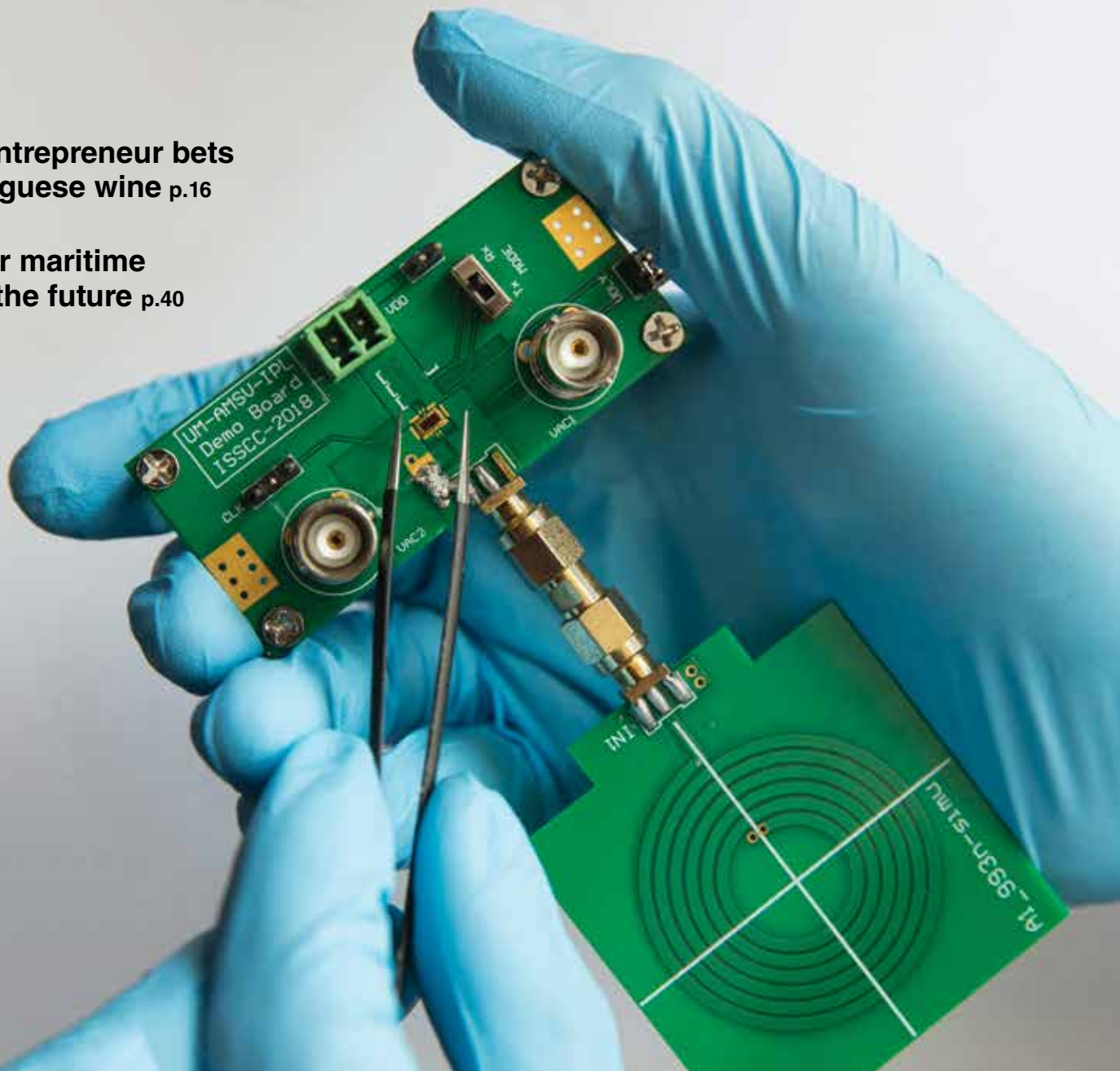


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plan for the future p.40





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From the Editor

Macao shows its international face

Macao's international footprint dates as far back as the 15th century and it continues to spread today, carried by political leaders and entrepreneurs with vision. This issue takes readers on a journey through time and geography – from the Chapas Sinicas, historical documents that show the city's early role in East-West exchanges, to the innovative laboratory at the University of Macau, where researchers are developing new microchips for wireless power transfer.

The government is paying great attention to the Greater Bay Area (GBA) Initiative. We follow the Chief Executive on his visit to Beijing and member cities in Guangdong, for meetings with officials to prepare Macao's integration into this national initiative. In an interview, Mi Jian, new director of the Policy Research and Regional Development Bureau, explains how developing of Macao's water area will further increase our participation in the GBA.

Another story chronicles the transformation of Shenzhen from a fishing village into 'China's Silicon Valley' over the last 40 years, exploring

factors that contributed to their successful rise – insights that may prove valuable as the GBA initiative seeks to transform other member cities.

Part of Macao's continued legacy is its role as a platform for China's relationship with Portuguese-speaking countries. Delegations from the government and business sectors recently held important meetings in Lisbon and Brasilia, on how to further this relationship in line with the GBA initiative. On that note, we visit a Macao entrepreneur in Portugal to learn how he is introducing fine wines from his vineyard near Lisbon into the Chinese market.

For the final stop on our journey, we return to Macao, to visit the State University Laboratory at the University of Macau. Researchers there are developing new microchips for wireless power transfer, an innovation that may open new paths to China's technological development. Last but not least, meet the dedicated athletes from Macao who won five medals at the 2018 Asian Games in Jakarta – another part of the city's international face.

Gonçalo César de Sá
Editor-in-Chief

Macao platform sees multi-dimensional expansion

Text Paulo Figueiredo in Lisbon Photos Alexandre Marques

**Macao government encourages Portugal
and Brazil to strengthen links in business,
economy, culture, and social affairs.**

National initiatives are generating new opportunities, reinvigorating Macao’s long-time commitment to streamlining economic and trade relations between China and Portuguese-speaking countries (PSC). As Forum Macao celebrates its 15th anniversary, the institution’s role is more important than ever before, as evidenced by the Meeting of Entrepreneurs for Economic and Trade Cooperation between China and Portuguese-speaking Countries, which took place in June 2018 in Lisbon.

