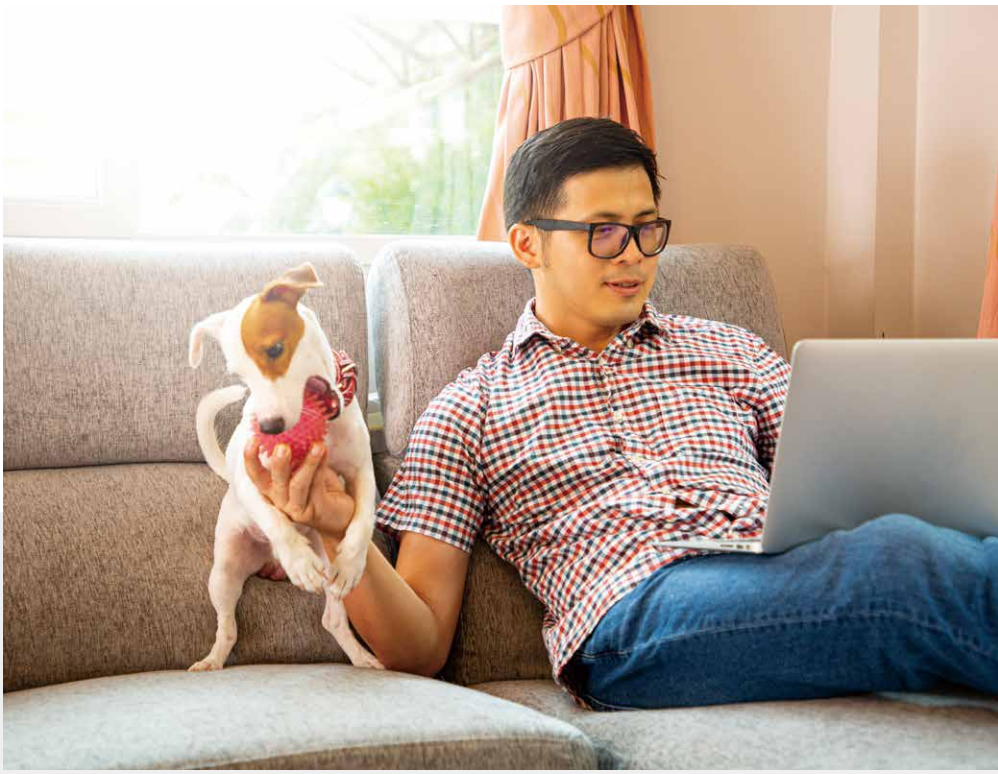
To make sure employees at different locations can communicate without any problems, the III utilized the self-developed human resource software iHR, Microsoft Teams, emails, and virtual meeting room tools for internal communication. As for communication between the III and its clients, U Meeting by CyberLink was used to convene online meetings. In regard to information security, employees were required to use VPN before accessing the intranet, and laptops and devices had to be examined beforehand by the information security department. "All it takes is just a change of mindset," Cho said. "Working from home and working in the office are basically the same."

The sudden change of work mode have brought about quite a few challenges. "Some employees do not have suitable space at home for work. There are many factors affecting work efficiency, including children, pets, unstable Internet connection, and unexpected events." Another pitfall of working from home is that the boundary between work and life is crossed.

要讓多數員工突然改變工作型態，的確也面臨不少挑戰。「有些人的家中根本就不適合工作，家裡有很多狀況。小孩吵鬧，貓狗跑來跑去，網路連線不穩定等等，員工有許多突發狀況。」遠距上班造成的另一個問題是，工作與居家的界限被打破，「原本以為省下通勤時間，工作可以更有效率，沒有想到有的員工早上 8 點就被 Call 了，晚上 11 點還在線上討論。」全日連線過度緊繃，超時工作，無預期的工作干擾，都是人力資源部門必須解決的問題。

安排線上活動 讓員工秀自我 成直播主

為此，資策會內的 IT、人資部門及福委會規劃出每天作息時間，每日早晨導入共編與線上會議室，中午則規劃大家一起線上吃便當，也針對遠距造成的社交疏離，利用線上群組推出各種活動，例如「動資動資動起來，線上運動作伙來」的群組負責讓同仁們一起線上跳有氧



▲ 在家工作雖然看似輕鬆，但面對突如其來的意外、超時工作等，都是遠距會議工作所面臨的挑戰。 Working from home seems easy, but unexpected events and overtime hours are some of the challenges.

"Employees thought that they can work more efficiently since they have saved the commute time. However, they ended up receiving calls at 8 a.m. and still participating in online discussions at 11 p.m." Overintensity, overtime hours, and unexpected interruptions are the common issues that the human resource department needs to address.

Online Activities for Employees to Become Live Streamers

The IT department, human resource department, and the welfare committee of the III laid out a work schedule for employees, including co-edit discussions and online meetings every morning, and remote lunches with colleagues. To facilitate employee interaction, online groups were formed to organize activities. For instance, the group "Get Moving" allowed employees to join online aerobic workouts, and the group "Living Life at Home" encouraged the staff to share their daily lives in words or pictures. Another group called "III YouTuber Show" served as a platform for employees to share the restaurants they like, handicrafts, and their travel reviews. Cho said, "Many supervisors had to sing, make latte art, play the erhu, and cook for the talent show." In fact, even Dr. Cho made a video of himself reviewing the signature

運動；「居家甘苦 543」群組鼓勵員工用文字與照片分享居家心得；「III Youtuber Show 出自我」則讓員工分享美食、手藝或是旅遊等心得，鼓勵秀出自我。卓政宏笑說，「有些主管因此被迫出來唱歌獻藝，表演咖啡拉花、彈奏二胡，大展廚藝，連卓政宏自己也秀了「美食開箱—為福樓烤鴨」，一時間大家都轉型成了「直播主」，一個多月下來全會有 20% 員工參與至少一次活動，例行性線上活動參與平均達 111 人次，也因此拉近員工間因遠距上班而疏離的距離。

資策會整理防疫工具包協助企業因應疫情衝擊

新冠肺炎讓全球經濟發生翻天覆地的變化，許多企業為了因應不得不轉換經營型態。面對可能繼續延燒的疫情，企業在安排遠距上班時，

▲ 遠距辦公雖然方便，但是資安防範也不可少。 Working from home may be convenient, yet information security has to be ensured.

dish peking duck by Wei Fu Lo. The employees became live streamers at home. For over a month, 20 percent of the staff took part in at least one activity and each routine online activity had 111 participants on average, which helped employees bond with their colleagues under the work-from-home plans.

