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城市與鄉村，在世界各國對未來一波波的提問、擔憂，以及在少子化、人口老化的沈重壓力之下，更應該是和諧共融而非對立。臺灣同樣面臨著人口成長衰退、都市集中化，以及城鄉發展失衡等問題，所幸透過數位科技的賦能，以及「區域創新」的推動與普及，讓我們能串連起城鄉高度差異化的需求，建構出以人為本的創新應用生態系，弭平城鄉落差，進而翻轉偏鄉衰退宿命，促成城鄉共存共榮，讓人類永續發展成為可能。

本期將藉由與政務委員吳政忠、經濟部工業局局長呂正華，以及成功大學資訊工程學系教授郭耀煌的對談，從產官學研的角度，發現科技下鄉和區域創新的無限可能。此外，也有許多臺灣新創優勢結合地方需求的範例在這一季內容中精彩綻放，像是打造出全世界第一個「區塊鏈食品溯源系統」，為農業注入科技能量的奧丁丁；還有仁寶電腦以 AI 等智慧技術，開發出慢性病、糖尿病遠距照護平台「愛糖寶」，讓偏鄉醫療不斷電；更深入了解亞洲第一的無人機整合服務廠商經緯航太，看無人機於農業、救災、資源探勘等方面的智慧應用；以及網奕資訊如何建置「遠距智慧閱讀」系統，讓偏鄉、弱勢孩童也能享受閱讀和語言學習的樂

As the urban-rural dilemma continues into the future, countries around the world are faced with challenges and concerns of their own while dealing with the burden of declining birthrate and aging population. Urban and rural communities should coexist in harmony instead of in conflict. Taiwan is also confronted with the problems of declining population growth, urban concentration, and imbalanced urban-rural development. Fortunately, digital technology empowerment and the promotion and popularization of "regional innovation" allow us to meet the highly differentiated needs of urban and rural areas. Constructing a people-centric innovative ecosystem is a way to close the urban-rural gap and turn the rural decline around to enable urban-rural coexistence and co-prosperity for truly sustainable development.

In this issue, we explore the infinite possibilities of bringing technology to the countryside and delve into regional revitalization from the industry, government, and academia perspectives through interviews with Minister without Portfolio, Tsung-Tsong Wu; Director of the Industrial Development Bureau, Ministry of Economic Affairs, Jang-hwa Leu; Professor from Department of Computer Science and Information Engineering, National Cheng Kung University, Yao-Huang Guo. We also present multiple examples of how Taiwan's innovative advantages are tied in with local needs. OwlTing

趣；同時，也看經濟部水利署利用物聯網、大數據、AI 等技術建置「水資源物聯網」與「水情 APP」，為防汛、灌溉等生活應用增添智慧化利器；還有展綠科技所開發的快速安裝、便利、低成本智慧電表如何成為城鄉智慧化的最佳敲門磚；最後，也介紹了日本運用數位科技推動地方創生 (區域創新) 的經驗，透過相互參照，建構出符合臺灣需求的和諧、創新智慧城鄉場景。

智慧化不能只是城市，而是需要城鄉全體一起協作改變。特別在面對人口老化、少子化等結構性困境的當前，任何地方、偏鄉需求的解題思索過程，都將是臺灣未來的機會與希望。「智慧城鄉」運用物聯網、大數據、區塊鏈、人工智慧等智慧科技去滿足每個地區獨特生活需求，也同時創造傳統產業的創新價值。隨著智慧農噴、智慧醫療、智慧教室等生活應用的逐步實現與普及，都深刻展現出臺灣科技、產業和在地生活的永續生命力。

▲ 無人機改變產業生態鏈，為偏鄉注入新經濟的動能。
The drones change the supply chain and creates the momentum for the new economy in rural regions.

is injecting new tech energy into agriculture by launching the world's first blockchain food traceability system. Compal has launched iDiabCare, a platform for chronic disease and diabetes remote care, using AI smart technologies to bring medical care to rural areas. Find out how GEOSAT Aerospace & Technology is Asia's first drone integration service provider to put drones in action for agriculture, disaster relief, resource exploration, and more. HABOOK Information Technology is building a smart remote reading system to give rural and disadvantaged children the joy and pleasure of reading and language learning. Meanwhile, the Water Resources Agency has developed the Water Resources IoT and Water Data app by tapping into IoT, big data and AI to offer smart applications for flood prevention and irrigation. 3Egreen Technology is rolling out low-cost smart electricity meters that are easy to install and use, serving as the tip of a spear for urban-rural smartification. Last but not least, we learn about Japan's use of digital technology to promote regional revitalization and cross-reference with the needs of Taiwan to create smart urban-rural environments that exude harmony and innovation.

Smartification shouldn't be just for cities but should engage rural areas to develop together to really effect change. In coping with the demographic challenges of aging population and low birth rates, any solution that tackles the problems of urban-rural relationship can be a glimmer of hope and opportunity for Taiwan's future. Smart cities and communities make good use of smart technologies—IoT, big data, blockchain, and AI—to cater to the unique needs of each region, while creating innovative values for traditional industries. Building on the realization and availability of real-life applications, such as smart agricultural sprayer drones, smart medical care and smart classrooms, Taiwan is demonstrating her strength in integrating the sustainable forces of science and technology, industries and local living.

科技下鄉—用區域創新翻轉偏鄉發展宿命

Digital Innovation Goes to the Countryside: Regional Innovations to Turn Things Around in Remote Areas

科技已成為各國解決當今少子化、人口老化與城鄉發展不均的焦點所在，加上它為社會、經濟各層面所帶來的創新，讓許多國家皆積極推動數位化建設與扎根工作。對此，臺灣亦沒有置身其外，面對地方缺工、經濟衰退，以及城市邊界持續流動蔓延的問題，扭轉區域發展不均已是國家治理上刻不容緩的重要課題。行政院透過「數位國家 ・ 創新經濟發展方案」(DIGI+ 方案)、「5+2 產業創新」以及「普及智慧城鄉生活應用計畫」等一系列規劃方案，用數位包容的思維，讓人工智慧、物聯網、大數據等智慧科技真正踏上串連在地生活的實踐與應用之路。

Technology has become the means for governments around the world in dealing with problems such as low birth rates, population aging and uneven developments in urban and rural areas. As technology brings innovations to the society and the economy at different levels, many countries promote digitalization by establishing relevant infrastructures and projects.

Taiwan is also part of this transformation. It is imperative for the country to deal with local labor shortage, economic recessions and continued growth of urban frontiers by turning around the imbalance in regional developments. "The Digital Nation and Innovative Economic Development Program" (DIGI+), "5+2 Industrial Innovation Program" and "Smart City Taiwan" are all initiatives orchestrated by the Executive Yuan strive to bring artificial intelligence, IoT and Big Data into local communities with digital contents and a plethora of applications.

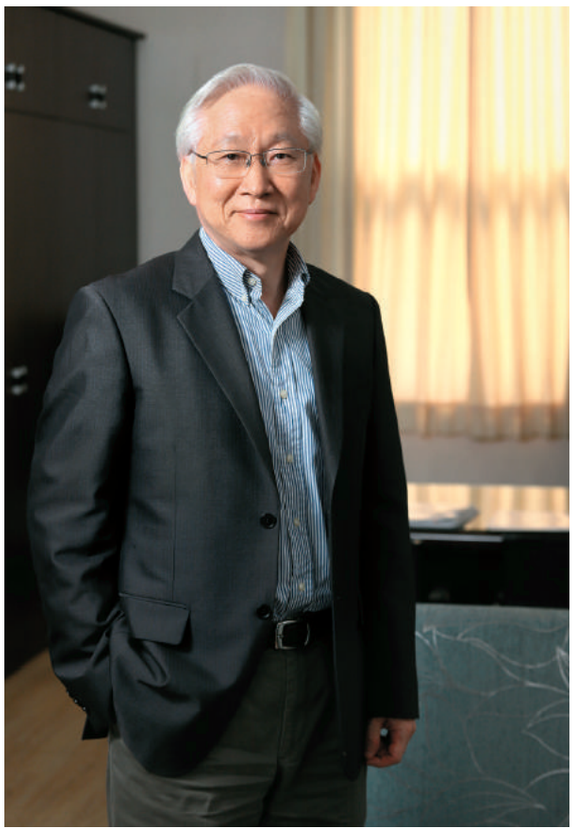
藉由與政務委員吳政忠、經濟部工業局局長呂正華，以及成功大學資訊工程學系教授郭耀煌的對談中發現，要解決人口問題、提高生活品質並讓環境得以永續發展，數位科技只是輔助工具，而民眾與地區的需求才是主體，特別是偏鄉與農村的發展，對於整體社會的互補和均衡至關重要。讓科技下鄉，唯有由下而上，透過科技力量與產官學研的整合，發現並滿足民眾及不同地區的多元需求，才能打造出全民有感的智慧城鄉創新應用生態系，成就快樂、成長、安全、永續的優質

According to Minister without Portfolio, Tsung-Tsong Wu; Director of the Industrial Development Bureau, Ministry of Economic Affairs, Jang-hwa Leu; Professor from Department of Computer Science and Information Engineering, National Cheng Kung University, Yao-Huang Guo, digital technology is only a supporting tool in the dealing of population problems, enhancement of life quality and the pursuit of environmental sustainability. What really matters is the needs of the public and local communities, particularly remote villages and farming townships. They are vital to the equilibrium of the whole society. A top-down approach is in order to bring technology to the countryside. The integration of technology

生活，以及為達成聯合國永續發展目標（SDGs）積蓄源源不絕的豐沛能量。

數位力量：越偏鄉就要越科技化

根據內政部資料統計，截至 2018 年底為止，臺灣戶籍登記人口為 2,358.9 萬人，較 2017 年底僅增加 1.8 萬人，成長率為千分之 0.8，創下歷年人口成長率首度新低；與此同時，臺灣的老年人口已攀升至總人口的 14%，正式宣告「高齡社會」已然到來；而人口移動則依舊持續向北部集中，目前全臺六都人口數已占全國總人口的七成……臺灣在上述這種人口成長拉警報，都市人口卻不斷攀升的情況下，都市生活品質持續不佳，農村偏鄉也面臨著人口老化與向都市集中所帶來的缺工、長照與醫療資源不足等問題。



▲ 政務委員吳政忠 Tsung-Tsong Wu, Minister without Portfolio

and resources from the industry, academics, government and research institutions should aim to identify and satisfy a variety of needs from people in different regions. This is the only way to create an innovative ecosystem of smart cities, towns and villages for everybody, ensure a happy, safe, growing and sustainable living environment and achieve the SDGs (sustainable development goals) set by the United Nations by cumulating continuous resources and momentum.

Digital power: deep technology for remote areas

The statistics from the Ministry of the Interior indicate that by the end of 2018, the number of registered citizens in Taiwan was 23.589 million, up only by 0.08% or 18,000 people from the end of 2017. The increase was at the record low rate. Meanwhile, the percentage of aged population has reached 14%, a milestone for the aging society. The population continues to move north, with 70% of the people clustered in six cities. Despite low population growth, cities are swamped with more and more people. As a result, the life quality in metropolitans remains poor. In the meantime, farming villages and remote townships are faced with problems such as labor shortage and insufficient resources for medicare and long-term care, as population aging continues and people move to urban areas.

Digital technology can serve as an effective solution to all these challenges. This is also where Smart City Taiwan fits in, by manifesting the value of technology. Professor Yao-Huang Guo indicated, "The core of smart cities is to assist in the smart transformation and digital value-adds for both urban and rural areas." However, this is particularly important to the countryside where resources are lacking. Minister without Portfolio, Tsung-Tsong Wu, said that Taiwan is not a big island and the distance between cities and rural areas is not far. "We cannot allow cities to walk faster and faster and leave remote regions behind. We think the more remote the place, the deeper technology should take root." The purpose is to use digital and smart technology to fill in the labor gap, enhance the local governance, and achieve the balanced allocation of resources and a better quality of life. It is hoped that co-existence and mutual prosperity is possible with the shortening of the

▲ 經濟部工業局局長呂正華 Jang-hwa Leu, Director of the Industrial Development Bureau, Ministry of Economic Affairs.

面對這些困境，數位科技正好可作為一帖有效解方，這也正是「普及智慧城鄉生活應用計畫」的科技應用價值所在。郭耀煌教授表示，「智慧城鄉的核心概念就是協助城市、鄉村做智慧轉型跟數位加值。」在智慧轉型、數位加值的思維脈絡下，對原本各項資源就多所缺乏的鄉村地區而言，這樣的轉型更顯得重要。吳政忠政委就說到，臺灣不大，城市跟偏鄉其實不遠，「你不能讓城市越走越快，然後去丟掉偏鄉這邊，所以我們的想法是越偏鄉要越科技化。」於是透過善用數位、智慧化科技所挾帶的強勁力道，來彌補勞動力缺口、強化地方治理、平衡資源配置不均和提升生活品質等諸多城鄉發展問題，為地方治理和產業環境帶來健全發展，進而縮減城鄉差距，讓共存共榮成為可能。對此郭耀煌教授也表示，「智慧城鄉第一是提升城市與鄉村，尤其是地方政府治理的效率跟品質；第二則是提升國民的生活品質，

gap between big cities and small towns supported with the healthy development of local governance and industrial environments. Professor Yao-Huang Guo said, "There are three goals for smart cities and townships: (1) to boost the efficiency and quality of local governance; (2) to improve the life quality for citizens (particularly in the countryside); (3) to achieve a balanced development for urban and rural areas (as the ultimate target)."

The advancement of "DIGI^{+} Program", "5+2 Industrial Innovation Program" and "Smart City Taiwan" have given a new thinking about rural areas and farming villages to government agencies, research institutions, academic establishments and industry players. Jang-hwa Leu, Director of the Industrial Development Bureau indicated, "Assistance should be offered to both urban and rural areas. In fact, rural areas should be allocated more resources. Innovations and new concepts should be brought to rural areas as well." Tsung-Tsong Wu, Minister without Portfolio mentioned that far-off agricultural villages deserve special attention. It is particularly important to take care of everybody at the bottom of the society. This is the digital inclusive spirit of "DIGI^{+} Program". "In other words, it is essential to keep the disadvantaged in mind for the development of emerging technologies. Their needs are important too. The more remote the regions, the more attention they require. This is the only way to turn things around and bring back the young people."

"Smart City Taiwan" serves as the application layer for "DIGI^{+} Program" and "5+2 Industrial Innovation Program". Anchored on the pursuit of humanity, it aims to resolve day-to-day issues with smart technology. Meanwhile, the power of technology should be deepened, in order to drive the innovations and development of industries. The vision is to fundamentally change the previous focus on outsourced manufacturing in Taiwan, into the new paradigm of an economy driven by intelligence and innovations. "We have been manufacturing for others, without spending much thought on what the products are for. At this juncture, we should think how to meet the needs of residents in cities and townships. This encompasses humanity, psychology and aesthetics in the development of new technologies, new products and eventually new industries," said Tsung-Tsong Wu, Minister without Portfolio.