Organised by Forum Macao, Macao Trade and Investment Promotion Institute (IPIM) and its Portuguese counterpart AICEP

Portugal Global, the Lisbon Meeting attracted around 400 participants, with more than 80 contact exchanges carried out and 24 protocols signed over the two-day period.

Agreements covered a range of topics from co-operation between governments to trade associations, and chambers of commerce to the introduction of healthy foods.

A number of protocols addressed the development of the financial sector with unique characteristics in Macao, emphasising financial leasing, wealth management and cross-border RMB settlement, in addition to the construction of the financial services platform to provide financial support to companies from China and the PSC.

Taking part for the first time, Leong Vai Tac, the Macao secretary for Economy and Finance, reaffirmed the government’s commitment to build the service platform “to serve the needs of China and to promote sustainable development through adequate diversification of the local economy.”

In his speech, Leong spoke to the advantages of the Macao service platform for “linguistic, cultural, and information services, combined with the development of the tourism, convention and exhibition sectors, and the financial sector with its own characteristics, as well as the opportunities arising from the deepening of regional co-operation with the mainland.”

He stressed that the “efficient articulation of China’s opening policy” will entail great opportunities for development, referencing the Belt and Road Initiative (BRI) as well as efforts toward economic and trade co-operation between China and PSC.

Facilitating such trade opportunities has long been the purview of Macao, which has worked to increasingly enrich its service platform. Leong called on the leaders of major mainland financial institutions in attendance to “consider establishing co-operative relations with Macao or set up branches

Leong Vai Tac, Macao secretary for Economy and Finance



Meeting of Entrepreneurs for Economic and Trade Cooperation between China and Portuguese-speaking Countries





Participants in the Meeting of Entrepreneurs for Economic and Trade Cooperation between China and Portuguese-speaking Countries

Macao delegation meeting with banking representatives in Lisbon

in Macao” to strengthen Sino-Lusophone business co-operation and create more opportunities. Significant changes are already afoot as Macao and its neighbouring provinces undergo rapid transformation, unlocking new opportunities for regional co-operation to further diversify the economy. The Hong Kong-Zhuhai-Macao Bridge will soon begin operations and details of the

Guangdong-Hong Kong-Macao Greater Bay Area (GBA) will be announced, which, according to Leong, “will provide excellent conditions for co-operation between Macao and Guangdong province.” He pointed to major examples of existing co-operative efforts with mainland provinces, particularly fellow members of the Pan-Pearl River Delta (PPRD). Macao has been an important bridge for the

PPRD, organising delegations composed of representatives of the nine provinces to visit countries in the Portuguese-speaking world to share information around environmental practices and build trade relationships. Macao also set up two co-operation parks in conjunction with two developed economic provinces – Guangdong and Jiangsu – and held a series of co-operation activities with PSC and Fujian province. Leong encouraged investors from PSC to partner with Macao companies and take advantage of the city’s platform to enter the mainland markets and exploit new opportunities.

Future of Forum Macao

On the first day of the Lisbon meeting, political and business leaders gathered for a reception celebrating the 15th anniversary of Forum Macao. Portuguese Economy Minister Manuel Caldeira Cabral joined representatives of investment and trade promotion agencies in China and Macao, Portugal, Brazil, Angola, Mozambique, Cabo Verde, Guinea-Bissau, Timor-Leste, and São Tomé and Príncipe, as well as Ho Hau Wah, vice-chairman of the Chinese People’s Political Consultative Conference and former Chief Executive of Macao, who highlighted the “originality” of Forum Macao, now “considered as a pioneering co-operation mechanism.”

In a year which also marks the 40th anniversary of China’s reform and opening up, Ho described the creation of Forum Macao as reflecting a willingness to take advantage of those changes and a desire for common development of China and the PSC. He noted that Macao has been “building up on its own advantages under the formula of ‘One country, two systems’ as well as using its established historical relationships” to promote the construction of its unique international platform. The BRI, Ho said, is providing new opportunities for co-operation between China and PSC, as well as a “rare opportunity to consolidate, promote, and develop Forum Macao that became a new example of co-operation within the framework of the national BRI strategy.”

According to Ho, the results of Macao’s efforts to implement the Trade Cooperation Services Platform have been “remarkable”: Chinese entrepreneurs can make full use of the Platform and through co-operation with PSC, expand their business to the EU, Latin America, and Africa. For their part, PSC can utilise the platform to identify business and co-operation opportunities in China’s vast market. With the results achieved by Forum Macao thus far, Chinese Vice Minister of Commerce Gao Yan, believes that the organisation “has fulfilled its mission” of seeking to promote exchange and co-operation, common development, and “accompanying the progress of China’s reform and opening up.” The deputy minister expressed “great satisfaction” at the

Forum Macao reception in Lisbon, Portugal



joint efforts of the countries represented, as well as the active support of the Macao government in holding five editions of the Ministerial Conference in Macao where “very significant results have been achieved.”

Through the mechanism of Forum Macao over the years, Chinese officials have announced a series of measures on economic and trade co-operation with the PSC, which signed with China a series of multilateral and bilateral agreements, as well as five Action Plans for the Economic and Trade Cooperation.

Areas of co-operation between the parties have ballooned since 2003, from 7 to around 20 in the most recent Action Plan. New areas of intervention include maritime co-operation, environmental protection, and productive capacity.

Xu Yingzhen, secretary-general of the Permanent Secretariat of Forum Macao, said that, with the active participation and attention of the relevant governments, the institution “has been improving with a remarkable development,” as well as “showing signs of maturity,” strengthening links between the various countries in the areas of economy, trade, culture, and education.

In addition to making “good progress” in the establishment of Macao as a service platform, Forum Macao has itself become a major platform for co-operation between China and PSC within the framework of the BRI.

Forum Macao, said the secretary-general, is now committed to getting involved in the industrial development process, through elements of services for trade co-operation, “creating a new momentum for the respective industrial sectors and for the platform.”