The III Toolkit to Help Businesses Respond to the Pandemic

The global economy is still under the impact of COVID-19, and many businesses thus have to adopt different business models. In case the pandemic persists, the III presents "The Work-From-Home Software Toolkit" for businesses to maintain their BAU. The toolkit includes software for video conferencing, communication, office automation, documents and briefings, attendance management, and mobile office. "There is no one-size-fits-all solution for every business due to the differences in corporate operations. Businesses can use software with similar user interfaces or one that is compatible to the existing system." Currently, the III has listed the corresponding applications and aspires to collaborate with other businesses and design a software package against epidemic outbreaks. It will be an all-in-one package with all the software needed for businesses to implement work-from-home plans easily. From this large-scale work-from-home experience, the III has learned

有哪些資源可以協助企業營運，資策會替大家整理出建議使用的「防疫遠距上班軟體工具」，包括視訊會議、通訊軟體、OA 文書簡報、人事差勤、行動辦公等軟體，「每間企業經營內容不同，沒有標準答案，建議挑選跟原本公司系統可以介接或是容易扣合的軟體。」目前資策會先羅列出相關應用，未來則希望與業界合作，整理成套裝式的「防疫工具包」，一套裡頭一次囊括遠距上班會需要使用的軟體，方便業者導入。從這次施行大規模遠距上班所獲得的寶貴經驗，為了保持內外溝通流暢，穩定的網路連線變得十分重要，而且企業營運相關配套措施及應用要到位。針對要到現場工作的人員除採輪班制分散風險，進入工作場域時，也要事先藉由資通訊科技，例如結合 AI 技術精準辨識的紅外線體溫量測警示系統來管控人流，將風險降至最低。

提早數位轉型及掌握後疫情經濟發展

卓政宏建議，包括國家的骨幹網路建設以及接取都應該再擴大加強，而在應用方面，資策會提供的「防疫工具包」則是幫助業者以低成本、有效率的方式導入，讓處於前線的企業得以因應全球疫情及早調整。長遠來看，遠距上班不只是針對這波疫情，也可能永久改變企業的經營型態。「這次疫情各國受傷很重，不得不做出改變，台灣雖然影響較輕，但 5 到 10、20 年後，還是要注意能不能跟上世界轉型的列車。」台灣企業在其他國家因疫情緊繃，被迫轉變生活、工作型態的同時，影響相對較輕，若是趁此時進一步強化企業自身的競爭力提早數位轉型，才有機會在後疫情時代掌握數位經濟發展。倘若因防疫做得很好，疏忽全球環境已大幅變動沒搭上這次轉型機會，反而會錯失良機。

that Internet connection stability, as well as supporting measures and applications in place, are crucial to business operations and internal/external communication. In addition, employees who have to work in the office are asked to work staggered hours to reduce the risks of infection. When they enter the building, it is required to screen their temperatures with AI-equipped infrared thermal imagers to manage the flow of people and mitigate infection risks.

Digital Transformation in Advance to Support Post-Pandemic Economic Development

Dr. Cho suggests that the national Internet infrastructure, including the Internet backbone and Internet access, should be enhanced. In regard to application, the III toolkit helps businesses install the necessary software in a low-cost and efficient way, allowing frontline businesses to make preemptive adjustments to their operations accordingly. In the long run, work-from-home plans can be implemented more than just during the pandemic. It may even change the landscape of business operation permanently. "The pandemic and its impact have been detrimental to many countries. Taiwan is relatively less affected, but we need to be able to catch the wave of digital transformation in the next 5, 10, or 20 years." The pandemic has crippled businesses and changed the ways they operate in many countries. Compared to them, the businesses in Taiwan can take this opportunity to become more competitive and promote digital transformation as soon as possible. In doing so, Taiwan can stay ahead of the curve and foster the development of digital economy in the post-pandemic era. Taiwan has done a good job in containing COVID-19. However, if we ignore the shifts in the global business landscape, we are likely to miss many good business opportunities.

教育部數位基礎建設超前布署

科技防疫 遠距教學 停課不停學

The MOE Takes Preemptive Measures to Build Digital Infrastructure

Digital Technology in Distance Education

教育部資訊及科技教育司
郭伯臣 司長
Dr. Bor-Chen Kuo, Director-general of the Department of Information and Technology Education, the Ministry of Education (MOE)

由於防疫有成，台灣的學校絕大多數維持正常上課，僅有少數班級、學校停課。因防疫假在家自主學習的學生，受惠於遠距教學而「停課不停學」。在軟硬體的支援下，嚴重特殊傳染性肺炎（COVID-19，以下簡稱新冠肺炎）推升了遠距教學的應用，也進一步提升教師的數位教學力與學生自主學習力！

Due to its success in the prevention of the COVID-19 pandemic, most schools in Taiwan are maintaining business as usual, with only a few classes and schools being suspended. Fortunately, students in home quarantine have benefited from distance learning and are now able to continue their learning outside the classroom. With technological support, distance learning has been further developed during the outbreak of COVID-19, and this trend has encouraged teachers to enhance their teaching skills in a purely digital environment and students to learn independently.

新冠肺炎疫情爆發初期，為了讓學生「停課不停學」，台灣許多教師嘗試遠端教學。在實施遠距教學的過程中面臨諸多挑戰，除了必須調整教學內容外，進行大規模遠距教學時，學術網路、行動網路與家中固網的頻寬能量，成為一大考量。

其實，早在 1990 年起，教育部就開始建構「台灣學術網路」（Taiwan Academic Network, TANet），由大學的網路服務延伸至中小學[1]。2017 年起啟動「前瞻基礎建設計畫—數位建設」，執行中小學「建置校園智慧網路計畫」及「強化數位教學暨學習資訊應用環境計畫」，以四年為期程，推動數位校園、智慧學習，增進資訊融入各領域的數位教學與學習應用等。教育部資訊及科技教育司司長郭伯臣指出，疫情期間教育界人士紛紛表示，受惠於前瞻計畫，教育現場的數位基礎建設超前布署，成為遠距教學最有利的支援。

停課配套措施 軟硬體盤點整合

新冠肺炎疫情來得又急又猛，教育部在 2 月 2 日依據中央流行疫情指揮中心決議，宣布全國各級學校寒假延期兩周，延後於 2 月 25 日開學；2 月 19 日教育部發布「因應疫情校園停課標準」，國教署隨後在 2 月 27 日發布「國民中小學補課原則之補充說明」、3 月 5 日發布「高級中等學校停課時之補課作業注意事項」，各級學校若因疫情停學，可採到校實體補課及線上補課方式辦理。

為了實施遠距教學，教育部展開相關配套措施，首先了解各校線

[1] 資料來源 Source：
http://history.moe.gov.tw/policy.asp?id=11

At the beginning of the COVID-19 outbreak, many teachers in Taiwan had begun delving into distance education in case schools were suspended due to the pandemic. Conducting distance education is not an easy process. In addition to the need to adjust class curriculum, another key limiting factor of promoting distance learning on a large scale is the internetworking bandwidths among academic, mobile, and fixed networks.

As a matter of fact, the Ministry of Education (MOE) began building the Taiwan Academic Network (TANet) as early as 1990. The network service originated in universities and was later extended to secondary and primary schools[1]. In 2017, the Executive Yuan launched the Forward-Looking Infrastructure Development Program, which encompassed the construction of digital infrastructure. In specific, two projects regarding digital education have been implemented: "Construction of Smart Campus Network, and Enhancement of the Environment for Digital Education and Education Resource Application." The four-year program aims to promote digital campus, smart learning, and the application of digital technology in various disciplines. According to Dr. Bor-Chen Kuo, Director-general of the Department of Information and Technology Education, MOE, practitioners in the educational community have pointed out that distance education benefited significantly from the forward-looking program and its initiative in building digital infrastructure beforehand.