尤其是鄉村的，所以最終的目的是要促成城鄉跟區域的均衡發展。」

從「DIGI⁺方案」、「5+2 產業創新」到「普及智慧城鄉生活應用計畫」的推動，讓產官學研各界對偏鄉與農村等地區，有了跟以往很不一樣的思考。呂正華局長就提到，「不只城市，而是城鄉的部分要有更多資源去做協助，同時引導新創、新想法能夠到偏鄉去做推動。」吳政忠政委也提及，偏鄉農村地區一定要特別關注，尤其要照顧到最底層的每一個人，這正是「DIGI⁺方案」所說的數位包容精神，「也就是說在發展新興科技時，不要忘掉有一批弱勢，他們的需求也很重要……越偏鄉越要注重，這才能真正反轉，讓年輕人回鄉。」

而智慧城鄉作為「DIGI⁺方案」與「5+2 產業創新」的應用端，就這一層次來看，它不僅要以人為本，用智慧科技解決切身的生活問題，還要從中回過頭來深化科技的力量，帶動產業的創新與發展，進而從根本上改變臺灣過去以代工製造為主的體質，朝向智慧創新經濟的典範前進。「我們以前都做代工製造，所以不必去想說製造這些東西要幹什麼，但現在變成是我們要從城市與偏鄉民眾的生活需求中，去思考要如何滿足他們的需要，同時還要把人文、心理、美學等部分都包含進去，再從中找到新科技與新產品，並創造新的產業出來，」吳政忠政委說。

發現需求：從地方出發，找到地方的 DNA

於是，「地方需求」便是數位轉型之外，在推動智慧城鄉上的另一關鍵要素，它與產業發展息息相關。呂正華局長就說到，「當初在推行智慧城市的過程中，我們發現城市跟偏鄉的使用者需求是不同的，而這也會讓科技的應用有所不同。如果用行銷的 STP(segmentation, targeting, and positioning) 來看，偏鄉需求跟城市需求就必須要做出區隔，所以新的計畫我們才稱為『普及智慧城鄉生活應用計畫』。」這個應用計畫以

Needs discovery: find the local DNA

Local needs are another key factor of digital transformation and smart cities and townships, as local needs are highly relevant to industrial developments. Jang-hwa Leu, Director of the Industrial Development Bureau pointed out, "We realized that the needs in urban and rural areas are different in the promotion of smart cities and townships. In other words, technological applications should also be different. According to the STP (segmentation, targeting, and positioning) framework in marketing, it is necessary to segment different needs in urban and remote areas. That's why we named the new program "Smart City Taiwan". This initiative is to enable and empower industries to resolve the issues raised by locals. Local governments are tasked to articulate local requirements and mobilize industry players to tackle the issues according to government policies and industrial developments for the local communities. Administrative support and testing grounds should be provided so that vendors and manufacturers can conduct trials. Director Jang-hwa Leu emphasizes the importance of local governments' participation to smart cities and townships. "Because these applications are highly relevant to different aspects of daily life, from food, clothing, medicare, accommodation, transportation, education to entertainment. The purpose is to improve the quality of life and create a testing opportunity for industry players. Of course, local governments will provide assistance along the way."

Director Jang-hwa Leu gave a few examples. For instance, Lienchiang County Government and Taipei City Government work together in the long-distance medicare platform by using block chain to allow the sharing of medical histories. In this way, patients no longer have to spend a dozen of hours on boat to come to the main island for diagnosis and treatments. Instead, they can consult the doctors in Taipei City with the company of doctors in Lienchiang. This allows these patients to enjoy the same quality of medicare on the main island. "We hope to conduct the same experiment for other off-islands and remote areas." The other example is the joint efforts from 34 schools in seven cities and counties (i.e. Hualien, Taitung, Nantou, Taipei City, New Taipei City, Taichung and Lienchiang) in the deployment of a language

「地方出題、產業解題」的方式來進行，從地方出發，由地方政府擔任地方需求的提供者，依其施政及在地產業發展的實際狀況來徵求廠商解題，並提供行政協助及試煉場域讓廠商能夠做驗證，呂正華局長認為，地方政府的參與對智慧城鄉計畫非常重要，「因為這些應用是跟人民的食衣（醫）住行育樂各方面息息相關，目的是要改善民眾生活，也讓產業能有試煉的機會，在這當中同時還能得到地方政府的協助。」

呂正華局長舉例，如連江縣政府與臺北市政府合作推動的遠距醫療平臺，透過區塊鏈技術讓病例能互相調閱，讓居民不再需要坐十幾個小時的船到本島掛號排隊求診，即可由連江縣的醫生陪同，與臺北市的醫生進行遠距看診，享有與本島同樣的醫療品質，「我們希望這實證經驗未來也能在臺灣其他的離島、偏鄉去做驗證。」另一個案例則集結了全臺七個縣市包括花蓮、臺東、南投、臺北、新北、臺中、連江的 34 所學校一同合作建置語言學習平臺，透過 AR、VR 技術打造出英語智慧教室與智慧校園，共計有 16.5 萬名師生受惠，「這讓校園學習也能融入當地文化，同時解決偏鄉師資不足的問題，花東的學生不用跑到臺北或新北來，在學校甚至在家裡就能享受到外語的學習環境。」

為了讓產業界，特別是許多新創團隊的力量能夠與地方政府和民眾需求做更強的連結，今年工業局也開始主辦「創業歸故里－眾志成城創新創業競賽」，以解決城鄉問題出發，用獎助金帶動人才返鄉創業的能量，結合地方資源，讓新創團隊的智慧服務能夠扎根，加深創新與在地連結。呂正華局長表示，「在科技會報的指導之下，我們覺得創業歸故里的模式，能夠引導更多的新創讓他回到家鄉去做服務，像是觀光、醫療、農業的部分，直接接地氣，把新創的能量、想法，以及對鄉土的情感落實在這塊土地上。」

而除了地方政府提需求，大學也應扮演「地方智庫」的角色，作為地方政府之外另一個發現地方需求的源頭，才能讓智慧城鄉的地方出題功能更

learning platform. AR/VR technology is used to create a smart classroom and a smart campus for learning of the English language. A total of 165,000 teachers and students benefit from it. "This brings campus learning to the local culture and resolves the problem of insufficient teachers. Students in Hualien and Taitung do not have to go to Taipei City or New Taipei City. They can enjoy the quality learning environment for foreign languages at school or even at home."

In order to connect industry players (particularly start-ups) closer to local governments and residents to address local needs, the Industrial Development Bureau started in 2019 "Entrepreneurs Going Home" competition. The purpose is to subsidize the start-ups established by the entrepreneurs returning to hometowns, in order to tackle issues in local cities and townships. It is hoped that the smart services rendered by new ventures in combination with local resources can deepen the connection between innovations and local communities. Director Jang-hwa Leu said, "According to the guidance from the Board of Science and Technology, Executive Yuan, we believe that bringing entrepreneurs back home can instill innovations and services to the countryside. It enables down-to-earth applications in tourism, medicare and agriculture by materializing innovative ideas and resources into the love for our homeland."

In addition to the initiations from local governments, universities should also play the role as local thinktanks for local needs discovery. This can enhance the robustness of local requirement developments for smart cities and townships. Professor Yao-Huang Guo explained, "Universities (particularly the local ones) should serve as local thinktanks on their own or by working with other organizations." The discovery of local needs depends more than just local governments. Universities, non-profit organizations and government officials should interact with each other continuously over time to build mutual trust and plan for local developments. They should collaborate in the proposals to the central government for reviews and funding support, before vendors and manufacturers to devise their responses and solutions. "This is the best way to ensure industry players can properly address the

▲ 成功大學資訊工程學系教授郭耀煌 Professor Yao-Huang Guo, Department of Department of Computer Science and Information Engineering, National Cheng Kung University

加完備。郭耀煌教授就認為，「大學，尤其是在地大學，應該以大學本身或者大學結合法人的方式來扮演地方智庫的角色，」郭教授繼續解釋到，地方出題不只是地方政府出題而已，還要透過大學、法人與地方政府官員三者間的長期互動，彼此建立互信關係，進而去具體規劃地方發展，後續送至中央由政府審定與補助，再讓廠商依據這個需求來提案開發，「這樣地方出題、產業解題才能更加落實。」吳政忠政委也提到：「大學、產業跟在地城市是三個重要因素，在地居民的需求可以藉由大學的能量，來幫助相關科技的導入，並讓產業能夠進來。」

創新永續：中央、地方、產學研攜手打造 Ecosystem

智慧城鄉從地方需求出發，以數位科技為地方解決問題，但並非至此告結，而是要讓這股科技、

issues for local communities." Minister without Portfolio, Tsung-Tsong Wu, said, "Universities, industries and local cities are the three pillars. Universities can help to introduce relevant technologies and bring industry players to address the needs of locals."

Innovation & sustainability: ecosystem created with joint efforts from central government, local governments, industries, academics and research institutions

Smart cities and townships are about the resolving of local problems and the addressing of local needs by using digital technology. However, this is not the end. Rather, technology and innovations should take roots and develop into an ecosystem meeting the SDGs (sustainability development goals) set by the United Nations. Only by doing so, it is possible to turn things around for rural townships and farming villages. The cross-disciplinary integration, by industries, academics, research institutions and government agencies, is the first essential for the creation of innovative and sustainable ecosystem. Director Jang-hwa Leu indicated that industries, academics, research institutions and government agencies are the four pillars of the nation's innovations system (especially research institutes). The Industrial Technology Research Institute and the Institution for Information Industry under the Ministry of Economic Affairs are research organizations unique to Taiwan. "This allows industry players to quickly access and apply technology to the innovations system in this country. The government serves as a platform and facilitator, to bring systems and concepts to projects such as smart cities and townships and Entrepreneurs Going Home. This will assist companies, colleges and research organizations to smoothly operate each module in the innovations system."

The establishment of an appropriate mechanism is also critical to the integration of industries, academics, research institutions and government offices. Professor Yao-Huang Guo believes that a mechanism is required to coordinate the relationship between universities and local governments for smart cities and townships. It is also necessary to include the Ministry of Education,

▲ 用智慧科技解決切身的生活問題，還要從中回過頭來深化科技的力量，帶動產業的創新與發展。To resolve day-to-day issues with smart technology , the power of technology should be deepened, in order to drive the innovations and development of industries.

創新的能量落地生根，長出以聯合國永續發展目標（SDGs）為本的循環生態系（Ecosystem），如此才能為偏鄉、農村的宿命帶來真正翻轉。要打造創新且永續的生態系，產官學研的跨領域整合是其中第一項關鍵。呂正華局長說，產官學研是國家創新體系裡很重要的四個支柱，特別是研究單位，包括經濟部主管的工研院、資策會，是臺灣很獨有的東西，「它能讓產業很快銜接技術，然後應用到國家創新體系裡頭。而政府扮演的角色就是一個平臺，把環境做好，我們才能讓制度、想法透過智慧城鄉、創業歸故里等計畫，去協助廠商、研究單位、學校將每個創新體系運作得更加順暢。」

在產官學研的整合當中，機制的建立也至關重要，郭耀煌教授就認為，智慧城鄉應該要建立一個機制去媒合大學跟地方政府的關係，還要跟教育部、經濟部乃至於國發會一起討論，建立長期跨部會的對話機制。對此，為了加強跨部會整合的力道，

the Ministry of Economic Affairs and the National Development Council to the on-going across-ministry conversations. Toward this end, Tsung-Tsong Wu, Minister without Portfolio, indicated that the government has set up a communication platform for smart cities and townships. "I will call for one meeting every three months to go over issues by inviting deputy city/county mayors and senior officials from the Ministry of Economic Affairs; the National Development Council; Deputy mayors of Counties; Commissioner of Research, Development and Evaluation Commission; and the government agencies responsible for the information industry." In addition to collaboration by different ministers and cross-disciplinary integration among industries, academics, research institutions and government agencies, Professor Yao-Huang Guo highlighted "It is necessary to formulate plans throughout cities and countries, on a regional basis or by taking into account the development of the same greater community." Minister Tsung-Tsong Wu pointed out the necessity for the central government and the local governments to work together, instead of

吳政忠政委表示政府目前已成立了智慧城鄉溝通平臺，「三個月開會一次由我來主持，與會代表有經濟部、國發會、各縣副市長、研考會主委，或是資訊相關首長等，在會中提出智慧城鄉推動上的各種問題。」於此郭耀煌教授還另外提及，其實不只各部會、產官學研要跨域整合，「在做規劃的時候，應該也要跨縣市，從區域發展，或同一個生活圈的發展做整體考量。」吳政忠政委也表示，中央跟地方必須要充分合作，改變以往各自為政的狀態，同時還需加上創新觀念的思考，「我們要跟大學、民眾、產業多交流，這才是未來臺灣的希望。」此外，各種資料數據的品質好壞，攸關 AI 分析與決策的成敗，於是跨部會整合也體現於資料的格式統一與開源上，「我們從現在開始，嚴格要求執行政府科技計畫的單位，資料第一要遵循格式，第二則必須要可以開源，」吳政忠政委說。

各地區的獨特性則是打造生態系的另一關鍵。吳政忠政委認為，臺灣過去都用國家創新的步伐在走，「中央說了算，地方跟得有點辛苦，」但現在我們要扭轉過去的效率經濟導向，讓創新在每個地區生根發芽，「因為每個地區都有它的特色，如果我們去發展跟這個特色有關的產業，它自然就會產生獨特性，而那都是區域創新的來源。」這種源於在地需求的創新模式，才有可能讓生態系走得更長久，正如郭耀煌教授論及的，「要找出一套模式跟連帶的加值服務，既可以讓廠商獲利，同時也能解決地方問題，這就是我們期待看到的部分。」最後，呂正華局長說到，每種科技能不能長出新芽，培育出灌木或是喬木，要視種籽本身的 DNA 而定；產業發展也是一樣，要看實際生命週期、在地養分，以及每個生態系中的競爭力，「宜蘭、彰化、屏東、北北基、雲嘉南等，每一個地區都有它的特色，我們的目標就是希望城市可以減壓，讓人才、科技等能量漂到臺灣的 6 都 16 縣市，在每個地方長出美好的果實。」

working in silo as they have been. In the meantime, we should apply new thinking and innovative concepts. "We need to communicate more with universities, industries and the public. This is where the hope lies for Taiwan." As the quality of data determines the success or failure of AI analytics and decision-making, it is a prerequisite for all the ministries to unify data formats and ensure open sources. "We have been demanding all the governments units implementing technology initiatives to adhere to data format requirements and ensure open sources" said Minister Tsung-Tsong Wu.

Local uniqueness is another key to the creation of the envisioned ecosystem. Minister Tsung-Tsong Wu indicated that innovations in Taiwan have been orchestrated at the national level. "Local governments find it hard to follow the policies from the central government." If we would like to change the previous focus on efficiency economy, we should allow innovations to take root in each region. "This is because every region has its own characteristics. If we develop the industries leveraging the local characteristics, unique will come into being. This will be the inspiration of regional innovations." Only the innovations model stemmed from local needs can make the ecosystem last longer. As Professor Yao-Huang Guo mentioned, "We would like to see a development model with the value-added services to generate profits for suppliers and resolve local problems." Finally, Director Jang-hwa Leu believes that whether a seed can spring to life and grow into a shrub or an arbor depends on its DNA. It is the same with technologies and industries. Lifecycles, local ingredients and competitiveness of each system are all part of the equation. "Yilan, Changhua, Pingtung, Taipei City, New Taipei City, Keelung, Yunlin, Chiayi and Tainan, each region has its own characteristics. Our goal is to relieve pressure from metropolitans by directing talents and technologies to all the six cities and sixteen counties all over Taiwan. We hope to see each region achieve wonderful results."