Through the main activities in the conventions and exhibitions sector, they intend to provide companies with a platform and services of co-operation and exchange, attracting entrepreneurs and introducing products.

Xu noted that the strategy for developing Macao’s financial industry has received strong support from major financial institutions in mainland China, including the Bank of China and the Industrial and Commercial Bank of China (ICBC), which signed co-operation agreements with the economic and commercial services of the Macao government.

“We have been, with the idea of the Macao platform, aiming to connect a new economic system based on partnerships, market sharing, capacity, knowledge and technologies.”

Antonio Trindade

Expanding information technologies abroad

Among the various business agreements signed in Lisbon, information technology took on particular importance. Macao-based technology services company CESL Asia entered into two partnership agreements, one with a Portuguese company and one with a Fujian-based company, Executive President and CEO Antonio Trindade told Macao Magazine.

The Chinese partnership deals with a planned centre for the development of new products and common technological applications for use in China, Asian countries and Portuguese-speaking countries like Brazil or Angola.

“The world is changing – transport, education, infrastructure, and systems,” Trindade reflected. “We have been, with the idea of the Macao platform, aiming to connect a new economic system based on partnerships, market sharing, capacity, knowledge and technologies.”

For him, the objective is to find solutions adapted to specific markets, particularly emerging markets in Africa, along the lines of what China has been developing. These include integrated e-commerce and express delivery solutions that enable agricultural producers to overcome market access problems for their products. “These are markets with enormous capacity for development,” Trindade said, noting that while economies in target countries are still at an early stage, the world and the economy are changing very rapidly.

“We are interested in developing the capacity for innovation with the purpose of adding value and quality of life in societies,” he asserted, crediting the platform for creating new paradigms, businesses, and ways of operating. “We create partnerships and integrate a purpose of each one to contribute on their part.”

Also signed in Lisbon, an agreement between Bringbuys Web Technology and Cabo Verde TradeInvest, a Cabo Verdean investment fund agency, to create a technology hub in Cabo Verde with plans to expand to other West African countries.

A source from Bringbuys told Macao Magazine that the



Signing agreements in Lisbon



Forum Macao delegation in Cabo Verde

protocol initially foresees building an international cloud computing centre in Cabo Verde. This US\$5-20 million investment is designed to create a pilot centre that will provide support to the government, including road safety and citizen services, as well as creating “big data” services. Investment could reach US\$50 million in the second phase, an industrial park dedicated to training local staff and incubation of companies.

Quality infrastructure and a geographic location well suited to expansion into West Africa made Cabo Verde an ideal choice for the project. If the pilot project is a success, Bringbuys plans to expand into other countries, such as Portugal and Brazil.

Following the Lisbon Meeting, Cabo Verde TradeInvest received a delegation from the Permanent Secretariat of Forum Macao, which travelled to the archipelago with businessmen from Chinese province Qingdao. The visit was the result of a protocol signed between the Cabo Verdean agency and the Qingdao government at the previous edition of the meeting, held in Praia in June 2017.

Connecting with Portuguese infrastructure

Also looking for a place in the BRI is the Port of Sines, the largest artificial port in Portugal. Located south of Lisbon, the port welcomed the delegation of companies and authorities participating in the Lisbon Meeting for a visit in June. Chinese companies have been a priority for APS (Administração dos Portos de Sines e do Algarve SA) and the Portuguese government in the promotion of investments in the port and the surrounding logistics area. Planned upgrades involve new and expanded

GBA to open new opportunities for Macao as a platform

Three years after the launch of the “Economic and Trade Co-operation and Human Resources Portal between China and Portuguese-speaking Countries,” the number of people looking for business opportunities in this sector has increased two-fold.

It is because of this portal that many businesses have been successful in achieving their targets and finding partners and investors in China and in Portuguese-speaking countries.

The databases for Bilingual Personnel and Professional Service Providers are not only growing with information from the Portuguese-

-speaking countries but also from Macao and mainland China on a daily basis.

The Greater Bay Area Initiative details are to be announced soon and will surely bring many co-operation opportunities for southern China, where Macao is set to play an important strategic position, as a

platform between China and the Portuguese-speaking countries.

The importance of the Portal is growing exponentially and more businesspeople are using it as their first point of contact for business for China and the Portuguese-speaking countries.



中國－葡語國家經貿合作及人才信息網
Portal para a Cooperação nas Áreas Económica, Comercial e Recursos Humanos entre a China e os Países de Língua Portuguesa



Economic, Trade Co-operation and Human Resources Portal



Jackson Cheong, president of Macao Trade and Investment Promotion Institute (left) and Francisco Mendes Palma, director of AICEP Global Parques (right)



Duarte Lynce de Faria



Miguel Borrallho

infrastructure, as well as well as the installation of industrial units for processing and re-exporting all kinds of products.

The new container terminal project is in the process of obtaining environmental licensing, followed by the elaboration of the tender, set to be launched in 2018 or early 2019. According to CLBrief, several Chinese consortia are in contact with APS and AICEP Global Parques regarding the tender, which at around US\$650 million, is the largest in over a century.

Some consortia are already outlined, but not yet in their final form, including builders, banks, and port operators. Recently, APS approached COSCO Shipping, China's largest shipping company, which already has a strong presence in the Mediterranean ports of Valencia, Spain and Athens, Greece.

"Chinese investors have realized that this location is

important for the Atlantic markets," said Francisco Mendes Palma, director of AICEP Global Parques. The state-owned company manages industrial parks in several areas of the country and has been involved in attracting investment to the railway project. He told Macao Magazine that Macao entities, namely Forum Macao, have played a role in project presentation to Chinese investors.

Mendes Palma believes "first-tier" Chinese investment in Portugal, especially in the financial sector, sets in motion the creation of conditions for a "second-tier" investment in the productive sector, which "naturally takes longer."

These productive investments may begin to arrive in 2019, with the start of the new terminal project at the Port of Sines, which should be operational in 2-3 years.

According to Mendes Palma, it's an ideal location for bringing

products from China to access Atlantic markets, designed to "bring industrial products that in Portugal can have a dematerialisation of cargo, receive some added value, and then supply markets in Europe and the South Atlantic."