Digital Resources Inventory

In light of the rapid proliferation of COVID-19, the MOE announced on February 2 that winter break for all levels of schools would be extended for two more weeks, postponing the start of the spring semester to Feb. 25, in accordance with the decision made by Central Epidemic Command Center (CECC). On February 19, the MOE released School Suspension Standards In Response to COVID-19. On February 27, the K-12 Education Administration announced Supplementary Notes on the Guidelines for Making Up

上學習設備，盤點出各縣市共可出借學生約 10 萬 3,896 台行動載具及 1,375 台 4G 行動網卡，優先提供給弱勢學生借用。教育部隨即協力 5 大電信廠商，募集 3 萬 2 千個 15 天免費易付卡門號，爭取電信廠商提供防疫期間優惠電信方案，支援停課學生居家學習。教育部並導入 Microsoft Teams、Cisco WebEx 等視訊系統及教科書出版商提供的備課軟體，提供全國師生免費使用。

遠距教學施行 師生同步成長

遠距教學涵蓋同步、非同步與混成等三大教學模式，在實際施行遠距教學的過程中，教育現場面臨眾多挑戰。郭伯臣舉例，視訊系統 ZOOM 因行政院公布具有資安疑慮而遭停用，教育部緊急建議各校可使用之替代軟體，包括 Microsoft Teams、Cisco WebEx、Adobe Connect、Google Hangouts Meet、訊連科技 U Meeting、開源軟體的 Jitsi Meet……等，並在教育部的教育雲「防疫不停學—遠距教學便利包」專區中提供操作手冊及學習資源，協助師生熟悉新軟體。

大部分的教師過去習慣在教室中和學生互動，不孰悉遠距教學，為此教育部特別製作教師遠距教學教案與課堂教學影片，整合各種遠距教學資源及方法，幫助教師瞭解遠距教學基本概念，了解不同工具進行線上同步教學及混成教學的應用，也提供學校行政人員、家長及學生快速理解遠距教學操作實施。

在教學數位資源方面，教育雲已上架 1 萬筆以上的數位影音資源，提供高中至小學國、英、數、自、社等主科影音教材，成為教師遠距教學最佳的幫手。教育部設立多年的「因材網」線上學習平台也已建置完整的學習課程內容，

Missed Classes in Junior High and Elementary Schools. On March 5, Guidelines for Making Up Missed Classes in Senior High Schools was published. Schools suspended due to the pandemic can either make up missed classes at school or over the Internet.

To implement distance education, the MOE had to develop a variety of supporting measures. The first task was to take inventory of Internet-enabled devices available to schools. A total of 103,896 mobile devices and 1,375 4G SIM cards from city/county governments were lent to schools, with priority given to disadvantaged students. Next, the MOE collaborated with the five major telecom companies in Taiwan and solicited 32,000

▲ 透過各種視訊系統，遠距教學更為方便，防疫不停學！ Video conferencing tools make distance learning easier and ensures education isn't interrupted during the outbreak.

▲ 台灣微軟響應教育部，提供全國師生 Office 365 教育版服務，透過數位學習使中小學生也可以在家安心就學。In response to the policies of the MOE, Microsoft Taiwan provided Office 365 Education for free for secondary and primary school students, with a goal of promoting digital learning at home.

complimentary prepaid SIM cards. Special telecom service discounts were provided to students staying home due to class suspension. Furthermore, video conferencing tools such as Microsoft Teams, Cisco WebEx, and etc., as well as lesson preparation software from textbook publishers were provided by the MOE to teachers and students nationwide on a complimentary basis.

Learning Together via Distance Education

Distance learning can be divided into three major categories based on modes of delivery: synchronous, asynchronous, and mixed learning. The process of realizing distance learning has been accompanied by numerous challenges. Dr. Bor-Chen Kuo pointed out that after ZOOM was banned by the Executive Yuan due to security concerns, the MOE immediately released a list of alternative software, such as Microsoft Teams, Cisco WebEx, Adobe Connect, Google Hangouts Meet, CyberLink U Meeting, and Jitsi Meet. In addition, relevant manuals and learning resources are available in the Uninterrupted Education - Distance Learning Package for COVID-19 on the MOE's Education Cloud platform.

As most teachers are still used to interactions in the classroom and remain unfamiliar with distance learning, the MOE produced a series of videos on the preparation and methodologies for remote teaching. A variety of resources and methodologies were integrated in the videos to provide teachers with basic knowledge and help them understand how synchronous and mixed learning could be conducted with the tools available. In addition, the videos were also provided to administration staff at schools, the parents, and students to help them better understand how distance learning is conducted.

Currently, over 10,000 video clips of learning resources are available on Education Cloud, ranging from Mandarin / Chinese Literature, English, math, science, and social studies for 1st to 12th graders. The videos have become great materials for teachers implementing remote education. In addition, a series of online courses have been released on MOE's Adaptive Learning website to further support

包括國小國語文、數學、自然及英語領域；國中國文、數學、理化及生物領域，支援師生進行遠距教學與學習。

學校面臨挑戰 升級頻寬 把關教學

然而施行遠距教學，學校端也面臨頻寬、教學品質把關等相關挑戰。在頻寬的部分，全國國中小學連外網路頻寬已達 100M 以上，因應疫情衍伸的遠距教學需求，教育部在今年 3 月協調中華電信，將全國國中小學校連外頻寬全面免費提升至 300M，並持續至 5 月底。

此外為了鼓勵教師使用數位資源及工具並精進遠距教學能力，教育部持續補助各縣市政府舉辦相關工作坊，例如師資培育及藝術教育司從今年 2 月起至年底推動數位學習教師增能工作坊，資科司則執行國中小科技輔助自主學習推動計畫，連結學校、教師、

▲ 教育部的教育雲「防疫不停學—遠距教學便利包」專區，讓師生在疫情時期的學習不間斷。The Uninterrupted Education - Distance Learning Package for COVID-19 on MOE's Education Cloud platform ensures education isn't interrupted during the outbreak.

distance education. The courses include Mandarin, math, science, and English for elementary schools and Chinese Literature, math, physics and chemistry, and biology for junior high schools.

The Bandwidth and Teaching Quality Challenges

As schools began to implement distance education, challenges such as internetworking bandwidth limit and teaching quality emerged. The original bandwidth for the external networks in elementary and junior high schools was 100Mbps. To address the growing need of distance learning during the outbreak, the MOE coordinated with Chunghwa Telecom in March and had increased the internetworking bandwidth to 300Mbps for free until the end of May.

To create incentives for teachers to utilize digital resources and tools and improve remote teaching skills, the MOE has been subsidizing city/county governments to organize workshops. For example, the Department of Teacher and Art Education is holding digital learning workshops for teachers, starting from February to the end of the year. In addition, the Department of Information and Technology Education has been promoting the technology-assisted independent learning project for junior high and elementary schools. The project links schools, teachers, and local education advisory groups by holding workshops, seminars, and on-site visits. Furthermore, members of the advisory groups are sent to each school to help provide teachers with specialized support.