奧丁丁用區塊鏈打造在地智慧生活進行式

OwlTing Makes Localized Smart Living a Reality by Using Blockchain Technology

作為臺灣最受國際矚目的區塊鏈新創公司，奧丁丁（OwlTing）從「人」的實際需求出發，陸續將區塊鏈技術導入農業、食品、旅宿產業，用區塊鏈說故事，讓區塊鏈的創新應用得以深入地方，解決在地問題，成為推動臺灣智慧城鄉發展的一大生力軍。

As the blockchain startup in Taiwan with the best international visibility, OwlTing introduces blockchain technology into agriculture, food, travel and accommodation industries by catering to people's needs. The company tells storied with blockchain so that the innovative applications are deeply ingrained in local communities to resolve local problems. OwlTing has become a driving force for the development of smart townships in Taiwan.

奧丁丁市集創辦人暨執行長 王俊凱 Darren Wang, OwlTing Founder / CEO

區塊鏈並不只是操作虛擬貨幣的必要工具而已，其正以去中心化、數據不可竄改等特性，逐步擴展到生活各層面，改變人與社會的互動模式。臺灣區塊鏈新創奧丁丁將區塊鏈技術與全臺灣小農、民宿業者的實際需求做結合，推出「食品溯源系統」和「旅宿管理系統」，利用區塊鏈公開透明、便利安全的優勢，建立消費者信心與新體驗，進而活化在地經濟，提升返鄉創業動能，形成城鄉間的新良性循環。奧丁丁以「助人」為核心理念，透過區塊鏈一步步改變臺灣、改變世界，創辦人暨執行長王俊凱說：「科技人從來不會去接觸真的『人』，但這東西我覺得是有意義的。」

Blockchain is more than a necessary tool for cryptocurrencies. Decentralization and tamper-proof data are bringing blockchain in different aspects of life and changing how individuals interact with the society. The blockchain startup OwlTing is using blockchain technology to meet the needs of small farmers and B&B operators in Taiwan by launching the food traceability system and the accommodation management system. The transparency, convenience and safety of blockchain can establish confidence and new experience for consumers, vitalize the local economy and promote entrepreneurship of returnees. This will eventually create a new virtuous cycle between cities and towns. OwlTing's core value is about helping people. It is about slowly changing Taiwan and the rest of the world with blockchain. Darren Wang, OwlTing

從產地到餐桌：區塊鏈食品溯源系統

2014 年起，奧丁丁決定打造安心食品的電商平台—奧丁丁市集，創辦人暨執行長王俊凱下鄉跑遍全臺各生產地，就是希望能讓優質的小農產品被消費者看見。當時奧丁丁結合電子商務與地圖技術，推出鮮奶地圖、水果地圖與國產羊地圖等，期間歷經頂新食安風暴事件，讓鮮奶地圖創下單月銷售破萬瓶的好成績，也替奧丁丁與小農們帶來更加緊密的合作關係。

為了將優質產品的「好」更詳盡、透明地展露於消費者眼前，奧丁丁在生產履歷中導入區塊鏈技術，推出獨步全球的 OwlChain「區塊鏈食品溯源系統」，藉由區塊鏈一經輸入即無法竄改的特性，保證資料的透明公開，從產地到餐桌，所有過程都「有憑有據」，消費者得以清楚了解各項生產與銷售資訊，建立起食的信任感。王俊凱說，目前奧丁丁的溯源系統除了有稻米、豬肉、蘭花等品項外，連醬油都加入了溯源系統的行列，可說是一大進步。

王俊凱口中的醬油即是雲林老字號的新芳園醬油廠，當初在王俊凱三顧茅廬的拜訪下，雙方從彼此默默無聞一路合作至今，「我們就這樣互相幫助，如果沒有這些好的良心的生產者，大家也不

▲ 奧丁丁創辦人暨執行長王俊凱表示，未來奧丁丁將打造出更多城鄉互惠的智慧生活應用場景，創造新社會價值。Darren Wang, OwlTing Founder / CEO said,"Going forward, OwlTing will create more use cases for smart living to benefit both countryside and metropolitans and create new social value."

Founder / CEO said, "Techies are never in touch with real people. But I think this is something meaningful."

From farm to fork: food traceability system enabled by blockchain

In 2014, OwlTing decided to create OwlTing Market, an ecommerce platform for safe foods. Darren Wang, OwlTing Founder / CEO visited produce sites and wanted to showcase high-quality small farmers to consumers. At that time, OwlTing combined with e-commerce and mapping technologies to launch Milk Map, Fruits Map and Domestic Goats Map. Milk Map once sold over 10,000 bottles per month in the wake of The Ting Hsin food scandal. This also enhanced the cooperation between OwlTing and small farmers.

In order to present the "goodness" of quality produces in a more detailed and transparent way to consumers, OwlTing introduced blockchain technology into the food traceability system by launching OwlChain. The immutable nature of blockchain ensures the openness and transparency of data. All the processes from the farm to the table are recorded. Consumers can clearly understand all the information regarding production and sales, and this fosters a sense of trust. Darren Wang indicates that OwlChain currently covers rice, pork and orchids. It is a major advancement now that soy sauce is also in the traceability system.

The soy sauce mentioned by Darren Wang is Hsin Fan Yuan Soy Sauce Factory, a historical shop in Yunlin. Wang visited the company many times before their low-profile cooperation until today. "We help each other. Without these honest producers, people will not shop in OwlTing Market. We only prosper if they profit. We want to gradually develop the ecosystem." By working with OwlTing, Hsin Fan Yuan Soy Sauce Factory is able to distribute its products from Yunlin to all over Taiwan. It is the first soy sauce manufacturer in the world that benefits from the blockchain technology. The traceability system covers each and every step of the processes, from sourcing of soybeans, inspections, beans washing and cooling, fermentation, brewing in urns, pasteurization and labeling. According to Wang, the quality of soy sauce depends not only on the brewer but also the ingredients. The quality of these ingredients needs proof other than words from the brewer. "This is why we want to bring blockchain into the supply chain of

會到奧丁丁市集來買東西……，他們好我們也會好，慢慢把這整個東西做起來。」與奧丁丁的合作，讓新芳園從雲林在地賣向全臺灣，甚至成為全球第一家應用區塊鏈釀造的純正醬油廠。透過這套溯源系統，新芳園的醬油從原料豆來源、送驗、洗豆冷卻、發麴、入甕、殺菌、貼標等過程都一覽無遺，王俊凱表示，一個醬油的好壞不是只看釀造的人，原料也很重要，而原料不能光靠釀造的人說了算，要有證明才行，「所以我們就是把區塊鏈慢慢帶進各產業的供應鏈，食品產業的溯源也是一種供應鏈，每個步驟都要去證明給消費者看。」

經營╳旅遊的好幫手：區塊鏈旅宿管理系統

除了食品履歷溯源，奧丁丁還將區塊鏈應用於旅宿產業上，開發出全世界第一個以區塊鏈為架構的旅宿業訂房及內部管理系統——OwlNest。透過區塊鏈資產不可重複交易的特性，幫助旅宿業者解決訂房碎片化、跨平台房間超賣等痛點；也結合金流，並將優惠方案寫進智能合約中，讓系統自動生效，節省人力管理成本，大幅降低經營門檻。推出一年的時間，已有一千家臺灣民宿業者加入使用，廣受好評，更獲日本金融服務集團 SBI 投資超過千萬美金。為了實際理解旅宿業者的痛點而環島十幾次的王俊凱說，「以前沒有人為中小型飯店、民宿去做這樣的系統，它相當複雜，我們花了快兩年時間才做出來。」

解決旅宿產業經營痛點的同時，奧丁丁還成立了旅行社，於區塊鏈旅宿管理系統中導入豐富多元的全球、在地體驗行程。也就是說，「在訂房的同時，你還可以看體驗行程；或是看到心動的體驗行程，即可同時查找當地的訂房資訊。」讓所有旅遊問題一鍵解決，成為智慧觀光服務的新利器。

區塊鏈整合在地能量，創造社會價值

而區塊鏈於農業、在地旅遊的應用，也有著吸引創業者返鄉的示範作用。王俊凱本身就是從美國

different industries. Food traceability is also a supply chain in its own right. Each step must be proven to consumers."

A helping hand with travel management: Blockchain Accommodation Management System

In addition to food traceability, OwlTing is also using blockchain in the travel accommodation industry by developing OwlNest, the first blockchain-based booking and management system for hotels and home rental operators. Given the no-double-entry nature of blockchain assets, OwlNest helps the accommodation industry to resolve the pain point associated with fragmentation of bookings and overselling across multiple platforms. Promotional offerings and transactions are also written into smart contracts so that the system can automate the booking process and saves manpower and management costs. This has greatly lowered the entry barrier for accommodation providers. Since its launch one year ago, over 1,000 home rental operators in Taiwan have signed up. The popularity of OwlNest has attracted over $10 million investment from Japan's SBI Crypto Investment. Darren Wang traveled around the island for a dozen of times in order to understand the paint point of the accommodation industry. "Nobody did such a system for small-and-medium hotels and private accommodation providers. It is highly complex, and it took us almost two years."

On top of the resolution for the operational headache in the travel accommodation sector, OwlTing has also set up a travel agent, in order to instill a diversity of local experiences around the world into the blockchain system for hotels and holiday rentals management. "When booking for hotels or holiday homes, consumers can check out local itineraries. Or, if they are interested in some products, they can look for local accommodation options." It is the total solution for travelers in the era of smart sightseeing.

Blockchain integrates local resources and create social value

The application of blockchain in agriculture and local travel industries serves as a magnet for entrepreneurs to return to hometowns. Darren Wang himself is a returnee youngster from the U.S. When he visited the countryside in Taiwan, he noticed that local villages in general do not resonate with the young people.

▲ 奧丁丁集團記者會暨區塊鏈服務發表會，邀請嘉賓與合作夥伴分享對區塊鏈應用實例的想法。OwlTing's press conference and blockchain product launch, by investing honorable guests and cooperation partners to share case studies.

回臺灣創業的返鄉青年，在下鄉的過程中，發現臺灣鄉村普遍「缺少年輕人的認同感，」於是他把區塊鏈技術帶進農業、旅宿產業裡，為了就是要把年輕人找回來。「當跟我們合作的池上青農魏瑞廷靠著區塊鏈履歷把米賣到香港、杜拜去，它就會產生示範作用，讓其他青農也想要試試看，」王俊凱繼續補充到，在區塊鏈導入旅宿產業後已經可以看到其成長規模，對年輕人返鄉經營事業也有很不錯的吸引力，「但農業這一塊還要再給它一點時間，市場才會慢慢了解到這東西是有價值的。」

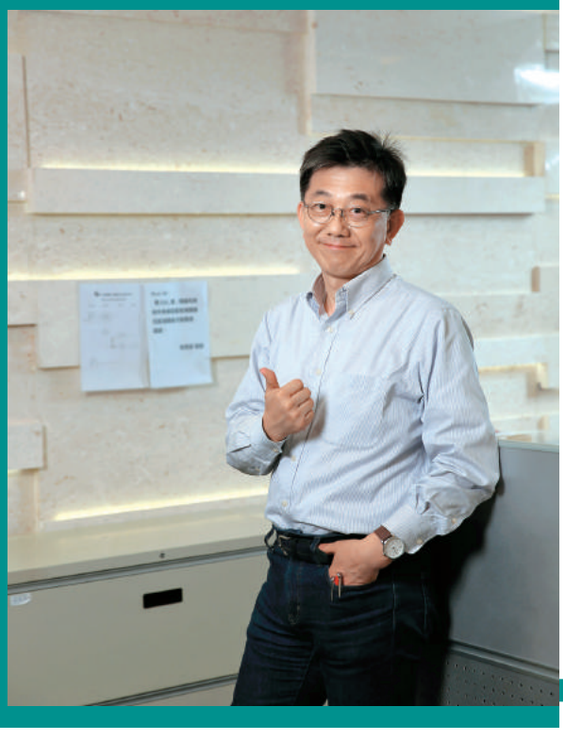
最後王俊凱提及，區塊鏈技術讓整個產業供應鏈的整合成為可能，「所有參與的人都可以去幫你把資料貢獻在上面，你也參與其中，隨時有資料都會更新，這就是以前做不到的事，也是我們在做的事。」奧丁丁集團於今年正式發表奧丁丁區塊鏈應用服務（OBS），彙整過去超過六年的產業實戰經驗，將三大區塊鏈應用—OwlChain 奧丁丁區塊鏈溯源系統、OwlNest 奧丁丁區塊鏈旅宿管理服務系統、OwlCheck 區塊鏈防偽系統整合，嘗試對多元產業推出專屬區塊鏈應用服務及解決方案。未來奧丁丁也將秉持一貫「助人為先」的信念，以區塊鏈技術整合城鄉間的豐沛能量，由解決農業產銷、食品安全與旅遊碎片化等問題，延伸至其他在地的難題與痛點，從產地到餐桌，從鄉村到城市，擴大區塊鏈的技術想像力，打造出更多城鄉互惠的智慧生活應用場景，創造新社會價值。

This was the reason why he introduces blockchain to agriculture and travel accommodation sectors, to bring back the young generation. "The young farmer Wei Rei-Ting from Chishang worked with us because he wanted to sell his rice, with blockchained traceability, to Hong Kong and Dubai. This will become a showcase to other young farmers so that they would want to give it a try." Wang said that there has been decent growth after the introduction of blockchain to the hotels and holiday rentals industry. It is very attractive for young people who would like to return home to make a living. "However, it will take a little longer for the agriculture industry to appreciate the value of blockchain."

Finally, Darren Wang mentioned that blockchain makes it possible to integrate the whole supply chain of a given industry. "All the parties involved can contribute data and everybody is a part of it. In the past, it was impossible to constantly update information. This is what we are doing." OwlTing just launched OBS (OwlTing Blockchain Services) this year. During the past six years, the company has introduced three systems to the market: OwlChain (food traceability system); OwlNest (travel accommodation management system); OwlCheck (anti-forgery system). The company spares no efforts in the integration of blockchain services and solutions for different industries. Going forward, OwlTing will continue to focus on helping others by gathering the richness of resources in cities and towns and use blockchain to resolve the fragmentation problems in agriculture, food safety and travel. This will gradually extend to the issues and pain points in other local communities, from the farm to the table, from rural to urban areas. By expanding the technical possibility of blockchain, OwlTing hopes to create more use cases for smart living to benefit both countryside and metropolitans and create new social value.

仁寶愛糖寶 從社區醫療到居家照顧 實現智慧照護普及偏鄉

Compal's iDiabCare Brings Smart Community Healthcare and Home Care to Rural Communities



仁寶電腦軟體研發本部副總經理 徐睿鈞 Richard Hsu, vice president of Compal's computer software R&D division

2005 年，世界衛生組織已表明慢性病為全球健康的頭號殺手。常見的慢性病包括了惡性腫瘤、糖尿病及心血管疾病等，而在臺灣糖尿病也被認為是「慢性病之王」，多數專家都建議臺灣將此疾病提升至國安層次。

In 2005, the World Health Organization declared that chronic diseases have become the number one cause of death worldwide. Common chronic diseases include malignant tumors, diabetes and cardiovascular diseases. In Taiwan, diabetes is considered the top chronic disease, prompting experts to urge the government to view this disease as a national security concern.