Among the priority areas for short-term investments are logistics, petrochemicals, containers, semi-finished and finished manufactured products, along with gas and petroleum products. The industrial zone already boasts pipeline connections to the Lisbon metropolitan area and the only Portuguese natural gas terminal, operated by REN Atlântico (China State Grid is a major shareholder).

Other notable infrastructure includes terminals for receiving petrochemicals and coal, as well as a power station operated by EDP (China Three Gorges is a main shareholder) and a logistics and

industrial park that includes a Galp Energia refinery.

The port is mainly open to the Atlantic, operating several routes to South America and Africa, most of them to other Portuguese-speaking countries. In the first quarter of 2018, the Port of Sines was responsible for 48.1 per cent of the total merchandise movement in Portuguese ports, totalling around 10.3 million tons.

According to Mendes Palma, the new terminal reinforces the attractiveness of the industrial component and will be very relevant "to show to Chinese investors the existence of an easy infrastructure," which combines the port and industrial zone.

AICEP Global Parques, with supporters including Haitong Bank and Bank of China, has also directly promoted Chinese investments in Sines, most recently in November 2017 in Beijing and Shanghai.

Plotting the new route

Speaking to the Lisbon Meeting delegation at the Port of Sines, Duarte Lynce de Faria of APS, levied a "challenge": "We are also here to conquer a point on the Maritime Silk Route."

Specifically, Sines is intended to be integrated into the new projects linking China and Europe.

"It is extremely important that Portugal and, in particular, the Port of Sines, to be part of this new challenge that, more than just joining ancestral cultures, will help develop all commercial ties and offer opportunities to China, its entrepreneurs, and Macao."

Their projects, Lynce de Faria believes, can imbue investors with the idea of making Portugal and the Port of Sines part of the new Maritime Silk Route, which "will make us central to the development of world trade."

A study by the New University of Lisbon found that, in 2015, the Port of Sines represented 1.13 per cent of Portuguese GDP and 18 per cent of exports, in addition to providing nearly 18,000 jobs, of which 3,600 are in the industrial zone.

As the Sines project advances, large companies have begun positioning themselves in the infrastructure sector in Portugal.

In June, the China Construction Group signed an agreement to buy a 7.5 per cent stake in Lusoponte, which manages the bridges linking Lisbon to southern Portugal. The selling company, Teixeira Duarte, agreed to a price of EUR23.3 million (US\$27 million) but the contract is still subject to authorisations and possible exercise of pre-emptive rights by the remaining shareholders – Mota-Engil (38 per cent), Vinci (37 per cent), and Atlantia (17.5 per cent). ●



Brasília

Brazil seeking closer economic and trade ties with China via Macao platform

Text **Marco Antinossi in Brasília**

Electronic platform will assist Brazilian firms interested in China

Brazilian small and medium-sized enterprises will soon benefit from an online electronic platform designed to facilitate their internationalisation process for the Chinese market.

The new tool will provide legal, accounting and financial support, as well as general information about legislation and the business environment, so that Brazilian companies can use funds made available by Forum Macao to operate in southern China.

Creation of the platform was discussed by a Macao delegation during an official visit to Brazil in late June. The delegation, headed by Macao's Economy and Finance Secretary Leong Vai Tac,

was received in Brasília by officials from the Ministry of Planning, Development and Management (MPOG); the Ministry of Industry, Foreign Trade and Services (MDIC); and the Brazilian Trade and Investment Promotion Agency (Apex-Brasil), a counterpart of Macao's Trade and Investment Promotion Institute (IPIM).

During the meetings, the delegation highlighted the economic appeal of the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) and the conditions offered to Brazilian companies to operate in that market. The megalopolis, currently under construction, encompasses two special administrative regions and nine mainland cities with a combined population of nearly 68 million people and GDP of US\$1.74 trillion.

Securing funds

"For Brazilian companies," MPOG Secretary for International Affairs Jorge Arbache told Macao Magazine, "development of that platform will open the doors of the co-operation fund set up by the Chinese government for Portuguese-speaking countries."

Arbache, one of the process's coordinators, said the online platform would supply information and services to aid decision-making by managers of Brazilian firms interested in opening offices in Macao to explore the market in southern China.

The co-operation fund, overseen by Forum for Economic and Trade Cooperation between China and Portuguese-speaking Countries – better

known as Forum Macao – with joint participation of the China Development Bank and the Macao Industrial and Commercial Development Fund, currently counts capital of US\$1 billion.

To receive support, projects must be recommended by Forum Macao's Permanent Secretariat or by the eight member-countries. Main investment areas include agriculture, industry, energy, and mining. Investments in Brazil since 2003 have reached almost US\$54 billion, making China one of the top foreign investors in the country.

Developing platforms, expanding brands

A task force with representatives from Brazil and Macao will be established to move forward in the process of creating the online platform. On the Brazilian side, the group will include the National Bank for Economic and Social Development (BNDES), a development institution of the Brazilian government, and the Micro and Small Enterprises Support Service (Sebrae), in addition to MPOG, MDIC, and Apex-Brasil.

The Brazilian Franchising Association (ABF) also took part in discussions to create the platform. A recent study by the sector's representative entity in Brazil indicated that the external market is increasingly attractive for Brazilian networks, especially during a period marked by a strong economic downturn in the country in the last few years.

In 2017, Brazilian networks expanded their international presence with 142 national franchises operating abroad in 100 countries, up from 80 countries in 2016. The United States boasts the highest concentration of Brazilian brands (46), followed by Paraguay (34) and Portugal (34), though China has also awakened the sector's interest, mainly due to its dynamic market, ABF Director Fábio Khouri told Macao Magazine.

Taking a brand to another country is always a challenge, explained Khouri, but certain factors can help ease the way: "Macao has the great appeal of the Portuguese language, which makes things a lot easier and helps a great deal when it comes to understanding local culture and habits. The kick-off has already happened," noted the director, who took part in meetings with the Macao delegation in Brasília.