As a result, teachers have learned to utilize the three distance learning modes announced by the MOE and adjust the methods based on student performance. For instance, teachers can assign homework, quizzes, and conduct adaptive testing on the digital learning platform. They can also interact with students and observe student performances through live streaming and online discussion.

各縣市與分區輔導團，不僅開設工作坊、座談會、參訪活動，更透過分區輔導團入校輔導機制，提供教師專業支持與協助。

教師能夠依照教育部公布之三種遠距教學模式，根據學生學習狀況善加應用，例如運用線上學習平台提供指派作業、練習題、適性測驗等進行教學活動，或是利用直播平台的視訊、討論等功能，與學生互動、觀察學生線上學習情形，還能夠應用線上學習平台的記錄，了解學生學習成效，即時給予鼓勵或回饋或協助。

科技輔助推動提升自主學習

從教育部的統計資料顯示，新冠肺炎成為遠距教學的一大推動助力，遠距教學平台在防疫期間使用人次大幅提升，以因材網為例，在防疫延後開學期間（109 年 2 月 10 ～ 16 日）使用人數為上課期間平均的 3.5 倍，開學後（109 年 2 月 25 日 ～ 3 月 22 日）平台使用時數較去年同期（108 年 2 月 25 日～ 3 月 22 日）成長約 12.7 倍。教師在實際使用過後熟悉度與信心大增，更願意嘗試並投入數位教學，並進一步提升學生的自主學習意願與能力，108 年至 109 年 4 月累計教師帳號數達 6 萬 5 千位、學生帳號數達 116 萬位、師生登入使用累計為 339 萬餘人次！

因為新冠肺炎，遠距教學成為教育現場新常態，不再僅是一個選項，而是絕對必要與必備。未來，教育部將持續提升台灣學術網路（TANet）能量，強化各級骨幹網路（縣市教育網路骨幹、區域網路暨核心網路骨幹）基礎建設，包括光纖網路設備、網路設備、相關模組與介面的擴充，並規劃建置內容傳遞網路（CDN）架構，不但因應疫情停課期間衍伸的遠距教學網路頻寬需求，更能支援數位學習及科技教育的落實，驅動教師擁抱遠距教學，善用智慧科技、強化教學能力，逐步讓學生備齊十二年國教課綱強調的自主學習核心素養。

The record system on the platform helps teachers understand more about students' learning schedules and allows them to give timely feedback or assistance.

Technology Fostering Independent Learning

Statistics from the MOE indicated that the COVID-19 pandemic has fostered the development of distance education, with a growing number of people joining distance learning platforms during the outbreak. Take the Adaptive Learning website for example. During the extended winter break period (Feb. 10 - 16, 2020), the number of users was 3.5 times that of the previous semester. After the spring semester began (Feb. 25 - Mar. 22, 2020), the number of users rose by 12.7 times compared to the same time period last year (Feb. 25 - Mar. 22, 2019). Teachers were confident after becoming familiar with the platform, and they were more willing to switch to the distance learning mode. This in turn improved students' willingness to learn independently. During April 2019 to April 2020, the number of teacher accounts reached 65,000, the number of student accounts was 1.16 million, and total logins recorded were over 3.39 million.

As a result of the COVID-19 pandemic, distance education has become the new normal in the educational field. Instead of just being an option, it is now an essential part of education. The Ministry of Education will continue to upgrade TANet and enhance backbone networks of all levels (city/county academic backbone networks and area-based backbone networks), with measures such as upgrading fiber optics networks, regular networks, and relevant modules and interfaces. In addition, a content delivery network (CDN) will be constructed. The policy will not only create abundant bandwidth for the growing distance education during the outbreak, but also realize the goal of digital learning and technology education. Teachers will be inspired to embrace distance education with the support of smart technologies, and students will be able to learn independently, one of the core competencies of the Curriculum Guidelines of 12-Year Basic Education.

政策、醫療、產業攜手合作

智慧、遠距
醫療「疫」展長才

A Collaboration Between Policies, Healthcare, and Industries

Smart Healthcare and Telemedicine Can Help

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嚴重特殊傳染性肺炎（COVID-19，以下簡稱新冠肺炎）自爆發以來，根據臺灣衛生福利部疾病管制署資料顯示，截至 7 月 1 日全球已超過 1050 萬人確診，逾 51.1 萬人死亡。此次疫情來得又急又快，由於傳染力強，許多國家的醫療體系在檢疫、治療與照護上都面臨更嚴峻的人力、資源分配與時間壓力。為因應疫情肆虐，加速了醫療院所採取智慧及遠距醫療的腳步。

Since the outbreak of COVID-19, more than 10.5 million cases had been reported worldwide, including more than 511 thousand deaths as of July 01, 2020, according to Taiwan CDC statistics. Due to the highly infectious nature of COVID-19, the pandemic is growing at a fast pace. It has challenged the healthcare systems in several countries on the testing, treatment, and medical care capacity as well as manpower, resource allocation, and time management. In response to the pandemic, many medical institutions have started to implement smart healthcare and telemedicine.

新冠肺炎的發生，考驗的不只是民眾對疫情的認知、對口罩的需求，而是全台灣醫療系統。面對這波看不見的敵人，全台灣醫療院所採取智慧醫療及遠距醫療的腳步，不由得加快了許多。

疫情爆發後 數位健康助攻防疫

在智慧醫療方面，像是為避免接觸傳染，敏盛醫療集團採用中華電信多元支付系統，打造「無現金交易」避免接觸的防疫環境，合作推動醫療產業數位化，逐步落實「智慧醫療」，以打造智慧醫療 ICT 數位轉型中心為目標；有鑑於美國在疫情中，長照護理機構的確診人數佔全美 10%，工研院攜手國內最

▲ 透過數位科技的幫助，智慧醫療得以逐步落實。Digital technology helps realize the vision of smart healthcare step by step.

The COVID-19 outbreak is a trial not only to the general public and the capacity of personal protective equipments, but also to the entire healthcare system in Taiwan. To fight an enemy that is invisible, medical institutions in Taiwan have to implement smart healthcare and telemedicine even faster.

Digital Health Helps Contain the Pandemic

In regard to smart healthcare, the Missioncare group adopted the CHT Multipay system for cashless payment to avoid contact transmission. This measure aimed to promote digital transformation in the healthcare industry, realize the vision of smart healthcare step by step, and eventually establish an ICT digital transformation center for smart healthcare. Given the fact that the confirmed cases in long-term care facilities accounted for 10 percent of the total cases in the U.S., the Industrial Technology Research Institute (ITRI) collaborated with the Veterans

▲ 新冠肺炎的發生，加速了遠距醫療的重要性與需求。The COVID-19 outbreak highlights the importance of and need for telemedicine.