為解決醫病兩端困境、降低臺灣在糖尿病與相關慢性病症的健保支出，仁寶電腦於 2018 年推出「愛糖寶 iDiabCare® - 慢性病及糖尿病遠距照護系統 (簡稱愛糖寶)」，並與各大醫療院所積極合作。

導入先進技術 打造糖尿病照護方案

仁寶電腦軟體研發本部副總經理徐睿鈞指出，愛糖寶計畫始於 2016 年，仁寶電腦陳瑞聰副董事長與當時彰化基督教醫院 (彰基) 郭守仁院長在一次聊天中發現，慢性病與糖尿病一直缺乏 IT 醫護系統，仁寶電腦經過評估決定投入發展，並於 2018 年推出產品並積極拓展產品應用於生態圈。

To address the problems from both physician and patient ends, on top of reducing the national health insurance expenditures on diabetes and related chronic diseases in Taiwan, Compal Electronics launched iDiabCare®, a remote healthcare solution for chronic illnesses and diabetes in 2018. Now, it is actively collaborating with major medical institutions to put it to good use.

Introducing advanced technology to create a diabetes care solution

Richard Hsu, vice president of Compal's computer software R&D division, says that the iDiabCare project began in 2016 when Compal Vice Chairman Ray Chen and Shou-Jen Kuo, Superintendent of Changhua Christian Hospital were talking about how there's a lack of medical IT system for chronic diseases and diabetes. After some assessments, Compal decided to invest in the development of such system and later launched a product in 2018. Now, it's actively expanding the product to create an ecosystem.

▲ 怡仁綜合醫院個管師與病友體驗愛糖寶及互動。Yee Zen General Hospital's discharge planner interacting with a patient using iDiabCare.

臺灣包括為恭、彰基、怡仁等醫療院所，都已導入愛糖寶平台，而新竹縣、嘉義縣市、雲林、澎湖等縣市政府也都陸續與仁寶電腦簽訂合作備忘錄中，此外愛糖寶的應用觸角也延伸到對岸，天津馬光醫療糖尿病診所應用愛糖寶，強化其照護品質。目前愛糖寶的總使用人數已超過 2 萬 5 千人，使用人次則超過 45 萬人次。

另外，臺灣已於 2018 年正式步入高齡社會，建立完整的照護體系、培養穩定的照顧人力及提高照護品質，已成為當今急需著手的重要課題。因此除了與外界的醫院、縣市政府合作，仁寶電腦也揮軍進擊長照科技領域，推出「仁寶 i 照護™ - 仁寶日照居服雲端系統 (簡稱仁寶 i 照護™)」，優化現有的長照作業程序，提升服務品質，現在導入的長照單位已超過 190 家，使用從業人員超過 7 千人，被照護者則達 4 萬人之多，每月透過仁寶 i 照護™服務，簡化機構行政作業及加速核銷，協助長照單位向政府申報總費用應超過 17 億元以上。

徐睿鈞指出，「仁寶 i 照護™」目前服務 4 萬名以上的長者，粗估約有四分之一左右的長輩罹患糖尿病，對此仁寶電腦結合遠距醫療與居家照護需要，整合「愛糖寶」及「仁寶 i 照護™」服務，搭配藍芽硬體裝置，由居服員至家中協助量測血糖或血壓，其量測數據將自動上傳雲端，並將結果即時通知長者的家屬。目前已有數十家長照單位有意願合作使用，預計 2019 年下半年全面導入。

愛糖寶系統採用了 AI、雲端與大數據等智慧化技術，提供醫護人員與患者專業的諮詢與搜尋服

Many medical institutions, including Wei Kong Memorial Hospital, Changhua Christian Hospital and Yee Zen General Hospital, are already adopting the iDiabCare platform. At the same time, many city and county governments, including Hsinchu, Chiayi, Yunlin and Penghu, have signed a memorandum of understanding with Compal. Moreover, iDiabCare is reaching across the Taiwan Strait to China, where the Ma Kuang Clinic in Tianjin is using iDiabCare to enhance its healthcare quality. So far, iDiabCare has been used more than 450,000 times, serving over 25,000 patients.

Taiwan officially became an aged society in 2018. Establishing a comprehensive care system, cultivating healthcare professionals and improving the quality of home care have become pressing issues urgently demanding attention. Therefore, in addition to cooperating with hospitals and county and city governments, Compal also launched Compal Healthcare™, a home care service cloud system that optimizes existing long-term care procedures to improve service quality. Currently, over 190 institutions have adopted Compal Healthcare, where some 7,000 caregivers are using it and 40,000 patients are serviced every month. Compal Healthcare streamlines the administrative procedures and speeds up the expense reimbursement process, helping long-term care institutions apply for and receive government funding that has totaled over NT$ 1.7 billion (approx. US$ 54 million).

Richard Hsu notes that Compal Healthcare™ currently serves more than 40,000 elderly people, among which a quarter are suffering from diabetes. Compal is meeting the telemedicine and home care needs by combining iDiabCare and Compal Healthcare ™ service. Using Bluetooth devices, home caregivers can assist the elderly in measuring blood sugar or blood pressure, and the data will automatically be uploaded to the cloud and results immediately pushed to the elderly's family members. Dozens of long-term care institutions have expressed interest in adopting the integrated system, which is expected to be fully available in the second half of 2019.

iDiabCare uses smart technologies like AI, cloud and big data to provide healthcare workers and patients with professional consultation and query service. It now has over 1,000 entries of food information provided by professional nutritionists, presenting nutrition facts like calories, three major macronutrients (proteins, fats and carbohydrates), carbohydrate counting (carb per portion), and glycemic index (GI), where red, yellow and green signals are given to let diabetes patients know how the food may affect their blood sugar.

iDiabCare also applies AI on the user end by offering a food ID robot app. Users can snap a photo of the food and upload it, then the robot will return nutritional analysis and suggestions. The back-end management system also links the uploaded photos to the database to create a user dietary log, which can later be used as a reference by the

務，愛糖寶的資料庫現已鍵入超過 1 千筆由專業營養師分析的食物資料，資料中包括熱量、三大營養成分 (蛋白質、脂肪、碳水化合物)、醣代換 (醣類份數) 與 GI 值等多種數據，並以紅、黃、綠 3 種燈號示警該食材對糖尿病患者的影響。

愛糖寶也將 AI 應用於個人端，推出食物辨識機器人 App，使用者可用手機拍照上傳食物，機器人將回傳飲食營養分析及建議，管理系統也會將照片與後端資料庫連結，建立使用者的飲食日誌，之後可透過此紀錄提供營養師、醫師、個管師做為個人醫療諮詢用途，另外此平台還有提供專業文章，經由 AI 自動爬文糖尿病相關的報導或衛教文章，現已超過 5 千篇。

為了實證愛糖寶對糖尿病醫病雙方的協助，仁寶電腦將愛糖寶導入合作的醫院進行場域試煉，發現超過 20% 病友糖化血色素獲得明顯改善，也透過相關數據之分析，可節省醫師看診時間約 10%。

以智慧化機制 解決城鄉醫療不均問題

愛糖寶透過 AI、大數據與雲端管理等技術，讓糖尿病與慢性病的醫療照護更完善、更有智慧，不過徐睿鈞也表示，現在這類型智慧化系統大多應用於城市，要普及到資源相對缺乏的偏鄉仍有挑戰需要克服，而就目前來看，這些困境都有解決之道。

首先是運作機制，徐睿鈞明白指出，作為商業機構，獲利才能讓廠商產生意願，不過偏鄉的智慧醫療不能以營利為目標，因此必須有妥善的機制，而其中大數據收集是可行之道。智慧醫療仰賴完整數據，唯有建立足量的資料庫，分析出的結果才有意義，而若可在避免隱私權外洩的前提下，讓廠商可在偏鄉蒐集民眾數據，並由城市使用者付費，機制就可建立起來。

另一個困境在於法規面，例如藥材、醫材限制，在可見的未來政府無意放鬆仍會嚴加控管，這部分他建議可以透過與藥局、居服單位的合作克服，讓應用在合於法規之下，讓系統落地使用。

第三個困境是便利性，目前科技化產品操作介面

dietitian, physician, and discharge planner during consultation. In addition, the platform also uses AI to scour the Internet for diabetes related reports or health education articles; over 5,000 articles are on the platform.

To test whether iDiabCare is effective in assisting physicians and diabetes patients, Compal conducted field tests with hospitals that have adopted iDiabCare and found that over 20% of the patients have significantly improved glycated hemoglobin. Meanwhile, analysis of relevant data has shown that the duration of physician consultation is reduced by 10%.

Addressing the problem of urban-rural medical inequality with smart solutions

iDiabCare uses AI, big data and cloud management technologies to provide smarter and more robust healthcare for patients suffering from diabetes and chronic diseases. However, Richard Hsu points out that these types of smart systems are still often limited to cities, and there are challenges to spread them to resource-lacking rural areas. But solutions may be on the horizon.

The first is the mode of operation. Richard Hsu clearly points out that as a commercial business entity, profitability remains a priority. Since smart healthcare in rural areas cannot be profit-oriented, there must be some kind of proper money-making business model in place. Big data collection is one way to accomplish this. Smart healthcare relies on comprehensive data sets, because it requires a sufficient database for the results be meaningful. Working on the premise of offering full privacy protection, a business model can be designed where data is collected in the rural areas and paid by urban users.

The other challenge lies in the regulations for medicinal products and medical devices. Since the government is unlikely to relax the strict regulations in the foreseeable future, it is suggested to overcome this challenge through collaborating with pharmacies and home care institutions to allow the system to be used in compliance with regulations.

The third obstacle is accessibility. Right now, the interface of technology-based products is often complicated, not to mention the high price tag, and the practicability is still lacking. Therefore, besides optimizing the interface and affordability, it is imperative to enhance the practicability and establish a technology-friendly medical environment that allows users to feel the benefits of the system, thereby increasing the willingness to take up the system.

Compal has observed from its experience in promoting iDiabCare that doctors have polarizing

複雜、設備價格過高，且實用性仍然不佳，這部分除了優化使用介面、降低成本外，更須強化實用性，建立起可主動偵測的醫護環境，讓使用者對系統效益有感，同時價格也能負擔，導入意願才會提升。

而就仁寶電腦推動愛糖寶的經驗，醫師對智慧醫療系統的使用意願兩極，不用者認為數據無參考價值，願意用者認為多了一個參考資料，雖然意願不同，不過這兩方仍有共同意見，希望建立起使用智慧醫療設備的標準流程，而且此一流程須依患者病況而有不同，透過醫界認定的流程，智慧醫療的實用性才會浮現。

翻轉既有由上而下機制 O2O 解決偏鄉網路問題

最後則是網路服務，目前智慧醫療高度仰賴網路，然而偏鄉地區的基礎建設有限，網路覆蓋率不足，線上服務尤其困難，對此建議必須讓線上線下 (O2O) 緊密整合，在沒有網路的狀態下改用線下機制，雖然即時性較差，但仍能完成服務。

而 O2O 也將是讓智慧醫療可以突破偏鄉困境的最重要做法。一般醫療體系的流程分為城市大型醫院、地方診所或衛生所、病患等 3 個階層，也就是所謂的 H2H2P(Hospital To Hospital To Patients) 模式，此一模式中，大型醫院到中型診所的通訊並不能完成，真正的問題在於中型診所到病患的通訊層，這部分受限於各種因素往往難以順利連結，偏鄉地區尤其嚴重，因此必須透過 AI 演算法與其他智慧化工具完成線下監測，當設備可連線時，再往往上傳輸資料，完成醫療服務。

要拉近智慧醫療的城鄉差距，徐睿鈞認為醫療涵蓋的範圍過大，光靠企業的 CSR(企業社會責任) 付出會難以支應，政府應該扮演火車頭角色，先行挹注資源後，再由企業以其所長接手營運，他也指出，現在台灣偏鄉的經濟走向文創，此一走向過於侷限，產值難以浮現，而長照是台灣包括偏鄉在內的普遍性需求，若能有智慧、有系統的建置，除可讓社會落實老有所終之願景外，還可創造出更大的產值，為地方經濟注入另一股活水。

views of using smart healthcare systems—the nay side thinks the data has no reference value, the yay side believes it will provide another piece of reference. Albeit this divergence, there is a consensus in establishing a standard procedure for using smart medical devices, and that this procedure should adapt to the patient's conditions. The practicality of smart healthcare will emerge when a procedure recognized the medical community is firmly in place.

Flipping the existing top-down approach and using O2O to solve the problem of Internet accessibility in rural areas

Then there is the challenge of Internet accessibility. Smart healthcare relies heavily on the Internet, but infrastructure and network coverage in rural areas remain largely inadequate, making it difficult to deliver online services. Richard Hsu therefore proposes that Online To Offline (O2O) strategies be used to complete services when Internet is not available; although it may not be real-time, at least they can get the job done.

O2O is likely the most important way for smart healthcare to make inroads into rural areas. In general, medical communication is divided into three layers: large city hospitals, local clinics or health clinics, and patients. In this so-called H2H2P (Hospital To Hospital To Patients) model, the communication between large hospitals to clinics can't be completed. The real problem lies in the communication between clinics and patients, where it's difficult to establish a connection between the two layers due to limitations by various factors, particularly in rural communities. This is why offline monitoring must be done through AI algorithms and other smart tools, so data can be uploaded to complete the medical service once a device is connected to the Internet.

In narrowing the urban-rural gap in smart healthcare, Richard Hsu argues that it is nearly impossible to exclusively count on the CSR of companies to cover the full scope of healthcare services. Instead, the government should be the locomotive—first allocating resources to get the train moving before enterprises with the knowledge and know-how take over the implementation. Richard Hsu also points out the drawback of focusing only on cultural and creative industry in Taiwan's rural communities, since this limits the value creation potential. Long-term care is a universal issue across Taiwan and that includes rural areas. If a robust smart system can be built and sustained, the aged can be taken care of at the end of their life's journey, while creating value to inject new momentum into the local economy.

遠距教學 + 互動學習 網奕資訊實現教育版「智慧城鄉」

HABOOK Achieves Smart Rural Education through Tele-Teaching + Interactive Learning

因為科技，讓時空不再是距離，因為教育，讓偏鄉與階級不再是藩籬，網奕資訊科技集團集結一群熱血教師，自 2014 年起推動「偏鄉希望工程 遠距智慧語文」計畫 (以下簡稱偏鄉希望工程)，透過智慧教室的軟硬體科技，啟動 e-teaching 與 e-learning， 幫助遠距教學更活潑、師生互動更熱絡，學習成效更卓著！

Technology shortens the distance between people, whereas education closes the urban-rural divide. Since 2014, HABOOK Group has been mobilizing a team of passionate teachers to the execution of "Remote Language Teaching Hope Program (Hope Program)",using smart classroom and e-teaching/e-learning technologies to bring more interesting, interactive and effective education to students in remote areas.

網奕資訊科技集團 (以下簡稱網奕) 創立於 1999 年，創業團隊為一群具備教育愛與資訊專長的小學老師，努力開發與學習相關的教學軟體，創業後聚焦於教學活動 e 化整合方案的產品開發與導入服務，創立「TEAM Model 醍摩豆」智慧教育品牌與系統，發展智慧教室的軟硬體，並結合 AI 蘇格拉底系統，突破傳統遠距教學的痛點。

智慧教室 即時互動 如臨現場

網奕副總經理吳目誠分享，傳統遠距教學最大的挑戰就是教師不在班級現場，缺乏臨場感、師生

HABOOK Group (HABOOK) was founded in 1999 by a team of elementary school teachers who are passionate about applying IT expertise into the development of learning and teaching-related software. Their dedication in the development and implementation of digitally integrated teaching solutions gave birth to "TEAM Model" - a brand of smart education systems incorporating innovative hardware, software and an AI engine called the Socrates System to resolve the pain points in remote teaching.