In August, the ABF took to China the second business mission organised by the body since last year. With more than 50 entrepreneurs representing various brands already operating abroad, such as Brazilian cosmetics giant O Boticário, it has taken part in several negotiating rounds in Shanghai.

The mission will remain in China until 9 September. Khouri said the ABF was studying a possible meeting with entrepreneurs and authorities from Macao during their stay in China.

Jorge Arbache, MPOG Secretary for International Affairs

Educational exchange

Another subject discussed by the Macao delegation during the visit to Brasília was closer relations in the area of education, through creation of a student and teacher exchange programme between Brazilian universities and the University of Macau.

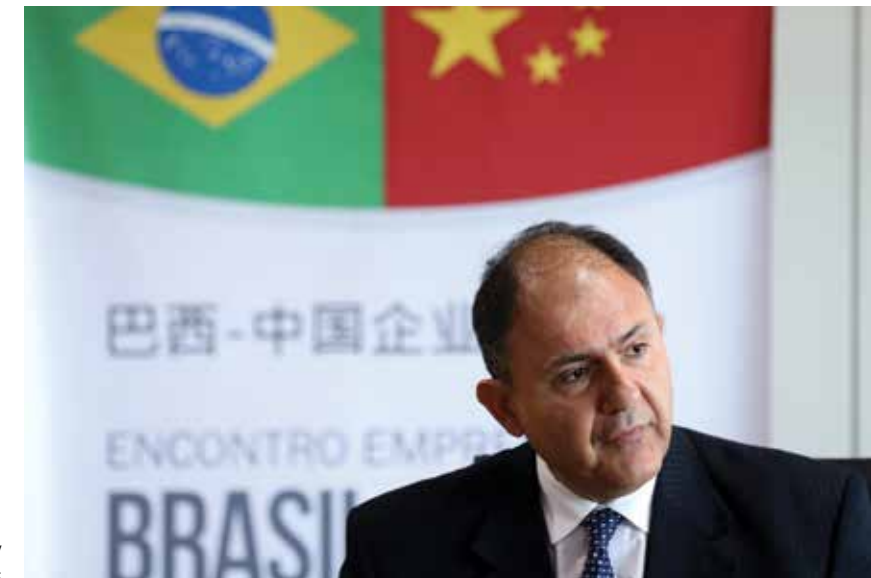
This type of internationalisation of higher education, long embraced by stakeholders for its wide range of benefits, may prove especially beneficial for Brazil which faces significant challenges in attracting students to its largely Portuguese-language higher education system. For Macao students, it represents an opportunity to immerse themselves in a prominent, Portuguese-speaking country, valuable experience as the city places increasing importance on bilingual professionals and interchanges with the Portuguese-speaking world.

Arbache of the Brazilian Ministry of Planning, Development and Management, agreed, noting that "student exchanges open many avenues to strengthen relations" between Brazil and Macao.

After the delegation's trip to Brasília, the Brazilian Ministry of Education began preparing an eventual Brazilian mission to Macao, with the participation of representatives from various universities, though the precise dates have yet to be determined.

A statement from the ministry indicated that the aim will be to "prospect and stimulate educational co-operation" between Brazil and Macao.

"This visit helped achieve closer ties with China overall. There's a lot of interest from all the parties involved and plenty of enthusiasm on both sides regarding the relationship's high potential. We hope the deeper relations will be profitable and generate benefits for both sides," said Arbache, who will be taking part in the Annual Meeting of the New Champions to be held by the World Economic Forum this coming 18–20 September in Tianjin, China.



Economy

Macao entrepreneur gives new life to Portuguese vineyard

Text Paulo Figueiredo in Lisbon Photos Luís Filipe Catarino and Alexandre Marques





Wu with his employees at the vineyard

Wu Zhiwei's decision to invest in Portugal by purchasing Quinta da Marmeleira in 2016 looks to be a very safe bet. This year, the first wine from its vineyards will be placed on the market and will soon be available to Macao consumers.

This June, Macao Magazine travelled in the company of Macao entrepreneur Wu Zhiwei, his wife, daughter Victoria and employees, on a visit to Wu's new winery on the outskirts of Lisbon.

On that hot, sunny afternoon, there was little traffic on the motorway to Carregado, a 40-km drive from the Portuguese capital. Mobile phone in hand, Wu looked on anxiously as the national teams of Portugal and Iran battled it out for a place in the knockout stage of the 2018 FIFA World Cup. The silence was only broken by cries of frustration whenever a shot by Cristiano Ronaldo went wide – or by a shuddering sigh when a Portuguese pass missed its mark or gave an opportunity to Iran. The final score, tied 1-1, made qualification uncertain.

Wu's decision to invest in Portugal by purchasing Quinta da Marmeleira in 2016 looks to be a very safe bet. But the entrepreneur – owner of Tin Min Jade, active in Macao construction and real estate, as well as tea plantations and other businesses in mainland China – said it's only the beginning. This year, the first wine from its vineyards will be placed on the market and will soon be available to Macao consumers. Construction of the new winery building, designed in Macao, is about to begin and the next project, involving tourism, is starting to take shape.

But Portugal has become more than just a place for business or holidays for Wu and his family. Wu since May has been a leading member of the Chinese-Portuguese Chamber of

Commerce. His Portuguese language skills are improving. With the help of his driver, he memorises new words every day, and has already mastered the vocabulary for numbers, basic food and drink, and simple conversation. Enough to go to a café by himself and order a *bica* (expresso coffee) at the counter and say *obrigado* (thank you) when he's finished – the most basic of Lisbon daily habits.

For his wife, Portugal is already a second home. Their youngest daughter is also learning Portuguese and should soon move there almost permanently: she's preparing to finish secondary schooling at one of Lisbon's best private schools and plans to attend university in the same city. She aims to study oenology (wine and winemaking), perhaps to help oversee wine production at Quinta da Marmeleira one day. Wu himself has been a Portuguese citizen for many years. The entrepreneur also has investments in London where the young daughter still studies.

The pleasure of business

On that afternoon Wu's wife took Macao Magazine on a tour of Quinta da Marmeleira. Accompanying them was the young Adriano Barrias, a Portuguese native who became fluent in Chinese in Macao, where he lived until his teenage years. He's now in charge of managing the large property, in addition to bridging the language gap with the other employees.