大照護機構—退輔會榮家榮院發展智慧科技長照，以整合科技與照護服務，透過 AIoT 智慧化裝置及遠距技術輔助照護人員，讓高齡長者透過智慧科技享有高品質的照護服務，並降低護理人力。

而在嚴峻的疫情中，更加凸顯遠距醫療的重要性。以全球遠距醫療發展領先的美國為例，疫情爆發之前，美國醫療保險（Medicare）已提供部分遠距醫療項目給付，如醫師可對患者上傳的照片進行評估等；疫情升溫後，川普總統擴大放寬 Medicare 遠距醫療服務，允許使用者與醫療機構運用通訊軟體， 例 如 FaceTime、Facebook

Affairs Council (VAC) on developing smart long-term care technology. As the biggest long-term care facility, the VAC-affiliated hospitals and care facilities integrated technology into long-term care services. With the help of AIoT smart devices and tele-caregivers, the elderly can enjoy high-quality care services, and the manpower for long-term care can be reduced.

During the pandemic, it has become evident that the importance of telemedicine cannot be overemphasized. Take the U.S., a leading country in terms of telemedicine, as an example. Before the outbreak of COVID-19, Medicare covered some of the telemedicine services. For instance, doctors could make a diagnosis based on the pictures the patient uploaded. As the pandemic raged, President Trump expanded Medicare telemedicine coverage, enabling beneficiaries to receive telemedicine services via communication software such as FaceTime, Facebook Messenger, and Skype.

In addition, the U.S. FDA announced emergency measures on March 20 to expand the scope of remote monitoring devices in healthcare facilities by adding oximeters, ECG machines, electronic stethoscopes, and some clinical decision support software to the list. With remote monitoring and automatic data transmission, the new measures have mitigated the infection risks from going to the hospital and reduced the burden on healthcare workers and facilities.

The Expansion of Telemedicine Coverage Benefits All

According to the existing Rules of Medical Diagnosis and Treatment by Telecommunications, medical diagnosis and treatment by telecommunications are available to people who live in mountainous areas, outlying islands, and remote areas, fall into the five special circumstances, such as residents of institutional long-term care facilities holding valid chronic disease refill prescriptions, or are under urgent circumstances.

In response to COVID-19, the

Messenger，或 Skype 進行遠距診療。

美國 FDA 亦於 3 月 20 日發布緊急措施，放寬原先醫療機構使用的遠距監測醫材，例如血氧濃度計、心電圖計、電子聽診器及部分可輔助臨床決策支援的軟體，透過遠距監測與數據自動傳輸，不僅降低民眾至醫院就診的感染風險，也減輕醫護人員與醫療機構負擔。

遠距醫療適用範圍放寬 嘉惠民眾

至於國內遠距醫療有哪些因應措施？現行《通訊診察治療辦法》（通訊診療，或又稱「遠距醫療」）規定，山地、離島、偏僻地區，或符合 5 種條件的特殊情形者，例如長照機構慢性病連續處方箋等，以及急迫情形，得以使用通訊診療。

因應疫情，衛福部於 2 月擴大原有《通訊診察治療辦法》的適用範圍，配合檢疫與防疫的居家隔離或居家檢疫者，得以進行通訊診療，讓醫生在醫院可透過電腦、手機或平板的視訊來診療，甚至開藥給居家檢疫或隔離的民眾。

另外，因疫情的情勢所趨，對於遠

▲ 中國醫藥大學附屬醫院去年推動遠端監控的居家血液透析，因為居家環境比較不會感染，避免群聚感染。疫情過後，可望促使更多患者使用居家血液透析。The China Medical University Hospital started to promote hemodialysis at home via remote monitoring systems in order to prevent cluster infection. After the pandemic, it is expected that more patients will start to do hemodialysis at home.

Ministry of Health and Welfare expanded the scope of the existing Rules of Medical Diagnosis and Treatment by Telecommunications in February. People in quarantine or isolation are now allowed to receive medical diagnosis and treatment by telecommunications. In other words, doctors can make diagnoses, provide treatment, or even give prescriptions to patients in quarantine or isolation.

Moreover, due to the pandemic, people have become more accepting of telemedicine. Mr. Jung-Lin Yang, the director of the Information Technology Office, China Medical University Hospital, pointed out that the hospital has started to accept the application for home hemodialysis training program since last year. As of now, ten patients have been in the training program. With the help of remote monitoring systems, they will be allowed to do hemodialysis at home after they complete the training program and pass the summative assessment.

Yang believes that during the pandemic, patients are more willing to do hemodialysis at home to prevent cluster infection in hospital. Hemodialysis patients usually have a weaker immune system, so staying at home is a better option for them. After the pandemic, it is

距醫療的接受度也提高。中國醫藥大學附屬醫院資訊室主任楊榮林舉例，去年開始院內接受患者專案申請居家血液透析（洗腎），已有10位患者在接受訓練並考試通過結訓後，透過院方遠端系統監控進行居家血液透析。

楊榮林認為，疫情期間為避免到醫院群聚感染，提升其他患者利用居家血液透析的意願；洗腎患者通常抵抗力弱，居家環境比較不會感染，疫情過後，有利促使更多患者使用居家血液透析。

疫後新常態 智慧醫療與遠距醫療發展可期

遠距化、行動化及虛擬化等新醫療服務型態因疫情而加速提前到來，傳統醫療服務數位轉型速度勢必加快，而遠距醫療具有減輕醫療資源負擔與分流、避免接觸交叉感染風險的優勢，成為各國政府率先用於防疫的醫療科技。只不過隨著疫情趨緩，人們也會回到生活常態，民眾照常上醫院，智慧、遠距醫療是否在疫情過後而沉寂？

彰基副院長林慶雄認為疫情期間炒得火熱的智慧醫療或遠距醫療題材，將成為疫後新常態。他舉彰基的「蘭醫師App」為例，目前有1萬5262名會員，會員利用聊天機器人（Line Bot）線上諮詢、線上衛教等功能，蘭醫師在疫情期間使用率提高，讓院方對於蘭醫師扮演的角色更有信心。另外他也指出，智慧醫療或遠距醫療可以避免患者集中在醫院，減少感染風險。長遠來看，遠距醫療有其必要性。

資誠聯合會計師事務所副所長暨生醫產業負責人曾惠瑾分析，遠距醫療在國際發展多年，非全新議題，法規限制及台灣使用者行為模式是目前尚未全面普及的主要原因。他進一步指出，面對疫情，台灣善用在資通訊產業優勢、醫療水準在全球領先地位，結合數據雲端共享的

expected that more patients will start to do hemodialysis at home.

The China Medical University Hospital started to promote hemodialysis at home via remote monitoring systems in order to prevent cluster infection. After the pandemic, it is expected that more patients will start to do hemodialysis at home.

Smart Healthcare and Telemedicine Are the New Normal After COVID-19

On account of the pandemic, new healthcare services will take the lead in remote, mobile, and virtual forms. The digital transformation of conventional healthcare services are likely to speed up. Meanwhile, telemedicine can reduce the burden on medical resources, serve as a triage system, and mitigate the risk of cross-infection. It has become a new medical technology that governments around the world adopt for epidemic prevention. However, as the pandemic slows down and life returns to normal, whether or not smart healthcare and telemedicine will subside remains to be seen.