Smarter classroom - a true-to-life, real-time interactive experience

Mu-Cheng Wu, Vice President of HABOOK, said that

互動薄弱，教師難以掌控班級的秩序與學習成效，網奕讓學生人手一支反饋器，針對教師的發問即時回答互動，教師可以知道每一個學生回答的答案，也能夠立刻針對統計數據進一步得知學生學習的現況，抽點學生分享作答的想法，深化教室現場的討論、互動、合作學習。

「目前的偏鄉教育面臨三大難題：缺資源、缺師資、缺刺激！」吳目誠進一步說明，「受限於預算，偏鄉學校經常缺乏智慧教室相關的軟硬體，許多教師也因為偏鄉交通不便而缺乏就任的意願，學生更缺乏外界資訊的刺激！」遠距智慧教室就是一個解方！由網奕提供軟硬體設備，由優秀教師遠距教學，再配合跨校、跨境、跨國的遠距連線共學，一次解決偏鄉教育的三大痛點！

▲ 透過「偏鄉希望工程 遠距智慧語文」計畫，讓偏鄉教育不再受時間、空間的距離限制。"Hope Program" breaks the constraint of time, space and distance in education for remote areas.

偏鄉希望工程 翻轉教育落差

自 2014 年起，網奕與臺灣讀寫教學研究學會攜手合作，推動「偏鄉希望工程」計畫，配合教育部國中小閱讀推動計畫，以資訊技術輔助國小、國中與高中推展閱讀教育。這項計畫啟動至今五年的時間，跨越宜蘭縣、新北市、屏東縣、南投縣等全臺多個縣市，應用在超過 20 所偏鄉弱勢學校，共有 2,000 名以上的學生受惠，節省教師超過 1 千公里以上來往的路程與交通時間，讓時間、空間的距離都不再是問題。

the greatest challenge associated with remote teaching in the old days was the absence of real teachers, and the distant teaching and lack of interaction all made it difficult for teachers to maintain order and keep track of learning progress. To resolve this issue, HABOOK provides each student with a feedback device that they can use to respond to and interact with teachers' questions in real-time, thereby produce immediate data on students' learning progress. This level of interaction enables teachers to tend to the needs of individual students and engage the class in live discussion, Q&A and coordinated learning.

"Education in remote areas currently lacks three essential elements: resources, teachers and information," said Mu-Cheng Wu. "Due to budget constraint, schools in remote areas do not have the hardware or software needed to establish a smart classroom, whereas teachers are reluctant to work in remote locations due to inconvenience and students have limited access to outside information." TEAM Model Smarter Classroom presents a solution to this problem! Using the hardware and software supplied by HABOOK, teachers are able to teach remotely across schools, boundaries and countries to resolve all three challenges outlined above!

Closing the urban-rural education divide through Hope Program

HABOOK has been working with Taiwan Research Association for Read-write Teaching in the execution of "Hope Program" since 2014. The Hope Program runs in complement with the Junior Read Project of the Ministry of Education, where information technology is used to assist elementary school, junior high school and senior high school students in developing good reading habits. After 5 years, scope of the Hope Program has expanded to more than 20 rural schools in Yilan County, New Taipei City, Pingtung County and Nantou County to the benefit of more than 2,000 students, while saving more than 1,000 km of travel distance and time for teachers.

In 2016, the Hope Program introduced "1+1 Smart Course," an innovative "reading-based" language teaching approach that connects two remote classes in the same live stream session. 1+1 Smart Courses are held on a weekly basis to guide students through the Mandarin learning materials of various schools and help them develop listening, speaking, reading and writing skills with respect to the language. More

2016 年這項公益計畫進一步發展出遠距直播的「1+1 智慧課程」模式，串聯兩個遠端班級，發展出異地同步互動的嶄新「閱讀」教學模式，每週進行 1+1 遠距智慧語文課程，教師依據各校選定的國語文教科書內容進行教學，培養學生在聽、說、讀、寫等多元能力，每周定期輔導超過 1200 名學生，臺灣讀寫教學研究學會理事長陳欣希教授更帶領專業師資團隊，在每次課後進行遠距議課與教學研討，幫助教師更能掌握智慧課程的相關專業能力。

遠距智慧聯盟 跨域共學成長

2018-2019 學年，這項公益計畫更進一步在各校建立遠距智慧聯盟，連結城鄉教育資源，串聯教師專業學習成長，進行遠距輔導、研習、教學與交流，增強偏鄉地區教育實力，不僅協助偏鄉學生提升閱讀理解能力、愛上學習與閱讀，也讓教師透過交流提升教學專業能力。

例如兩岸四地已經建構遠距智慧教室聯盟，連結四川成都師範銀都紫藤小學、福建廈門陽翟小學、香港學生輔助會小學與臺北的志清國小，幫助師生跨越地域的限制，受惠於不同文化的碰撞與刺激，持續共學、成長。

網奕的「TEAM Model 醍摩豆智慧教室」系統目前已應用在華人世界與中東地區的學校中。吳目誠分享，目前團隊面臨的挑戰，主要在於偏鄉的資源匱乏，除了網奕贊助的設備之外，偏鄉學校在線材、螢幕、麥克風、攝影機等器材的數量不足，都仍待突破。此外，偏鄉的師資相較為缺乏，並且需要持續強化新科技觀念，因此網奕利用遠距課堂進行師資培訓，讓偏鄉教師更能掌握應用新科技。

推動智慧城鄉 發展聯合生態系

過去臺灣發展智慧城鄉多由中央部會和地方政府自行規劃，以由上而下的方式推動，往往與地方實際狀況與需求無法緊密配合。吳目誠強調，「偏鄉希望工程」計畫近年來結合教育局、學術團體、社團法人、企業等資源，已經形成一股由下而上

than 1200 students are taught through the weekly courses. In addition, Professor Hsin-Hsi Chen, Chairman of Taiwan Research Association for Read-write Teaching, leads post-course discussions after each session to help teachers develop expertise in smart courses.

Smart education alliance - mutual learning and growth

This program was further expanded in the 2018-2019 academic year, and a Smart Education Alliance was formed with contacts assigned in participating schools to coordinate education resources in ways that improve teachers' training and growth. Through remote counseling, workshop, teaching and interaction, the program aims to improve the quality of education in remote areas and help students develop both interest and comprehension in reading, while enabling teachers to build up professional capacity through knowledge exchange.

This alliance has been expanded to include counterparts in the Greater China Region, including Chengdu ELDU Wisteria Primary School, Xiamen Yangzhai Primary School, Hong Kong Student Aid Society Primary School and Taipei Municipal Zhiqing Elementary School, thereby helping teachers and students overcome geographic limitations. The inclusion of different cultures also inspires learning and growth that were otherwise impossible under conventional methods.

HABOOK's "TEAM Model Smarter Classroom" solution is currently implemented in schools of the Chinese-speaking population and The Middle East. Mu-Cheng Wu said that the challenges currently encountered by his team are largely associated with the lack of resource in remote areas. Apart from the equipment sponsored by HABOOK, schools in remote areas are also deprived of supplies such as cable, monitor, microphone and video camera; all of which are prominent issues to their efforts. Schools in remote areas also lack teaching talents with up-to-date IT knowledge, which is why HABOOK's solution is being used in distant training to help familiarize local teachers with available technology.

Supporting an ecosystem of smart cities

In the past, smart city projects used to be planned and executed separately by central and local government bodies using a top-down approach,

的力量，而在臺灣也看到許多由下而上、從地方需求出發的成功案例。

「桃園市自 2015 年開始推動『智慧學校數位學堂』，已經建置超過兩千間智慧教室，並選定大有國中為智慧教室示範學校，大有國中積極進行跨域共學，在今年 5 月份和新加坡華義中學透過遠距智慧教室連線、未來更計畫與日本的姊妹校、中國的友好學校進行定期遠距教學，可謂是經典的遠距推展模式。」吳目誠舉例說明。

如今城市的發展，講究以區域為單位，發展城鄉聯合生態系，各國政府都極力突破城鄉發展落差，吳目誠認為，科技是一大關鍵，傳統不可行的事情，現在卻都因為科技而有可能成真。「偏鄉希望工程」以科技融入教學，幫助師生都能掌握科技工具、發展科技應用優勢，更在教育專業群體之間，建立「科技融入教學」的主流價值，進一步透過科技翻轉教育、弭平城鄉落差！

展望未來，吳目誠表示，網奕將更進一步結合各界資源，舉辦跨領域增能研習、楷模見面會，也會持續舉辦小貓頭鷹讀寫營活動，讓各縣市學生進行跨領域、跨年級的讀寫交流，持續推動偏鄉希望工程、改善偏鄉教育環境。「也希望政府給予更多的協助，支持舉辦巡迴講座、教師與學生的閱讀活動、國際遠距智慧課堂交流，讓『偏鄉希望工程』的效應更加擴大。」

▲ 網奕的「TEAM Model 醍摩豆智慧教室」系統，透過科技逐步翻轉教育、弭平城鄉落差。HABOOK's "TEAM Model Smarter Classroom" solution incorporates technology to narrow the urban-rural divide.

which often failed to address the reality and needs of the local society. Mu-Cheng Wu emphasized that the "Hope Program" has been coordinating with education authorities, academic institutions, non-profit organizations and businesses in recent years to come up with solutions using a bottom-up approach; today, there have been many examples of successful solution inspired by local needs.

"Taoyuan City first introduced its Smart Classroom Initiative back in 2015, and has constructed more than 2,000 smart classrooms to date. The city government designated Da You Junior High School as the pilot school for smart classroom development, and Da You made its first remote connection with Hua Yi Secondary School in Singapore in May this year. Da You serves as the role model of how remote education should progress, and will be connecting partnered schools in Japan and China for remote teaching on a regular basis," said Mu-Cheng Wu.

Urban developments nowadays tend to be isolated and confined within separate regions, and governments around the world are starting to realize the importance of coordinating efforts between urban and suburban areas as a means to minimize the urban-rural divide. Mu-Cheng Wu considers technology to be the key for this development, and solutions that used to considered impossible are beginning to surface because of new technology. By incorporating technology into teaching, the "Hope Program" not only enhances teaching advantage for the teachers and learning progress for the students, but also promotes the concept of "technology-aided education" that has the potential to narrow the urban-rural divide.

Mu-Cheng Wu said that HABOOK will incorporate resources further across the industry to organize events such as skill enhancement workshop, speech by reputable professionals, and junior read-write camp for students of all counties and cities. In the future, the Hope Program will continue to serve as a solution for improving education in remote areas. "We hope that the government may provide us with more assistance and support our seminar tours, reading programs and smart classroom interactions with foreign counterparties, and help expand the Hope Program to a new level."

智慧化×服務化，經緯航太以無人機打造在地新經濟

Intelligence & Services. The Drones for the New Local Economy

從防災、資源探勘、智慧農噴到未來智慧巡檢、智慧物流等領域的發展應用，經緯航太致力將無人機的技術價值轉化為生活應用價值，站穩在地、放眼國際，不但深化了臺灣航太業的競爭力，更讓無人機航向智慧應用的新高度，改變產業生態鏈，為偏鄉注入新經濟的動能。

From disaster prevention to resource discovery, from agricultural chemicals spraying to smart reconnaissance and distributions, GEOSAT Aerospace & Technology Inc. ("GEOSAT") endeavors to bring drones to practical applications, to drive the local economy and connect with the international community. This enhances the competitiveness of the aerospace industry in Taiwan and raises the bar for smart applications of drones. It changes the supply chain and creates the momentum for the new economy in rural regions.

經緯航太董事長 羅正方 Cheng-Fang Lo ,Chairman & CEO of GEOSAT Aerospace & Technology Inc.

擁有整機系統整合製造技術的經緯航太，是亞洲唯一具備研發、製造、後端資料分析能力的全方位無人機應用領域加值型服務廠商。「知識求新為經，創意求變為緯」，經緯航太依此不斷開拓無人機的研發生產與新應用場景，提供完整且切合在地需求的解決方案。從繪測探勘、防災效率的提升，到無人機農藥噴灑的實現等，經緯航太透過科技、資訊與服務的匯流，形成跨領域整合的力道，讓無人機在翱翔天空之際，也能於臺灣每個角落撒下智慧化與改變的種子，解決農村、偏鄉人力不足的結構性困境，更賦予這些地區未來多元發展的智慧能量。

As a system integrator and manufacturer, GEOSAT is also the only full-service vendor in Asia with UAV research, manufacturing and backend data analytics capabilities. The company's core value lies in the pursuit of knowledge and innovations. GEOSAT spares no efforts in the development and application of drones, in order to provide comprehensive solutions to meet local needs. From metrology and discovery, disaster prevention to agricultural chemicals spraying, GEOSAT facilitates the integration of different domains with the combination of technology, information and services. It is envisioned that their drones can plant the seeds of change in each corner of Taiwan, in order to tackle the structural shortage of labor in farming villages and remote areas. The vision is to empower these regions with a plethora of smart applications.

▲ 透過無人機機上的感測器，為農業做精準投遞，不但解決偏鄉勞動力不足，同時也能讓農業上升到智慧化農業。
Equipped with sensors, UAVs make precious dispatches and deliveries required for farming. This resolves the insufficiency of manpower in remote areas and brings intelligence to agriculture.

唯一擁有無人機上中下游全能量的服務廠商

經緯航太源於董事長羅正方對臺灣航太競爭力的思考：「有什麼長遠的路能保持臺灣在航太界的競爭力，並站上世界舞臺發光發熱？」於是羅正方帶領經緯從無人機著手，歷經多年研發生產，陸續開發出定翼機、旋翼機、直升機和微型機等無人飛行載具系統，以及飛控、地面導控、感測器模組等關鍵次系統，搭配操作應用服務，讓無人機的設計、生產、製造、測試、飛行服務，乃至於後面的 AI 大數據分析全部留在經緯，也留在臺灣。羅正方說，「非常驕傲的是在發展自動無人載具的過程裡面，我們建立了所有大腦，並打造出一個上中下游垂直整合的生態系。」

羅正方解釋到，大腦的掌握對產業很重要，經緯擁有無人機產業的全能量，也持續推進軟體技術，強化 AI 感知與控制的能力；同時還針對新材料、新能源做更多的研發導入。羅正方以經緯自主研發，全機用 EPP 發泡材質製成的輕便型手拋無人機「翼龍」為例，「它只有 2.2 公斤，還包含感應器、相機跟降落傘，滯空時間可達 70 分鐘，比美國跟法國同級產品的 50 分鐘還要長。」而法規環境的建置也是讓經緯無人機得以持續發展的重要因素，特別是 2018 年 4 月民航法通過「無人機遙控專章」的修法，同年12月再通過「無人載具科技創新實驗條例」，羅正方說，臺灣去

The only full-service vendor with UAV capability from upstream to downstream

Cheng-Fang Lo Chairman of GEOSAT hopes to make Taiwan's aerospace industry shine and thrive in the global market. Under his leadership, the company spent years in R&D and designed a variety of UAV models, e.g. fixed-wing UAV, rotaplanes, helicopters and mini-UAVs, as well as and sub-systems such as control, navigation and sensor modules. By rendering drone services, GEOSAT keeps the knowhow from design, production, testing, flying and AI analytics all in Taiwan. Cheng-Fang Lo said, "We are proud that we have built all the brain power sitting inside a drone and established a vertically integrated ecosystem from upstream to downstream".