"My husband likes cigars, cigarettes, and wine. His dream has been to produce a top-quality wine," she said, "and I like nature very much." There's no shortage of that on their Portuguese property. In early summer, the trees around the main house at Quinta da Marmeleira are full of fruit: figs, lemons, plums, and more.

Tree branches bent low with fruit are a continual source of wonder. Wu's wife couldn't resist taking pictures with her phone along the way; occasionally plucking a piece of fruit from a tree, a little treasure for later. She stopped to sniff the lemons, inhaling the intense citrus aroma and even tried the figs, offering some to others. Smiling, it's clear the grove brings her joy and a measure of pride.

"I like Europe and wanted to take advantage of China's Belt and Road strategy," said she, also a Portuguese citizen. "We chose Portugal due to the good relationship through Macao; we have



Quinta da Marmeleira wine bottles



Wu Zhiwei

a special connection to Portugal.” She praised the Portuguese people for their kindness and hospitality, noting their welcoming approach makes it “easy for people who come from abroad.”

“Portugal is more relaxed for doing business or touring, which makes it very worthwhile,” she said, gesturing warmly as she held two lemons in each hand. “We’re developing this wine business and have ended up enjoying it.”

Their youngest daughter’s desire to come to Portugal, where Wu already spends half the year, has made both parents “very happy.” It was not without difficulty, however: “She was upset because when she first came here, she couldn’t speak to anyone because she didn’t know Portuguese. She realised the distance was too large, so she decided to learn the language.”

Harvest time is nearing and the vines at Quinta da Marmeleira were loaded with bunches of grapes. Green is still the prevailing colour in the estate’s valleys, dozens of hectares planted with the touriga nacional, syrah, and alicante bouschet varieties. But the planted area is growing as adjacent land was purchased. The Quinta’s new winery building is now undergoing the licensing process, with construction set to begin in September and finish within a year.

The winery’s first vintage was nevertheless bottled in August. It’s actually the third since Wu bought the property, but the first to be marketed: 60,000 bottles under three different labels for different market segments.

The property has been expanding and the team has likewise grown. It now totals 15 people, including full-time employees and service providers, from agronomists to stablehands.

Dreaming big

“I’m not a wine expert, but if we talk about construction, I can tell you the names of each specific screw,” Wu Zhiwei joked to Macao Magazine, taking refuge from the heat in his air-conditioned office at Quinta da Marmeleira. However, he has long appreciated good wine, especially from France.

‘Quality’ is the word most repeated when he talks about his wines. Wu is “learning as things are done,” an unwitting paraphrase of the maxim “knowledge from experience made” of Portugal’s greatest classical poet, Luís de Camões.



Logo of Quinta da Marmeleira

The three wine labels are almost ready, though certain details must still be worked out. The highest quality brand (reserva) represents the idea of ‘change’ and will be the high-end brand, while the others are two combinations for the middle price ranges. Each label has a story connected to Quinta da Marmeleira, which has a history of producing award-winning wines.

Although the wines will be available in Portugal, the main market, according to Wu, will be Macao and mainland China. Thus the wines’ characteristics have been adjusted to the tastes of Chinese consumers, through personal consultations with his oenologist. Wu nevertheless stresses that the main goal is to “make quality wine, not to

specifically adjust” to a market. “I hope the wines are not only accepted by the Chinese market,” he stated. His wife nodded agreement by his side, while tasting plums picked in the field and trading impressions with their youngest daughter.

Wu has learned to appreciate the working methods of the oenologist, who was initially recommended by friends. Now his concern is the “search for the ideal taste” for the wine, giving it time to age and exceptional conditions, including the use of wooden barrels. “If money was all that mattered,” he emphasised, “we’d have bottled wine two years ago.”

Recognition of quality is perhaps the only point in common between Portuguese and Chinese consumers, who have very different consumption habits, Wu noted. While for the Portuguese, drinking wine is an established part of the culture and daily life, for the Chinese, “the idea is different, more situation dependent... They may use a more normal wine at events or marriages, without being anything special. The drinking culture is more aggressive; the aim is to toast and then drink it down at once *ganbei* (bottoms up). Compared to the Portuguese, the Chinese drink less often, but can drink more each time.

As the vineyard expanded, production will continue to increase in coming years. With more experience and more refined methods, the quality will also start standing out, believes Wu.

Before closing the deal on Quinta da Marmeleira, he visited many wineries in northern and southern Portugal, including some larger ones. The location – close to Lisbon, the airport, and some of the country’s main motorways – proved decisive. “It was something that suddenly happened,” said Wu. “But my dream is very big.”



Wine bottling process of Quinta da Marmeleira

The drinking culture is more aggressive; the aim is to toast and then drink it down at once ganbei (bottoms up). Compared to the Portuguese, the Chinese drink less often, but can drink more each time.

‘Made in Macao’ architecture

The architectural plans for the new winery had just arrived at Quinta da Marmeleira from Carlos Couto. A long-time Portuguese resident of Macao, Couto, is an international renowned architect with projects in Macao, Shanghai, Taiwan, Cabo Verde, and Portugal, among others places.

These days he divides his time between Macao and Taiwan, where he owns Tuga, a Portuguese restaurant, and sells Portuguese wines.

When asked, Couto jumped at the chance to design the winery; he had always wanted to do such a project, but never had the opportunity. Wu recounted his

admiration for projects by the architect, a former civil servant, who offered an added confidence due to his knowledge of licensing processes in Portugal.

The structure will incorporate elements of traditional Portuguese architecture, particularly in the style of the windows and roof. Every detail has been thoughtfully planned with advisement from the oenologist, including the kind of vats used to age the wine, their arrangement, and the materials they will be made with.

Wu is naturally excited by the construction project; after all, it's the business he's most familiar with. He's noticeably less interested in talking about the financial details

of his investment: "I'm not worried about the amount invested... But I am concerned about the best price and deal. The aim is always to run a good business."