Dr. CH Lin, the Deputy Superintendent of Changhua Christian Hospital, suggested that smart healthcare and telemedicine, which received much attention during the pandemic, will become the new normal in the post-pandemic era. He took the Dr. Lan App by Changhua Christian Hospital as an example. Currently, there are 15,262 registered users. The App allows users to receive consultation and health education services via the Internet. During the pandemic, Dr. Lan was able to attract even more users, which was a confidence booster for hospital executives. Furthermore, Dr. Lin pointed out that the application of smart healthcare and telemedicine is able to prevent cluster infection in hospital and mitigate infection risks. In the long run, telemedicine is indeed necessary.

According to Audrey Tseng, the Deputy Chairman and the biomedicine industry leader of PwC Taiwan, the development of telemedicine has been ongoing for years. Nonetheless, there are still some challenges, including

軟體系統以及數據處理分析，在這波防疫抗疫戰中出奇致勝。

台北醫學大學醫學資訊研究所兼任副教授劉立也認同，台灣的資通訊與醫療在國際上都是強項，兩者整合是時勢所趨。疫情期間，智慧防疫成為顯學，發揮很大的功能。「傳統醫療模式與行為必須改變，」國內面臨少子化及老年化社會，勞動力不足，智慧醫療與遠距醫療可以提升效率與減輕醫護人員負擔。「考量醫師意願及病人需求的情況下，法令若可以更加開放其適用範圍，個人是持樂觀其成的態度。」劉立總結。

新冠肺炎為人類健康帶來危機，卻也加速在使用者行為、醫療服務態樣的變革。醫療科技帶給民眾更方便的醫療接近性，法規層面如何開放，及完整的配套措施，讓有需求的民眾，享有方便安心的醫療品質，都值得產官學醫界全面探討。

▲ 彰基院長陳穆寬醫師（右）示範操作「蘭醫師醫療照護對話機器人 LINE Bot」。Dr. M.K. Chen, the Superintendent of Changhua Christian Hospital, demonstrated the "Dr. Lan Medical Care Dialogue Robot LINE Bot."

regulatory restrictions and the behavior patterns of users in Taiwan. Tseng indicated that during the pandemic, the key to Taiwan's success in the combat was its ability to utilize its strong ICT industry, high-quality healthcare services, as well as excellent Cloud data software and data analysis ability for epidemic prevention.

Dr. Li Liu, the Adjunct Associate Professor of the Graduate Institute of Biomedical Informatics, Taipei Medical University, agreed on Taiwan's leading positions in the ICT industry and healthcare services. The integration of the two is a trend of the times. During the pandemic, smart epidemic prevention has become the mainstream and has been proven effective. "Conventional healthcare patterns and behaviors have to change." Given that Taiwan is an aged society with low fertility rate and shortage in manpower, smart healthcare and telemedicine can improve the efficiency of healthcare services and reduce the burden on healthcare workers. "As long as doctors are on board with the idea, patients' needs are fulfilled, and the scope of the regulations can be expanded, I personally am optimistic about the development of smart healthcare and telemedicine," Dr. Liu concluded.

The COVID-19 pandemic has threatened the health and well-being of humanity. However, it has also reshaped user behaviors and the landscape of healthcare services at the same time. Health technologies have given people easier access to healthcare services. It remains the focus of the industry, the academia, the government, and healthcare providers to better provide convenient and high-quality healthcare services to those in need, through appropriate deregulation and comprehensive supporting measures.

睿智通用醫護機器人為產業升級
科技防疫讓世界看見台灣

Aeolus Robotics Drives Industry Upgrade with Medical Robots
Taiwan's Epidemic Prevention Technology

在全球遭受嚴重特殊傳染性肺炎（COVID-19，以下簡稱新冠肺炎）衝擊下，睿智通的機器人成為醫護人員的好幫手，而其引進各國人才、堅持在地生產的策略，貼合行政院 DIGI 方案的發展基盤、創新經濟、智慧治理、數位包容等四大策略，將協助台灣產業全面升級。

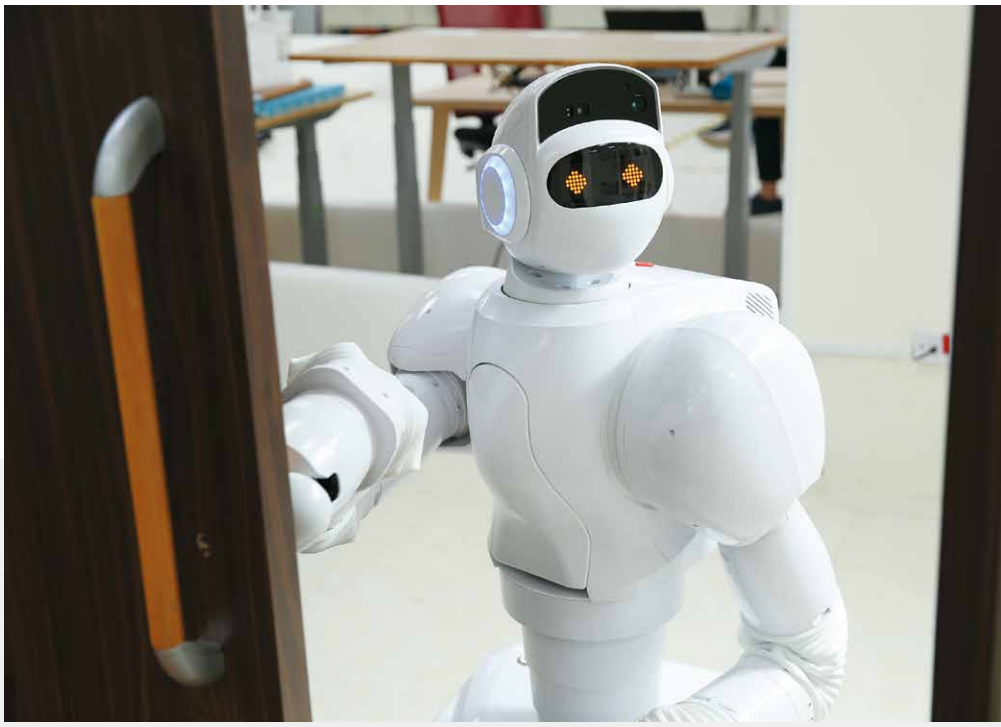
As the COVID-19 pandemic rages around the world, robots developed by Aeolus Robotics have become the best assistants for health care providers. Introducing international talent and insisting on local production, the company's core values are in line with the four major policies of the Executive Yuan's DIGI+ Program: Development, Innovation, Governance, and Inclusion. It is expected that Aeolus Robotics will drive unprecedented industry upgrade in Taiwan.