Cheng-Fang Lo indicates that the brain capacity is critical. GEOSAT has the full-service competences for the drone industry. The company continues to develop its software capability and enhance AI sensing and control expertise. More R&D spending will be allocated to new materials and new energy. Cheng-Fang Lo uses the Pterosaur lightweight UAV throwing hand as an example. Developed by GEOSAT, the Pterosaur series is made of EPP form throughout its body. "It weighs only 2.2 kilograms and contains sensors, cameras and a parachute. The Pterosaur series can stay airborne for up to 70 minutes, longer than 50 minutes for comparable products in the U.S. and France.

In Taiwan, the institution of the legal environment is one of the important factors to sustainability of the UAV industry. In April 2018, the Civil Aviation Law of the Republic of China was amended with a new chapter dedicated to remote control of drones. In

年一整年在法規上的進步，等同於過去十年的進步，「因為有標準跟施作規範，安全可以被確保，整個產業的技術跟需求就起來了。」

多元應用，解決鄉村地區人力短缺的困境

於是經緯航太的無人機在技術、法規、與試煉場域多重測試驗證下，這十年來已經於「防災」、「資源探勘」、「農業」等領域獲得成功的應用經驗。羅正方說，「第一個就是防災，特別是我們的災害大多發生在比較偏郊的地方，從莫拉克颱風到臺南、花蓮大地震，每一場戰役都可以看到經緯的無人機。」無人機可快速掌握災害現場的第一手資訊，解決人力難以企及的部分，使得救災、災後重建都能更有效率。

第二則是資源探勘，羅正方表示，「資源探勘當然很多是在偏郊地區，從農地、地熱到水資源等等，你並沒有那麼多的人力去做巡邏巡檢，必須要進行空中的監探。」無人機能夠大幅提升探勘面積，加上快速回報、機動性強，成為國土資源保護的新智慧工具。而無人機優異的探勘效能，對於農業也有著無比重要性。「無人機在農業上有兩個角色，一個是空中之眼、一個是精準投遞，」羅正方說明到，偏鄉地區因高齡化、少子化而造成勞動力不足，「透過農業自動化去維護環境跟生產作為就很有幫助。」目前經緯無人機可透過機上的感測器，去探測作物的健康情形，進而進行精準的施肥、施藥投遞，同時建立起農業的大數據，「我們目前為止可以掌握國內的水稻、玉米、茶葉，以及國外如馬來西亞的棕梠樹等等，這能讓自動化的農業上升到智慧化的農業，既安全又有效率。」羅正方說。

打造新分享經濟，提升偏鄉競爭力

而經緯無人機於農業的應用也在行政院科技會報辦公室指導下，以「神農無人機」於臺南後壁進行大規模的農噴國家實驗，為了就是要建立農噴施作的標準作業 SOP；同時農委會也將於今年以

December during the same year, the Statute for Innovation Experiments of Unmanned Vehicles was passed. Cheng-Fang Lo said that the advancement in the regulatory framework in Taiwan in 2018 was the equivalent to the aggregation of baby steps during the previous ten years. "With the assurance of safety supported with standards and operational requirements, the technical capability and demand levels start to gather momentum."

A variety of applications to resolve the problems of labor shortage in rural areas

GEOSAT has ten years of experience under its belt in trials-and-tests of applications in disaster prevention, resource discovery and agriculture in terms of technology, legality and viability. Cheng-Fang Lo said, "Our first focus is disaster prevention, because most of the calamities in Taiwan occur in remote regions. From Typhoon Morakot to earthquakes in Tainan and Hualien, GEOSAT's drones were at every event site." UAVs can rapidly capture the first-hand information at disaster sites difficult to access. This enhances the efficiency of disaster rescue and subsequent reconstructions.

Resource discovery is the second focal point for GEOSAT. Cheng-Fang Lo indicated, "Of course many resource discovery activities are in inaccessible areas. This includes the investigation of agricultural land, thermal heat and water resources. It is difficult to organize enough manpower for patrols and inspections. Aerial monitoring is a prerequisite." UAVs can accelerate returns by massively expanding the coverage of explorations. With great mobility, drones serve as the new intelligence vehicle for the protection of national lands and resources.

The exploration and investigation capabilities are pivotal to agriculture. "UAVs serve as the eye from the skies and the dispatch of payloads with great accuracy" said Cheng-Fang Lo. Rural areas suffer from human resources insufficiency due to population aging and low birth rates. "Automation is very helpful to the production and maintenance of the environment." GEOSAT's drones, equipped with sensors, can detect the health of crops and administer precious dispatches of fertilizers and agricultural chemicals. This also enables the establishment of Big Data. "We have so far cumulated data of rice, corns, teas in Taiwan and palm trees in Malaysia. This adds intelligence to automation in agriculture, boosting safety and efficiency", said Cheng-Fang Lo.

▲ 無人機能夠防災、資源探勘，解決人力難以企及的部分，同時建立起農業的大數據，使得救災、災後重建及改變產業生態鏈，為偏鄉注入新經濟的動能。Drones can reach inaccessible regions for disaster rescue and resource discovery and establish Big Data in agriculture. This will transform the supply chain of disaster rescue and post-disaster reconstructions, as well as create the momentum of the new economy for remote areas.

一試雙證照（怎麼飛、怎麼噴）的方式，讓無人機合法合規使用，解決農村長期缺工的問題。羅正方說，「像稻熱病疫情爆發時，施藥都是大家搶工，老農體力無法負荷，找代噴人手也不足，」但藉由「神農無人機」的幫助，第一噴藥效率可增加 5 到 10 倍的效率；第二可讓農民或代噴業者無須暴露在危險的環境底下；第三是農藥只要減半，就能達到同樣的效果，對環境友善永續。

無人機合法上路後，經緯航太的農噴應用將跨域整合農資、肥料、農藥、營養劑、除草劑等廠商，形成一個服務體系。羅正方表示，未來無人機農噴市場預估至少需要兩千部無人機與四五千位飛行員，「這就是一個新的就業經濟，並將以一個類似 Uber 的想像去實現。」羅正方說明到，透過農噴服務的膠囊化，建置資訊平臺予以媒合，讓擁有合格證照的年輕人能回到家鄉去做服務，施作即是標準 SOP，噴灑的相關數據紀錄也全數傳至監理平臺，透明化且可溯源，不僅消費者安心，生產成本也大幅降低，「這樣的共享經濟、平臺經濟與資訊智慧經濟，能提高我們偏鄉的競爭力，是跨領域整合及新經濟的表現，更是臺灣未來的希望。」

Creation of the sharing economy and enhancement of rural competitiveness

Under the guidance from the Board of Science and Technology, Executive Yuan, GEOSAT's APLAS series conducted a large-scale experimental spraying in Houbi, Tainan, in order to establish standards of operations. In 2019, the Council of Agriculture also issues dual permits regarding how to fly and spray for the compliance of drones, in order to resolve the long-term headache of labor shortage in agricultural villages. Cheng-Fang Lo said, "When the rice blast hits, everybody rushes to spray chemicals. However, old farmers are not physical capable and there is not enough temp labor coverage." With the help of the APLAS series, the spray becomes 5 to 10 times more efficient than before. It also exempts farmers or temp personnel from exposure to hazards. Meanwhile, the chemical required is reduced to half for the same effects. This is beneficial to environmental sustainability.

Now that the regulatory regime is in place, GEOSAT will serve as a full-service vendor by offering solutions in data analytics and spraying of fertilizers, herbicides, nutrients and agricultural chemicals. Cheng-Fang Lo indicated that the market for agricultural spraying requires 2,000 drones and 4,000 to 5,000 pilots. This is a new job market similar with Uber. With modularization of agricultural services and matching of demand and supply, the qualified young people can return to hometowns for work. Everything will follow the standards of operations and relevant data will be uploaded to the supervisory platform. It will be transparent and traceable. This will significantly ensure trust from consumers and lower production costs. "The sharing economy of information platform and intelligence will boost rural competitiveness. The cross-disciplinary integration and new economy is the hope for the future of Taiwan."

▲ 無人機在農業上有兩個角色，一個是空中之眼、一個是精準投遞。UAVs serve as the eye from the skies and the dispatch of payloads with great accuracy.

解城鄉的渴：經濟部水利署為古老行業注入創新思維

Quenching a City's Thirst: Innovative Thinking for Century-Old Professions

經濟部水利署結合 IoT、AI 與大數據技術打造出臺灣水利資料整合 平臺——「水資源物聯網」，透過串接感測端、平臺端與應用端，發展一系列如智慧防汛、智慧灌溉節水、智慧水表等生活面及產業面的相關應用，不僅達到便民、離災防災之效，也縮短了城鄉差距，為各地注入豐沛的永續能量 。

Water Resource Agency, MOEA incorporates IoT, AI and big data technologies into creating a "Water Resource Information Network." Using a combination of sensors, platforms and application software, the agency is able to develop a series of lifestyle and commercial solutions such as flood prevent, smart irrigation and smart meter that not only improve the convenience and safety of the general public, but also narrow the urban-suburban divide and enhance sustainability of the environment.

經濟部水利署長 賴建信 Chien-Hsin Lai, Director-General of Water Resource Agency, MOEA

北回歸線通過臺灣，但副熱帶高壓並沒有為我們帶來沙漠，反而與季風環流和西太平洋颱風交互影響，提高了臺灣氣候的變化度與敏感度；加上高聳中央山脈橫亙南北，雖賦予臺灣豐富的林相資源，卻也使得上游降雨到下游入海的時間短暫，造成防災上的困難。經濟部水利署長賴建信表示，此種氣候與地形的特殊性，讓臺灣在防災上必須要更加迅 速地反應，「於是我們利用科技去幫助地理環境很敏感的 區位，達到災害預測、疏散撤離的快速應變。」對此經濟部水利署開發出「水資源物聯網」與「水情 APP」，利用 IoT、AI、大數據與雲端技術，於災害前事先掌握各地的水情資訊，並透過電話、簡訊和水

Tropic of Cancer passes through Taiwan, but instead of creating a desert on the place we live, the subtropical highs interact with atmospheric changes and Typhoons in the western Pacific that increases the volatility and sensitivity of climates in Taiwan. Although the Central Mountain Range that stretches the entire length of the island does provide abundant forestry resources, it shortens the travel distance of rain from mountain into ocean, which poses challenges to flood prevention. Chien-Hsin Lai, Director-General of Water Resource Agency, MOEA, said that given the distinctive climate and geographic characteristics, speed and responsiveness are absolutely critical in Taiwan's flood prevention efforts. "This is why we use technology in climate-sensitive locations to help predict disasters and support evacuation." By incorporating IoT, AI, big data and cloud computing technologies, Water Resource

▲ 透過水情 APP 等管道將可能的災害訊息做預先傳遞，將傷害降至最低。Disaster-related information is transmitted through Water Data APP to facilitate preventive efforts and minimize damage.

情 APP 等管道將可能的災害訊息做預先傳遞，達到離災、防災的目的。同時，經濟部水利署也運用「水資源物聯網」開發出更多創新的應用服務，在推升水利產業的同時，也帶動了城與鄉的智慧發展。

水資源物聯網 × 水情 APP：智慧防汛新利器

極端氣候變遷加上臺灣特殊的地理樣貌，讓近年「短延時、強降雨」的致災性暴雨頻仍。擁有豐富救災經驗的賴建信說到，「當雨下下來才反應就太慢了，比如說位於城市或周遭的安養院、老人之家等機構，一但水淹到那邊才開始通知疏散是來不及的。」因此經濟部水利署建置了「水資源物聯網」，作為掌握、調控臺灣水資源來源去向和防汛安防的整合平臺。利用大數據蒐集與雲端分析，從取水、供水到用水端，讓水資源使用發揮最大效益；並且結合智慧河川管理系統，透過物聯網技術的傳輸、水情 APP 的主動推播通知，達到水情監控以及水災預警、預報，大幅增強防災力道。

目前經濟部水利署正積極擴大「水資源物聯網」的外部資料介接與整合，如全國各單位的感測資料、氣象局與各國模式的預報資料等等，「在前瞻基礎建設計畫裡面，很大一部分是在做這樣的

Agency, MOEA has developed a "Water Resource Information Network" and a "Water Data APP" that constantly monitor and provide water-related information throughout the nation. Possible floods can then be identified and communicated through phone, SMS and the APP to facilitate prevention or isolation measures. In addition to water resource management, Water Resource Agency, MOEA also uses the "Water Resource Information Network" for other innovative applications that support the development of a smart city.

Water resource information network × water data app = smart flood prevention

Climate changes combined with Taiwan's distinctive geographic characteristics have made rainfalls "shorter and more intensive" in recent years, causing frequent disasters. As a veteran in rescue and disaster prevention, Chien-Hsin Lai said: "Reacting to rain is too slow a response. Institutions such as nursing home around the city, it is important to order an evacuation well before the place is flooded." With the creation of "Water Resource Information Network," the Water Resource Agency, MOEA is able to monitor the shift in water resources and coordinate flood prevention and rescue efforts. The network incorporates big data and cloud computing technologies for the gathering and analysis of data from water intake, water supply to utilization, and in doing so maximizes the yield of water resources. Combined with the availability of a River Management System, an IoT network, and Water Data APP for push messages, the Water Resource Agency, MOEA is able improve its flood monitoring, alert, prediction and rescue efforts by a significant degree.

Water Resource Agency, MOEA is currently expanding the interfacing and integration of external data such as nationwide measurements, predictions by the Central Weather Bureau and foreign authorities etc for the "Water Resource Information Network." "A large part of the government's new infrastructure projects has been aimed at integrating data and applying AI to generate analyses and predictions out of it, which is also the direction we are taking." Chien-Hsin Lai explained that this level of integration will allow more user-friendly interfaces to be developed for the needs of the general public, the prevention workers and other users, and provide more comprehensive support for analyses and predictions that improve the efficiency of flood prevention efforts. This is especially important for remote

▲ 土壤水分含量感測器能有效控制灌溉自動閘門，以花最少的人力，放最少的水，去灌溉最多的面積。Soil moisture sensor allows automated irrigation control, which maximizes irrigation area for the given volume of water while requiring little to no labor.

區塊，即是不同資料怎麼去整合，繼而累積數據產生 AI 分析預測，這也是我們最近正在努力的地方。」賴建信解釋到，如此一來便可以「水資源物聯網」為基礎，開發出能同時滿足民眾、防災人員等不同使用者需求的友善介面；二來是能產生更為全面的分析及預測，提升防汛效率，這對少子化、勞動力不足的偏鄉地區更是特別重要，「我們的防汛物資是有限的，加上未來我們人口是減少的，所以我們必須要把資源很快速地分配到風險最高的地方，產生最好的 CP 值與防災效能。」

打造聰明、豐富的水資源智慧管理解決方案

為了讓水資源管理更聰明、應用更豐富，經濟部水利署除了加強「水資源物聯網」的內外資料庫整合，還開發出不同的 API（應用程式介面）供民間使用，「只要稍微加工就可以去發展出客戶端、個人化的設計。」賴建信表示，水情 APP 已經盡力去針對不同用途來做研發，但還是希望藉此去蒐集地方上其他人的創意，讓水資源解決方案更加豐富完整。「所以我們也參與了黑客松競賽，去整合其他人的想法，我覺得這是很好的蒐集創意方式，」賴建信說，經濟部水利署本身有水利方面的領域知識（domian know-how），但要想辦法將它拓展到應用端，包括介面與科技之間都要做好系統整合，這在未來特別重要。

locations where young population and manpower are scarce, "because given the limited resources we have and potentials of a dwindling population, we must be able to distribute resources quickly to areas of the highest risk and make the best out of them."