The original drawing of what would eventually become the winery, sketched by Wu within two hours in late 2016 and still in his possession, was inspired by a photo he saw of a former royal residence. Couto used it as a starting point to create the final project, which was modified to its current version during their successive conversations.

Meanwhile, another 'dream' is also taking shape: wine tourism. Despite the region's easy transportation access, including

an airport, bus terminals and motorways, with Lisbon less than 30 minutes away, there are virtually no hotel offerings in the area. "People come here for events and then go sleep in Lisbon," Wu explained. By building a hotel along with the winery, those same people would be able to stay in the area. "It boosts the local economy when people stay longer."

The local authorities have shown a great deal of interest in the project, attracted by the potential to finally gain a hotel offering and develop tourism. The site for the hotel, located within the Quinta's property, has already been chosen.

But with wine production just beginning, things have to be done

one step at a time, said Wu. The entrepreneur has businesses in various countries on two continents. He already spends half the year in Portugal, and with the winery project now well under way, he'll probably spend much more time there.

"I don't invest wildly in things. I'm focused on making this business work," he told Macao Magazine. And as this 'dream' consolidates, others move to the forefront. More familiarity with the local reality means new opportunities will naturally arise. The emphasis, as he continually repeated, is on quality.

"My way of thinking is: first, do something well; then think of doing the next thing." •



Quinta da Marmeleira

Marmeleira Winery looks to China

While the northern Douro Valley has an impressive reputation for winemaking, with production dating back to the Roman period, there is no shortage of admirers for wines produced the south. The areas surrounding the Tagus River, flowing through the heart of Portugal, boast their own centuries-long tradition – and increasing popularity abroad.

The Quinta da Marmeleira's oenologist supervising wine production at Quinta da Marmeleira, cites the region's unique 'terroir' as central to its success: "The sea breeze rushes through the valley [where Marmeleira sits], so the heat of the day is tempered by the coolness of the nights," he told Macao Magazine.

Terroir encompasses the complete natural environment in which wine is produced, from the climate mix – Atlantic from the west, heat from the south and cool from the east – that gives the region "optimal wine maturity" to the mixture of clay and limestone soil in Marmeleira, similar to the famed Bordeaux region of France.

The estate's vines – half recently planted, and half evenly split between 10 and 20 years old – are strategically distributed with two areas in the hills, facing north and south, and two in the lower part, with opposite positions facing the sun. According to Andrade, "the secret is to try to get the best from each position."

Other regions may produce more wine, but for the oenologist, the focus is "quality, not output." To reach discerning consumers at every price point, Marmeleira is entering the market under three brands.

The top wine this year will be a red (10,000 bottles), selected from the best of the estate's crop, combining Portugal's "ambassador variety" – touriga nacional – with syrah and alicante bouschet. A white wine version is planned for the future, once quality meets the winery's high standards for the brand.

"White wines depend a lot on the year – they are the ones that tell us when they're ready," he noted. Another top variety is planned, but will only come out in exceptional circumstances, like Douro's Barca Velha, Portugal's most exclusive red wine.

"We have great ambition for this wine. With the 2017 crop we could have reached the point for bottling, but the weather was too warm," he told Macao Magazine. "This has to be a wine that lasts 20–30 years bottled."

The first white wine will instead be a *reserva* (40,000 bottles), a combination of arinto and moscatel varieties from the 2016 crop, that Andrade defines as "fresh, feminine, super floral." The red version (6,000 bottles) combines classical varieties like aragonez, castelão, syrah, and touriga nacional for a "soft, smooth [flavour] with hints of red fruits."

The 'budget' brand will be a red wine from the 2017 crop that combines aragonez, cabernet, castelão, and other grape varieties. Approximately 25,000 bottles will reach the market in the regular version – "open, simple, more consensual" – and 10,000 of the higher quality *reserva* version, fermented in wooden casks.

The oenologist has been attentive to pairing the Marmeleira identity and Lisbon area terroir with evolving wine-

-consumption trends, particularly in Macao and China. Andrade has been tasting over 50 Chinese wines a year, developing a better understanding of the market, and notes that consumers tend to appreciate "Bordeaux-style structure and colour."

Carregado, where Quinta da Marmeleira sits, has "exactly the features that Chinese wine drinkers value: warmth, softness."

The steady rise in wine consumption in China – and planting, already the second largest vine area in the world, after Spain – has led to more quality and refined tastes, drawing hundreds of European oenologists (namely French) to the Chinese market.

With the first bottling completed, Marmeleira turns its focus to grape harvesting, set for late September.

Location of Quinta da Marmeleira



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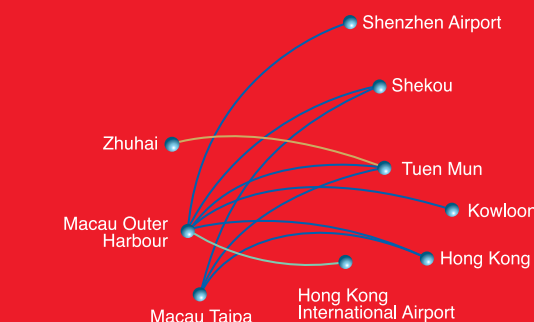
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Greater Bay Area, a priority for Macao's future

Text Sha Kai Sa Photos Government Information Bureau

The Greater Bay Area is one of the 19 planned city clusters. Of these, the GBA, the Yangtze River Economic Belt in the east and the Beijing-Tianjin-Hebei area in the north, are undergoing the most developments.

Over the next decade, the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) will become a major priority for the Macao government as it works to pro-actively promote the concept both at home and abroad.

Several foreign partner nations have hosted delegations from Macao in recent months, eager to access the rich economic opportunities presented by the GBA. Chief Executive Chui Sai On visited the Southeast Asian nations of Cambodia and Thailand in May, meeting with high-ranking government officials from both countries and signing a number of agreements over the course of his five-day visit.

Then in June, Secretary for Economy and Finance Leong Vai Tac headed a delegation on a combined visit to Portugal and Brazil, two major partners in the Portuguese-speaking world. Like Chui, he advocated Macao as a platform for entry into the GBA and the broader Chinese market.