睿智通總經理 黃存義
Alexander Huang,
CEO of Aeolus Robotics

新冠肺炎疫情衝擊全球，病毒在短短幾個月內蔓延全球，而在這次疫情中，台灣的科技抗疫成為全球最佳典範，在 DIGI 方案的推動下，台灣不僅持續強化新創能量，讓新技術順利落地於實際場域中，更將人才與技術應用觸角延伸到國外，凸顯出台灣在軟硬兩端的強大實力，睿智通機器人的醫護機器人就是其中最具代表性的典範。

靈活醫護機器人 強化科技防疫能量

如果有機會走進睿智通的內湖辦公室，一開門你就可以看到裡面滿滿的機器人大軍，這些有著手臂的機器人，穿梭在模擬老年照護院所的空間中，用設置在機器人身上的雙手靈活的按下電梯開關按鈕、撿拾地上物品、開關房間門，看到有人倒臥在地上時，也會立即發出警報，通知醫護人員處理。「我們的 Aeolus Robot 是全球唯一有雙臂的照護機器



▲ 睿智通機器人是全球唯一有雙臂的照護機器人。The Aeolus Robot is currently the only care robot in the world with two arms.

The COVID-19 pandemic has caused global impacts, with the virus proliferating to around the world in just a few months. During the outbreak, Taiwan's success in COVID-19 containment with technological support has inspired countries worldwide. With the launch of the DIGI^{+} Program, Taiwan continues to strengthen its startup ecosystem and put innovative technologies into practice. Furthermore, the island country is proactive in recruiting international talent and expanding the scope of technology application to abroad. The strategies are demonstrative of Taiwan's competitive edge in technology development and talent cultivation. In particular, the medical robots of Aeolus Robotics are the living proofs of that.

Agile Medical Robots Enhance Taiwan's EpidemicPrevention Capabilities

If you ever walk into the office of Aeolus Robotics in Neihu, Taipei, you will be greeted by an array of robots as the door opens. The robots with arms hustle around the simulated nursing home. With two agile robotic arms, they can press elevator buttons, pick up things on the floor, and turn the doorknob. In addition, when the robots see someone lying face down on the

人。」睿智通總經理黃存義認為，有手臂、能移動的機器人才能靈活配合環境運作，可用性與防護性也才會高。

他以這次防疫期間的隔離病房、旅館為例，為了避免感染，不少隔離場域都使用機器人遞送餐點與物資，不過這些機器人都是採用類似掃地機器人的機構設計，醫護人員要先用手把餐點與物資放在上面，再讓機器人遞送，不過黃存義指出，「只要經由人手，就有交叉感染的問題。」相較之下 Aeolus Robot 則可以用自己的雙手拿取物品，不但可以落實真

▲ 黃存義認為，醫護領域的服務機器人是台灣另一個可以引領前進的指標性產業。
Alexander Huang indicated that service robots in healthcare can be a new pillar industry for Taiwan.

ground, they send emergency alerts to health care providers. "The Aeolus Robot is currently the only care robot in the world with two arms,"said Alexander Huang, CEO of Aeolus Robotics. He added that arms and mobility are the two elements that make a robot agile and adaptive to different environments and conditions, which gives it great usability as well as protection capability.

Huang then took isolation wards and quarantine hotels as an example. To prevent infections, robots are frequently used for supplies and food deliveries. However, the mechanism of these robots are derived from that of robot vacuums. Health care providers need to put food or supplies on the robots with their hands. "As long as things are passed over through our hands, there can be risks of cross-infection, "Huang indicated. In contrast, the Aeolus Robot is able to pick up supplies with its robotic arms, realizing the vision of complete automation and reducing the risk of virus transmission.

Established in 2016, Aeolus

正的自動化，而且也可大幅降低病毒的傳播感染機率。

成立於 2016 年，短短 5 年內就完成醫護機器人的設計與量產，而且已經拿到日本老人安養機構的訂單，與其他新創團隊相比，睿智通的腳步又穩又快，黃存義表示，堅持走沒有人走的路是關鍵。他進一步指出，80 年代的半導體與 PC 兩波發展，為台灣科技產業奠立可與國際大廠比肩的競爭優勢。不過這股優勢的邊際效應已經開始遞減，台灣必須盡快找出另一個可以引領前進的指標性產業，黃存義認為服務型機器人的機會最濃厚，尤其是醫護領域的服務機器人。

AI 與機器人整合應用更具彈性

雖然現在全球服務型機器人的出貨量不高，不過黃存義還是看好其未來性，他以行動電話為例，「在黑金剛當時代，誰會想到今天的智慧手機如此強大而且如此普及？」而服務型機器人也會跟智慧手機一樣，未來幾年功能不僅會逐漸完整多元，而且會無所無在地出現在各種場域。

也因此在睿智通成立初期，就鎖定服務機器人為核心產品。確立產品路線後，黃存義緊接著思考，從必要性來看，誰會是服務型機器人的第一需求者？「答案是醫護機構的年長者。」因此 Aeolus Robot 的功能就往此方向走，前面提到的自動開關電梯與房門、遞送物資、人體姿態判斷等功能，都是因應老人安養中心的環境而設計。而且透過 AI，機器人不只動作更靈活，使用上也更有彈性。

對於 AI，黃存義認為這絕對會是機器人中最關鍵的靈魂，事實上在這次新冠肺炎中，Aeolus Robot 迅速轉型為消毒機器人，

Robotics has succeeded in converting startup designs to mass-production products and obtained orders from nursing homes in Japan. Compared to other startups, the pace of Aeolus Robotics is indeed fast and steady. Huang indicated that the key to the company's success was choosing the road not taken. In the 1980s, the growth of the semiconductor and PC industries set the cornerstone for Taiwan's high tech industry, making it comparable with leading businesses around the world. Nevertheless, the marginal returns have been diminishing, and it is urgent that Taiwan find another pillar industry that drives economic growth. Huang believed that service robots, particularly those for health care purposes, have the most promising opportunities.

Combining Robots and Artificial Intelligence

While global demand for service robots is moderate currently, Alexander Huang remained optimistic about its outlook. Taking mobile phones as an example, he added,"Back when DynaTAC first came out, who would have expected that mobile phones can be so powerful and common now?"Huang believed that the growth pattern of service robots will be similar to that of smartphones. Within a few years, they will be mature and diverse enough and be introduced to various fields.