Creating smart water resource management solutions

To make water resource management smarter, more useful and versatile to the general public, the Water Resource Agency, MOEA has enhanced integration of internal and external database for the "Water Resource Information Network" and developed a variety of APIs (application programming interfaces) that "only require a small modification to support personalized designs at the user end." Chien-Hsin Lai said that the agency has tried its best to design the Water Data APP for various purposes, but still welcomes creativity from the public to improve its water resource solutions. "We also participate in hackathons to integrate opinions from others, which I think is a good way of gathering creative ideas," said Chien-Hsin Lai. The Water Resource Agency, MOEA has strong domain know-how in water management, but to make it useful in real-life applications, there has to be proper integration of interfaces and technologies, which is particularly important in the future.

"Higher level of sensor-platform integration and more creative applications are some of the improvements that we can make in Taiwan," said Chien-Hsin Lai. The smart irrigation system implemented at Guantian, Tainan, for example, incorporates the use of soil moisture content sensors developed by Taiwanese companies, which gather and transmit data through cloud to facilitate automated irrigation control. In

「於感知端、平臺端多一點整合，應用端再多一點創意，這是臺灣可以大力發展的部分，」賴建信以臺南官田的智慧灌溉系統為例，透過結合臺灣在地廠商研發的土壤水分含量感測器，將相關資料傳送至雲端，進而控制灌溉自動閘門，讓掌水工老齡化、人力普遍不足的農村地區可以花最少的人力，放最少的水，去灌溉最多的面積。今年賴建信更帶領臺灣許多新創業者如安研科技(AnaSystem)、蜂巢數據科技(Beehive Data Technology)等去英國交流，展現臺灣結合傳統與創新技術的完整水利解決方案，獲得成功迴響，「臺灣是一個很好的試煉場域，ICT 技術很好，人才水平也很高，只要能把它整合起來，它就會是一個很好的水利產業。」

從「水」中找出更多服務人的方式

而「水資源物聯網」的應用與生活品質提升及產業發展也息息相關，尤其對人口老化的偏鄉地區更是如此，「水是人生命的三大要素，我們可以好好去管理，特別是智慧水表，與長照有很大的關係，」賴建信說明到，「每天一早起來我們就會刷牙洗臉，就會用水。假設智慧水表普及化，我便可以從雲端看到媽媽是否按時起床及作息，進而掌握其安全。」

前瞻基礎建設計畫中的水環境建設，將「水與發展」、「水與安全」及「水與環境」訂為三大建設主軸，賴建信表示，這些都是基礎建設的部分，「前瞻基礎建設計畫也不是只有做基礎建設，還要軟硬體一起提升。」人口老化與都市過度集中是全世界都共有的問題，而水是人生命中最重要的元素之一，「怎麼樣給大家最乾淨的水，怎麼樣從水裡面去找出服務人的方式，去找出水怎麼減少災害的方式，這裡面有太多很好的潛在應用。」透過服務經濟的方式，利用智慧化科技來解決傳統的用水問題，進而推動智慧城鄉的穩定發展，「讓我們的生活更加便利，也讓環境更加永續」賴建信說。

rural areas that no longer have the manpower to control irrigation manually, this installation maximizes irrigation area for the given volume of water requiring little to no labor. This year, Chien-Hsin Lai led several new Taiwanese businesses including AnaSystem and Beehive Data Technology to a knowledge exchange tour in UK, where they showcased how Taiwan has combined conventional and innovative technologies to introduce robust water resource management solutions. "Taiwan offers the perfect environment to experiment such solutions mainly because of its well-established ICT industry and talent quality. They can be integrated to create excellent water resource management solutions."

Exploring applications in water usage

The "Water Resource Information Network" can be used to improve the quality of people's lifestyle and expand industry prospects, especially in remote areas with aging population. "Water is one of three elements that are critical to our survival, and therefore should be managed pro-actively. Smart meters, for example, can be very useful in nursing service," said Chien-Hsin Lai, "washing and brushing are the first things we do every morning, and with smart meters in place, I can track my mother's daily routines over cloud and establish her state of health."

The government's new infrastructure initiative incorporates a number of water-related projects that are aimed to address "water in industry development," "water safety" and "water environment." According to Chien-Hsin Lai, "These projects are merely infrastructures, and require improved equipment and software support to function." Aging population and over-populated city are common problems around the world, and since water is one of the critical elements to human life, "there are significant benefits for exploring cleaner water supply, new water applications, and alternative flood prevention solutions." Smart technology provides the means to solve century-old water problems and contributes to the development of smart cities. "It makes our lives more convenient and our environment more sustainable," said Chien-Hsin Lai.

創新能源管理
智慧生活應用的第一把鑰匙

Innovative Energy Management
The First Key to Smart Living Applications

智慧化不再遙不可及！展綠科技以「綠能智慧鉤錶」和 LP-WAN(Low-Power Wide-Area Network) 物聯網技術打造創新能源管理系統，其快速安裝、便利、低成本的特性，讓智慧科技能極為簡單地導入生活且接軌產業需求，進而成為開啟在地居民、產業界和地方政府感受智慧化的第一把鑰匙。

Intelligentization is not far beyond reach anymore! 3Egreen Technology Inc., with Smart Green Power Clamp Meter and LP-WAN (Low-Power Wide-Area Network) IoT technology, develops an innovative energy management system that features rapid installation, convenience, and affordability, facilitating the introduction of smart technology into our daily life and industry, and thereby becoming the first key to intelligent solutions for local residents, industrial sector, and local government.

隨著氣候變遷加劇和能源需求的增長，如何高效率地使用能源同時保證其安全性，將是左右區域乃至國家邁向永續發展的重要關鍵。展綠科技運用 IoT 物聯網打造出能源管理的軟硬體整合解決方案，透過一顆顆輕巧的「綠能智慧鉤錶」，展現低門檻、隨扣即用的便利性，讓使用者得以輕鬆進行用電狀況的監測、分析及管理工作；同時也藉由低建置成本、高傳輸效率的 LP-WAN 技術，給予不同區域，特別是偏鄉地區的智慧化需求可以得到最適切的照顧。展綠科技執行長吳仁作表示，這套創新的能源管理系統，「能夠依照各偏鄉實際的狀況，讓他們用較少的資源跟費用就達到智慧化的入門。」

With intensive climate changes and increasing demands for energy, how to use energy more efficiently with compromising safety will be a crucial factor for regions or even the whole nation on their roadmap to sustainable development. The software-hardware integrated solution for energy management, developed by 3Egreen Technology Inc. from IoT, offering affordability and convenience of immediate use through a lightweight and compact "smart green power clamp meter", allows users to monitor, analyze and management their power consumption in an easy manner. In addition, with LP-WAN of low implementation cost and high transmission efficiency, it properly addresses the need for intelligent solutions in different regions, particularly in remote areas. Curtis Wu, CEO of 3Egreen Technology Inc., says that it is an innovative energy management system that "introduces the people in remote areas

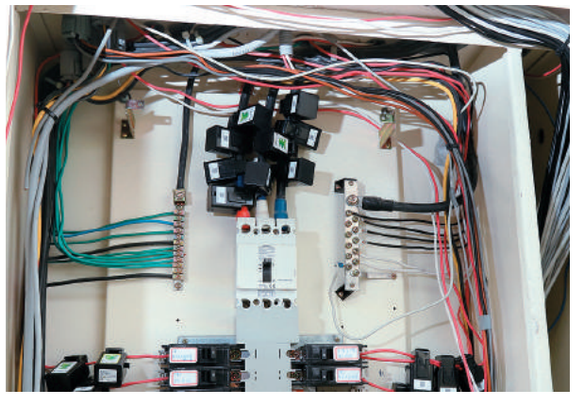
創新型能源管理系統 克服傳統用電領域痛點

展綠科技成立至今，一直是以發展「物聯網（IoT）綠能」的能源管理解決方案為核心。由於看見傳統用電領域長期存在著高成本、安裝複雜的不便利性，特別是電力消費佔比最大的工業用電部分，以往若要安裝監測電錶往往成本高昂且曠日耗時，「跟有執照的人員約施工時間並不容易，來了之後還要協調哪條線能動，哪條不能動，加上剪接拉線、停機斷電等，讓整個廠必須暫停生產，這對工廠來說幾乎是不可能的事情，」吳仁作說，這些因素正是導致臺灣用電管理難以落實和普及化的最主要原因。

看到用電管理的痛點，展綠科技開發出小約五公分的輕巧「綠能智慧鉤錶」，只需扣掛在機電設備即可使用。吳仁作表示，「非侵入式、非接觸式」是這款智慧鉤錶與一般其他業者最大的差別，「它不需要執照人員就可以做，而且工廠可持續運作，無須停機斷電。以我們來說，一天一個人可以裝到 200 個電錶，這些特性大幅降低了設備硬體端與人力安裝的成本。」在物聯網架構下，智慧鉤錶擁有充分、快速蒐集所有用電資訊的優點，並可上傳至電能檢測系統，讓使用者可以很簡單地直接管理到所有機器的用電狀況。工廠透過持續收集數據與後台的數據分析來觀察用電趨勢，很容易就能知道機器哪裡有問題，進而節省掉不必要的能源耗費，「而更進一步則是安全問題，這套系統能夠事先預警不當用電所造成的公安危險，」吳仁作說。

提升產業競爭力　從物聯網 綠能到工業 4.0 的實現

展綠創新型能源管理系統不僅讓用電管理有了落實和普及化的可能，更重要的，它還讓用電數據的蒐集、應用變得簡單。以往臺灣中小企業在面對智慧化浪潮時，常常因為相關建置成本過高而



▲ 約五公分大小的輕巧「綠能智慧鉤錶」，可以快速蒐集所有用電資訊。The lightweight and compact "Green Smart Power Clamp Meter", as small as 5cm, may collect all power consumption data rapidly.

to the world of intelligence with less resource and budget, depending on actual needs".

An innovative energy management system that can solve traditional power consumption problems

Since its establishment, 3Egreen Technology has been committed to the development of "Green IoT" energy management solutions. Seeing high cost and complicated installation of monitoring meters for traditional power consumption, especially for industrial power consumption where the installation costs a lot and takes time, "the installation is nearly impossible for a factory, which should make an appointment with certified engineers in advance and then discuss with them which wire to cut and which to connect , not to mention the halt of production for the whole factory," Curtis Wu says, "These are the main reasons for difficulties in realization and prevalence of power consumption management in Taiwan."

Gaining an insight into the problems, 3Egreen Technology has developed a lightweight and compact "smart green power clamp meter", as small as five cm in length, that is ready for immediate use by simply been attached to electrical equipment. "The significant difference between the ‘non-invasive, non-contact' smart clamp meter and others is that the smart clamp meter can be easy to install, without the help of certified engineers, while the factory may continue to work without interruption due to power off," indicates Curtis Wu, "a person may install up to 200 meters a day, which dramatically decreases hardware and labor cost." On the IoT platform, the smart clamp meter may adequately and rapidly collect information on power consumption and upload it to the energy testing system, allowing users to easily manage power consumption status of all machines directly. With continuous data

讓智慧化的力量無法為其所用，進而減弱了競爭力。吳仁作觀察到，「他們對智慧化不是沒需求，只是卡在經費。」而展綠這套使用簡易、成本合理的能源管理系統，數據隨裝隨抓，便成為有效協助中小企業跨入智慧化行列的重要推手。吳仁作進一步解釋，工廠要智慧化與應用 AI 技術，第一步便要做數據的蒐集，「展綠要解決的是如何幫他們收集數據，尤其是那些中小型的工廠，他們其實有待智慧化幫他們提升競爭力，這對臺灣也是很重要的事情。」

吳仁作舉例，有家傳統工廠，廠長因產量下降而向老闆提了增加人力的需求，但老闆研判並非是人力因素造成的，便向展綠求助。展綠以不到一天的時間於該廠內佈建智慧鉤錶蒐集用電資訊，並經過一週的數據蒐集分析，發現原來每日半夜 2 點到 5 點之間，機器都處於待機狀態，「數據呈現出來就很清楚了，這是管理問題。」吳仁作繼續舉例說到，另一家工廠也透過展綠的智慧鉤錶發現其廠內的變頻鼓風機每月竟比非變頻機型少了約 6 萬元的電費，這讓老闆立刻毫不猶豫地全面更換、添購變頻機種，有效降低經營成本。「基本上我們是朝著工業 4.0 的方向前進，」吳仁作說，展綠目前專注在電跟溫度的管理，未來將繼續加上如馬達震動、濕度、空氣品質等等的數據蒐集，「希望跑出一個數據無所不在的世界。只要數據資料完整，就能夠清楚知道發生什麼狀況，接下來要做什麼樣的決策也變得容易。」

連結偏鄉 智慧有感

展綠科技還運用 LP-WAN 技術，即透過通訊商如遠傳、中華電信等有支援 NB-IoT(Narrow Band Internet of Things) 的基地台，讓 WiFi 覆蓋率不足的地區，也能將智慧鉤錶所蒐集到的大量資訊順利送到雲端。而某些地區假使 WiFi 不足且無基地台支援 NB-IoT，展綠科技也開發出自己的基地台與傳輸協定，經由兩層 Repeater 的幫助，可將資料傳送達 6 公里遠，「它讓鄉村與城市的距離能夠拉近，而且佈建成本不會讓對方有

collection and backstage data analysis, a factory may observe its power consumption trend and find which machine goes wrong, therefore saving energy from unnecessary wastes. "The safety problem is the next concern, and the system will alert in advance in case of any improper power consumption that may lead to public safety concerns", says Curtis Wu.

To sharpen competitive edge, from green IoT to Industry 4.0

The 3Egreen's revolutionary energy management system makes it possible not only to realize smart energy management but also to prevail among the industries. Furthermore, the system makes it more simple to collect and apply power consumption data. Over past years, SMEs in Taiwan always lost their competitive advantages when facing Intelligent challenges, because they couldn't afford high cost of intelligent systems. According to Curtis Wu's observation, "it's not that they don't have such demand; it is that they don't have the budget." The 3Egreen's simple and affordable energy management system, easy to install and ready for data collection, has become an important tool helping upgrade SMEs to smart enterprises. Curtis Wu further explains that the first step for a factory to create intelligent solutions and apply AI technology is data collection, "3Egreen wants to help those factories, especially small and medium-sized ones, collect data," Curtis Wu added, "intelligentization will sharpen their competitive edge, which will enhance Taiwan's production and trade as well."