Therefore, since its establishment, Aeolus Robotics has regarded service robots as its core products. The next thing Huang needed to consider was, who would be in desperate need of service robots? "The answer is seniors in healthcare institutions,"he pointed out. Ever since then, Aeolus Robotics has delved into the development of medical robots. The functions aforementioned, such as pressing elevator buttons, turning door knobs, and recognizing body postures, were designed specifically for working

可以手持紫外線燈照射走廊、門把、扶手等容易有病毒的部位，就是因為所內建的 AI 程式，可以讓工程師立即加上新功能，並快速轉換應用方向。目前除了醫護院所之外，Aeolus Robot 也可以應用於辦公室、工廠等場域。對於 Aeolus Robotics 的應用，黃存義則強調，其工作內容絕非取代現有的人力，而是從事人工無法或危險的工作，例如會傷及人體的紫外線消毒或手術房中的注射針筒處理。

引進全球菁英 堅持在地製造

除了確立以服務型機器人為核心產品外，黃存義也訂下其他兩條營運策略：首先是「培養人才、成為業界技術領導者」；其次則是「在地化生產」。人才方面，在微軟工作 18 年，黃存義眼光擴及全球，在內湖辦公室中，你可以看到來自歐、美、亞不同國家的菁英聚集在一起工作。台灣以外，睿智通在全球其他國家還有 7 個辦公室，而且這些辦公室的軟硬體平台都與台灣連結，可以透過遠端遙控測試內湖辦公室內的機器人，「所以我們是 24 小時三班制運作，台灣下班後，歐洲同仁就接手，歐洲下班時間一到，換美國員工上班。」這個運作機制，不僅讓睿智通的研發速度飛快成長，同時也將全球人才帶進來與台灣菁英們互動，全面提升台灣的技術質量。

至於生產部分，黃存義則堅持在地化製造，而此策略對睿智通與台灣製造業來說會是雙贏局面。他指出台灣的軟硬體實力皆強，尤其是硬體方面，台灣製造技術實力深獲業界肯定，再加上政府多年來的政策，也讓台灣擁有全球少見的完整產業鏈，此優勢可讓睿智通的研發成果快速商品化。

in nursing home environments. Furthermore, the introduction of artificial intelligence (AI) has made the robots even more agile and adaptive.

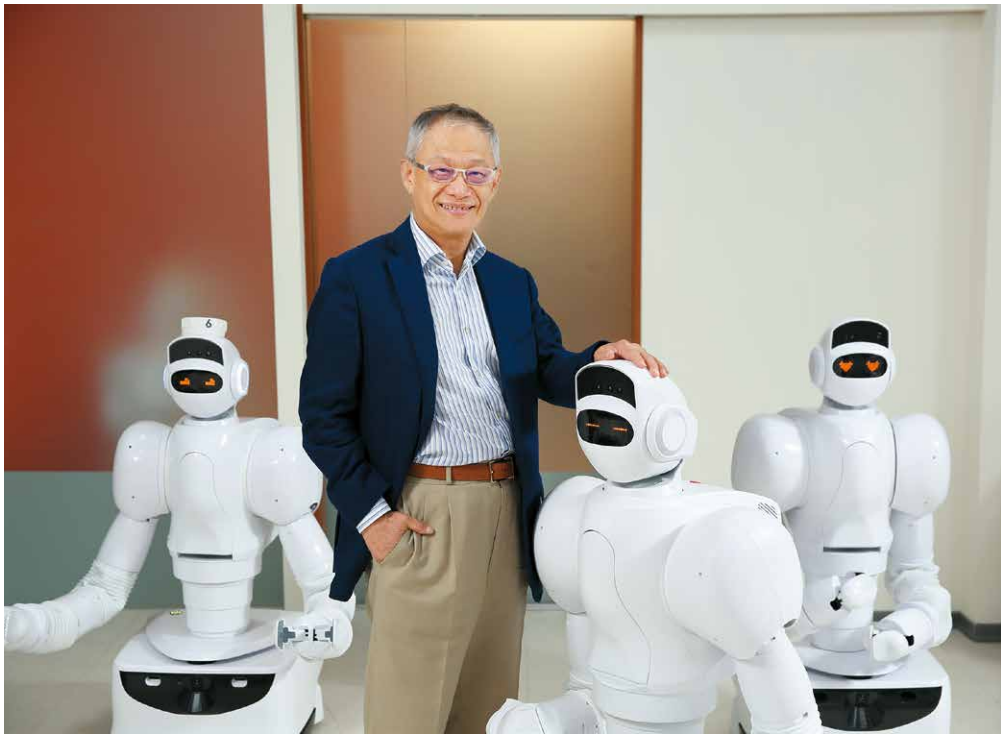
Huang believed that AI is the most crucial element of a robot. During the COVID-19 outbreak, the Aeolus Robot has been immediately transformed into a disinfection robot, which is capable of holding UV lamps to sterilize corridors, doorknobs, handrails, and other high-touch surfaces. The success of such a swift transformation lies in the built-in AI software, with which engineers were able to add new functions and adjust application patterns. In addition to medical institutions, the Aeolus Robot can also be used in places such as offices and factories. In terms of the application, Huang emphasized that the purpose of the robots was never to replace existing labor, but rather to take on tasks that are impossible or hazardous for humans, such as UV disinfection or the disposal of surgical syringes.

International Talent and Local Production

After finalizing service robots as the company's core products, Alexander Huang has proposed two more operation strategies: cultivating industry-leading talent and implementing local production. In terms of talent, with his 18 years of work experience at Microsoft, Huang holds a global perspective on talent recruitment. Inside the company's office in Neihu are experts from Europe, the U.S., and other Asian countries. In addition to Taiwan, Aeolus Robotics has offices in 7 locations around the world. What's more, all of the overseas offices are connected to the base in Taiwan through remote control systems, allowing the staffs to control robots in Neihu from afar. "We're basically working on an 8-hour shift for 24/7 coverage. After employees in Taiwan get

至於台灣製造業，他表示國內多數廠商向來以代工製造為主要業務，產量雖大但價值不高，軟硬整合的機器人，則可為製造業帶來更高的附加價值，走出與以往不同的路。

在產品創新、人才培養與在地生產等三大路線的堅持下，睿智通創造耀眼成績，而此成績也完全體現了 DIGI+ 政策的精神，透過其發展、創新、治理、包容等四大精神，睿智通的 Aeolus Robot 也將與台灣產業共同升級，創造出下一波經濟奇蹟。



▲ 睿智通的服務機器人完全體現了 DIGI+ 政策的精神，是 AI、數位與醫療的完美結合。The service robots of Aeolus Robotics are representative of the core values of DIGI+ and are a perfect combination of AI, digital technology, and healthcare.

off work, their counterparts in Europe will take over, and the staff in the US will continue the work of their European colleagues, "Huang indicated. The operation mechanism allows a fast pace of R&D and attracts international talent to work together with Taiwanese experts, elevating Taiwan's technology development to a new level.

As for production, Alexander Huang insisted on local production. This is a win-win operation strategy to both Aeolus Robotics and the manufacturing industry in Taiwan. He pointed out that Taiwan has powerful talent pools in both manufacturing and R&D. In particular, Taiwan's manufacturing industry has been widely acknowledged. Together with the support from government policies over the years, Taiwan has developed a complete industry chain that is rarely seen in the world. This competitive edge allows Aeolus Robotics to commercialize its R&D results within a short period of time. Huang added that most manufacturing companies in Taiwan are OEM suppliers. While total production output is huge, the value added is relatively low. A combination of robots and artificial intelligence can produce greater added-value for the manufacturing industry and drive transformation.

With its three operation strategies (product innovation, talent cultivation, and local production), Aeolus Robotics has achieved brilliant success. Most importantly, the company's strategies are representative of the four core values of the DIGI+ Program. Through development, innovation, governance, and inclusion, Aeolus Robotics will drive industry upgrade in Taiwan and create the next Taiwan Miracle.

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