Curtis Wu takes a local conventional factory as an example. The factory manager made a request to his boss for more labor as the production capacity dropped. But the boss didn't consider it was about labor; he turned to 3Egreen for help. Within less than a day, 3Egreen installed smart green power clamp meters in the factory and collected power consumption data. After a week of data collection, we found that machines were in standby status during 2 a.m. to 5 a.m. "The data shows clearly that it was about management." Curtis Wu supplements that another factory also sought for installation of 3Egreen's smart green power clamp meters and found that variable-frequency blowers consumed NT$60,000 less than non-variable-frequency ones monthly, which urged the owner to replace non-variable-frequency blowers to lower management cost. "Basically we are moving toward Industry 4.0," says Curtis Wu. 3Egreen is now dedicates to electricity and temperature management and will expand its function such as collecting data on motor vibration, humidity, and air quality, etc. "Ideally, in a world of "data everywhere", we clearly know what happens based on the data collected and easily make decisions for the next step," Curtis Wu adds.

▲ 展綠科技執行長吳仁作與員工群希望透過「綠能智慧鉤錶」，能讓偏鄉地區的智慧化需求可以得到最適切的照顧。3Egreen's CEO Curtis Wu and his colleagues hope to deliver proper care for remote areas and satisfy their demand for intelligent lifestyle through "Green Energy Power Clamp Meter".

太大壓力、速度也快，大幅提升執行順暢度。」

未來，透過這套創新型能源管理系統的持續導入，將讓經費資源不足的偏鄉地區逐漸達到能源系統的智慧化與轉型，進而促進區域的創新升級。「依照每個地區的實際狀況，用較少的資源跟費用來協助其邁向智慧化的入門，」吳仁作解釋，「透過這套系統的佈建，地方政府可以馬上看到各鄰里的用電狀態，經由改善許多不必要的用電消耗，即可將錢省下來用在更多需要的地方，並且讓大家開始把注意力跟資源擺在智慧化上面。」展綠用物聯網綠能連結偏鄉，讓當地的居民和地方政府都能透過簡單、低門檻的方式感受智慧化的直接效益，繼而才能開啟更多在地智慧生活應用的可能性。

◀ 綠能智慧鉤錶
Smart Clamp Meter

Connection with remote areas for intelligent lifestyle

With LP-WAN technology and through NB-IoT (Narrow Band Internet of Things) base stations of telecommunication service providers such as Chunghwa Telecom or FET Net, 3Egreen allows users in insufficient WiFi coverage areas to send a bunch of data collected by the smart clamp meters to the cloud. For insufficient WiFi coverage areas without NB-IoT supported, 3Egreen also develops its own base station and transmission protocol, which, with the help of two-layer Repeater, may transfer the data as far as 6km away. "It reduces the distance between rural and urban areas; besides, the implementation cost is affordable without compromising the speed," Curtis Wu says.

In the future, the continuous launch of this innovative energy management system will help upgrade remote areas lacking resources to intelligent communities. "Depending on actual status in respective area, we may help them move forward to intelligentization with less resource and cost," explains Curtis Wu, "with this smart system, power consumption status in each village will be clear to the local government; we may improve unnecessary power consumption and use the money saved on the power bill in another place, focusing public attention and resource on intelligentization." 3Egreen's green IoT may connect with remote areas where local residents and government may perceive direct benefits from intelligentization, exploring more possibilities of smart living applications.

未來技術×地方創生 智慧城鄉的日本經驗

Japan's Experience in Future Technology and Regional Revitalization for Creating Smart Cities and Communities

數位科技被日本政府視為推動地方創生的一大助力。透過「RESAS 地方經濟分析系統」的建置，使得深入理解地方特性和數位治理成為可能；同時藉由 ICT、IoT、AI 等科技能量與相關人才的導入，讓各鄉鎮得以獨立自主，縮短城鄉差距，也成就地方活化的永續生命力。

Digital technology is deemed by the Japanese government as a major driver to regional revitalization. Through the establishment of RESAS (Regional Economy Society Analyzing System), it deepens the understanding of local characteristics and makes digital governance possible. Meanwhile, with the empowerment of ICT, IoT, AI and technology talents, rural communities can be autonomously self-sufficient, which is conducive to shortening the urban-rural gap and infusing sustainability into local community revitalization.

在日本地方創生的道路上，數位科技有著協助創新與加速解決地方問題的強大功能，是振興地方經濟及培育各地自助精神不可或缺的有效工具。透過數位科技的導入與滲透，加上人才的培育，日本政府希望能藉此消除區域發展不平衡，重新建構「鄉鎮、人、工作」三者間的良性循環，進而賦予未來世代滿足自身需求的能力。

科技作為日本地方創生的最強奧援

為解決日本少子化、人口老化、地方衰退與高度集中東京（日本人口、政治、經濟等資源過度集中於東京及其周邊）的結構性危機，安倍內閣在 2014 年通過〈地方創生法案〉，以國家戰略層級的「地方創生」政策作為因應危機的解方，同時擬定「まちひとしごと創生合略」（鄉鎮、人、工作創生綜合戰略）為總體方針，輔以情報支援之箭（RESAS 地域經濟分析系統）、人才支援

On the road to regional revitalization in Japan, digital technology plays a powerful function of supporting innovation and accelerating the resolution of local problems; technology is an indispensable and effective tool for revitalizing the local economy and fostering the spirit of self-reliance. Through digital technology and its penetration, coupled with talent grooming, the Japanese government hopes to address the imbalance in regional development, re-construct a virtuous cycle of "communities, people and work" and empower future generations with the ability to meet their own needs.

Technology is the strongest driving force in Japan's regional revitalization

Japan's population, politics, and economic resources are excessively concentrated in Tokyo and its adjoining areas. In a bid to tackling the demographic crisis of Japan's declining birthrate, aging population, local decay and the high concentration in Tokyo, the Abe Cabinet passed the Regional Revitalization Act in 2014, putting regional revitalization at the forefront of national strategy as a solution to the crisis. At

之箭，以及財政支援之箭的「地方創生三支箭」來作為創造地方生命力的武器。

安倍晉三於 2014 年發表施政演說時說到：「重振地方經濟，使年輕人對未來能充滿憧憬和希望，我們要竭盡全力創造一個好的開始……最基本的目標，就是要重啟地方發展的活力，解決人口減少的問題。」而其中重啟地方活力的關鍵點，便是「以地區特色解決地區問題」，利用當地資源創造工作機會，打造出讓年輕人能安心工作、結婚、育兒的在地環境，吸引人與工作流入，克服人口減少與地域經濟萎縮的困境。

借助 ICT 資通訊、IoT 物聯網、大數據及 AI 人工智慧等科技，可以讓理解與解決地方問題變得快速且有效。因此，日本政府近年來大力推動這些科技的普及和活用，同時也積極培育 IT 人才，就是要讓每個地區都能及早擁有獨立解決老人照護、醫療、教育、公共交通、災害等問題的能力，達到以地方為主體的治理方式，建立起地方創生關係良性循環的基礎。

the same time, A Comprehensive Strategy for Communities, People, and Work was put in place as a general guideline, supplemented by the three arrows of information support (RESAS), talent support, and fiscal support, to spearhead a three-pronged strategy to revitalize Japan.

In his policy speech in 2014, Prime Minister Abe remarked: "We aim to revive the local economy, so that young people can be filled with longing and hope for the future. We intend to make every effort to create a good start…our most fundamental goal is to revitalize regional development and address the problem of population decline." The key to regional revitalization is "solving regional problems with regional characteristics", leveraging local resources to create job opportunities in shaping a local environment where young people can work, get married and raise children. This way, people attract jobs and jobs attract people to ameliorate the predicament of population decline and regional economic contraction.

With the help of ICT, IoT, big data and AI, it is possible to identify and solve local problems quickly and effectively. The Japanese government has been actively promoting the effective utilization of these technologies and grooming IT talents in recent years, in hopes that each region can gradually be able to independently solve the problems of elderly care, medical care, education, public transport, disaster relief, etc. to realize region-based governance and establish a virtuous cycle for regional revitalization.

▲ 藉由 ICT、IoT、AI 等科技能量與相關人才的導入，得以縮短城鄉差距，也成就活化的永續生命力。With the empowerment of ICT, IoT, AI and technology talents,which is conducive to shortening the urban-rural gap and infusing sustainability into local community.

全民一起說故事：活用「RESAS 地方經濟分析系統」

在日本地方創生策略中，活用科技的第一步即是建置與推廣情報支援之箭一「RESAS 地域經濟分析系統」。該系統蒐集了大量官方、民間的數據資料，彙整成包括：「人口」、「地域經濟循環」、「產業結構」、「企業活動」、「觀光」、「城鎮發展」、「勞動雇用／醫療 社福」與「地方財政」等八大資料庫，並編輯成視覺化的資料地圖形式，開放給各機關、公民團體與民眾們做使用。

RESAS 讓各利害關係人能更深入理解地方特性，挖掘出有價值的在地資源，使地方創生的相關政策規劃、驗證都能夠以資料為基礎來制訂，後續也能以 KPI 及循環式品質管理（PDCA）來檢視成效，已成為協助地區產業發展的利器，如北海道新雪谷町以「在地美食」打造觀光新主軸、兵庫縣豐岡市將擁有千年製包技術的「豐岡鞄」推向海外市場等……皆是活用 RESAS 來分析及制定地方經濟策略的案例。

RESAS 是理解各地區資源特色的入口與數據資料平台，目前日本從全國到地方皆不遺餘力地設計各種 RESAS 課程，透過網路、學校、研討會、政策黑客松等各種管道來做推廣，希望各級政府單位、民間企業、團體甚至是每一位民眾，都能擁有活用 RESAS 系統的能力，一同腦力激盪，為家鄉訴說新的故事。

科技與人：以 ICT、IoT、AI 來振興經濟、提高生活品質

地方創生中活用科技的第二步，則是結合「社會 5.0（Society 5.0）」的超智慧社會願景，於日本各地推動 ICT 資通訊技術普及化，同時銜接 IoT 物聯網、G 空間（Global Positioning System 全球定位系統 +Geographic Information System 地理資訊系統）與 AI 人工智慧等相關應用，整合網路空間與地理空間，提高偏鄉地區的生活質量與災害應變能力；與此同時，也透過新

Telling stories together: taking advantage of RESAS

In Japan's regional revitalization strategy, the first step is the flexible use of technology by fashioning the arrow of information support—RESAS (Regional Economy Society Analyzing System). It collects and compiles large quantities of data from public and private sectors, with eight databases including: population, regional economic cycle, industry structure, corporate activities, tourism, community development, employment/medical care and welfare, and local finance. Presented in visualized data maps, the RESAS is open to and accessible by institutions, civic groups, and the general public.

RESAS lets all stakeholders better understand local characteristics and uncover valuable local resources, so that relevant policy planning and performance management for regional revitalization can be delivered on the basis of actual data insights. Furthermore, KPI and PDCA (Plan-Do-Check-Act) cycle can be implemented to measure results. Used as a tool to assist the development of regional industries, RESAS has already seen several success stories. For example, Hokkaido's Niseko Town has launched a new tourism scheme revolving around local cuisines, while Toyooka City in Hy go Prefecture has capitalized on its thousand-year legacy of bag craftsmanship to put the Toyooka Kaban brand on the global map. These are just some of the many examples of how RESAS is being used to analyze and develop regional economic strategies.

As a portal and database to understanding and identifying local characteristics and resources, RESAS is now being used across Japan, with various courses designed and activities organized to promote its use. The Japanese government hopes that, whether it's on the Internet, in schools, seminars, or hackathons, RESAS can be effectively utilized by government agencies, private enterprises, civic groups and even the general public, so that people around the country can brainstorm together to tell the stories of their hometown.

Technology and people: using ICT, IoT and AI to revitalize the economy and improve the quality of life

The second step in using technology for regional revitalization is to move toward the vision of Society 5.0—a super-smart society—by the diffusion of ICT technology across Japan and integrating IoT, G-space

▲ 以 ICT、IoT、AI 來振興經濟、提高生活品質。Using ICT, IoT and AI to revitalize the economy and improve the quality of life.

科技克服距離和時間的限制，為地區創造新產業與增加就業機會，進而改變人口流向，回復地方活力，打造出「以人為中心」的新社會。

例如位於日本四國德島山區的神山町，便藉由全縣光纖網路的鋪設，讓非營利組織「綠谷」（Green Valley）能夠於此以舊工廠打造出衛星複合辦公室，至今已成功吸引了 16 家 IT、設計、影像等企業在此設點，讓這個曾因人口外流而垂垂老矣的偏遠部落，搖身一變成為山中矽谷，帶來年輕的活力也振興了地方經濟，在 2012 年時甚至還創造了 50 年來首次移居人口正成長，成為地方創生的奇蹟與典範。而位於北海道的北見市，也藉由 ICT 基礎建設的導入，結合當地大學以及位於東京首都圈的企業，共同打造「北見遠程辦公室」，使得年輕人才可以安心留在家鄉工作，省去通勤的困擾，更優化了工作與生活品質，為這個小鎮帶來人口回流與經濟振興的活力。

而在導入智慧科技的同時，日本還特別注重地方創生人才與 IT 人才的培育，從官方到民間都提供許多豐富的學習資源，如上述的 RESAS 訓練課程，還有「地方創生學院」，以及各種「地方創生 X 程式設計」的紮根、普及教育等等，大幅提升在地的知識活力與自主性，成為地方創生的堅實後盾。這種以「人」為中心的科技下鄉思維，正是臺灣推動智慧城鄉的重要經驗參考，在專注於新科技與地方居民需求的契合之際，也要同時培育能為在地所用的各式人才，讓最理解地方的人（從居民、IT 人員到公務人員等）來協助地方發展，進而充實「以地區特色解決地區問題」的自助、自主能力，讓地方創生的智慧得以生生不息。

(Global Positioning System+Geographic Information System) and AI applications, essentially bringing together cyberspace and geospatial intelligence to improve the quality of life and disaster response in rural areas. New technologies are breaking the constraints of time and space to create new industries and boost employment opportunities for various regions, thereby directing the population flow to revive local communities for shaping a new people-centric society.

For example, the installation of fiber optics Internet in Kamiyama Town in the mountainous regions of Tokushima Prefecture has allowed Green Valley, an NPO, to build satellite offices inside old factories. So far, it has already attracted 16 IT, design, production companies to set up offices there, turning this remote village that was once dying from population exodus into a new Silicon Valley in the mountains and drawing in youthful energy to stimulate the local economy. In 2012, it saw a positive population inflow for the first time in 50 years—a miracle and exemplary model of regional revitalization. In Kitami City, Hokkaido, local universities and companies based in the Tokyo metropolitan area, together with the introduction of ICT infrastructure, have jointly created the Kitami Telework Office, so that young people can work at their hometown with a peace of mind and avoid the hassle of commuting. This has improved the work-life quality of many and witnessed the return of young locals and economic revival.

Aside from introducing smart technologies, Japan is also paying particular attention to the cultivation of regional revitalization and IT talents. Diverse learning resources are available from both private and public sectors, such as the aforementioned RESAS training courses, as well as regional revitalization schools and coding courses. These efforts greatly enhance the dynamic vitality and autonomy of knowledge in the local communities as the solid backbone for regional revitalization. Deploying people-centric technology in rural communities is precisely the experience Taiwan needs in promoting smart cities and communities. On top of focusing on the convergence of new technologies and the needs of local residents, we must foster various local talents—from residents to IT staff and public servants—who actually know their hometown to work side by side to shore up local development. Only by nurturing the ability of self-help and self-reliance, where regional problems are solved by regional characteristics, can regional revitalization be passed onto future generations.

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