The Chief Executive spent June and July closer to home, visiting the nine Guangdong cities included in the GBA (along with Hong Kong). He assured his counterparts that Macao is ready to co-operate in the development of the cluster, explaining how the territory

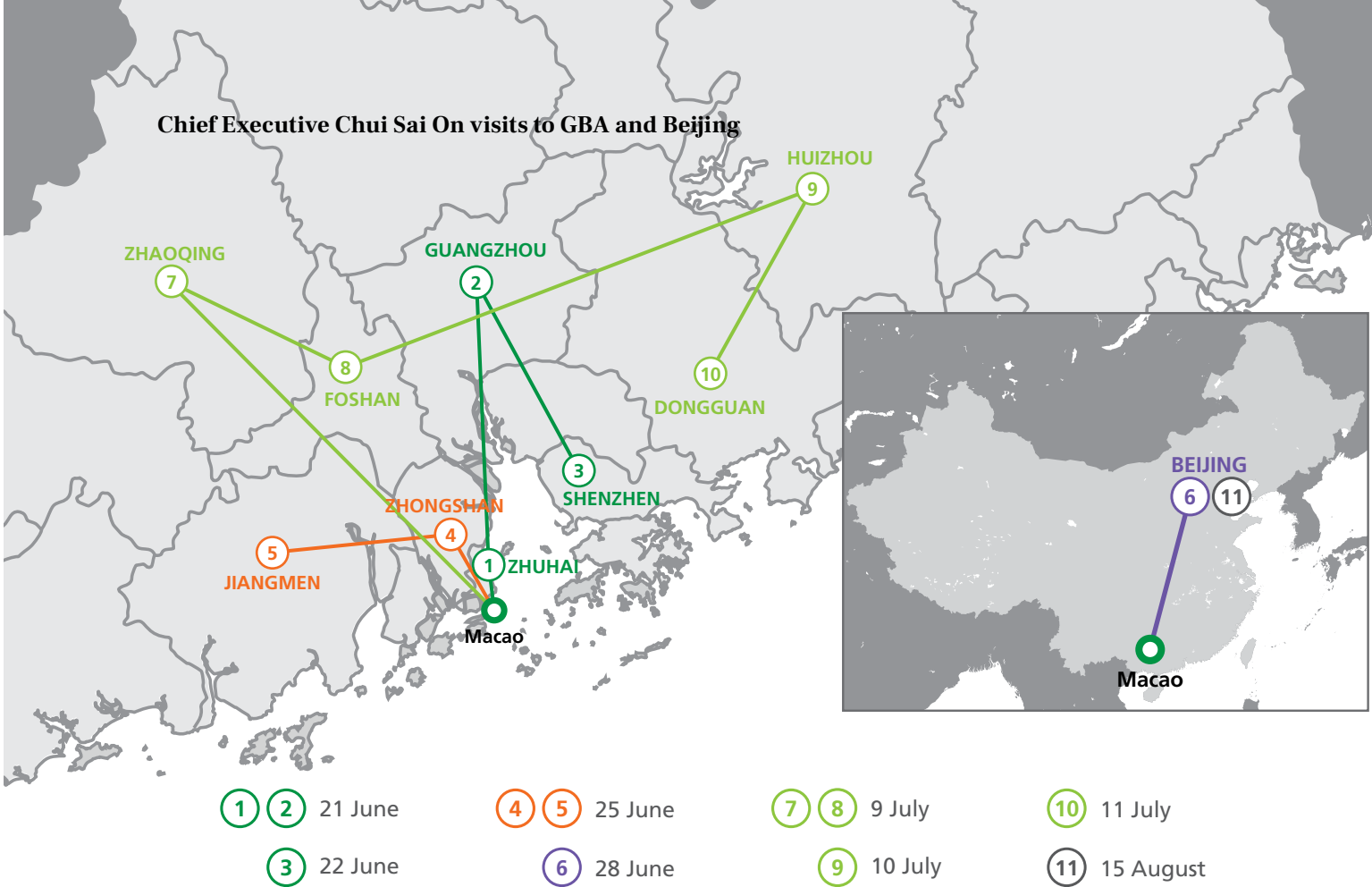
can contribute through its relations with the Portuguese-speaking countries, platform for tourism, and financial centre.

He also travelled to Beijing in June to discuss the GBA with the Chinese Vice Premier Han Zheng, who oversees the GBA Initiative.

In August, Chui participated as a member in the first plenary meeting of the leading group for the development of the GBA at the Great Hall of the People in Beijing. The meeting was headed by the Vice Premier Han Zheng, a member of the Standing Committee of the Political Bureau of the Communist Party of China (CPC) Central Committee.

In the meeting, Han Zheng said that the 11 GBA cities needed to fully utilise the area's "comprehensive" advantages to build a vibrant and internationally competitive area and a world-class group of cities.

Han Zheng also said that "one country, two systems" was the "best system" for ensuring Macao and Hong Kong's long-term stability and prosperity. He added that the development of the GBA must closely follow the Basic Law, upholding strictly the principle of "one country" and utilising the advantage of "two systems," so that the GBA can be successful.



According to a statement by the Government Information Bureau, Chui said that Macao would fully co-operate with the national development strategy and actively utilise its own unique advantages to participate in the development of the GBA, in order to diversify its economy and continue to raise Macao people's living standards.

Strength in numbers

Originally conceived in 2006 as part of a development strategy for China, the Guangdong-Hong Kong-Macao GBA made its official debut at the National People's Congress in March 2017 as part of the government work paper of Chinese Premier Li Keqiang.

The GBA, like all city clusters, leverages the economics of agglomeration: the greater the concentration of related business interests, the lower the

cost of production. It increases competition in the supply chain, encourages greater specialisation and division of labour, and makes it easier for employers to locate the best professional for the job.

The plan outlines the target, development direction, and major tasks of the GBA, which comprises Macao, Hong Kong, and nine cities in Guangdong province: Guangzhou, Shenzhen, Dongguan, Foshan, Zhuhai, Zhongshan, Jiangmen, Huizhou, and Zhaoqing.

With an area of 56,000 sq km and a population of almost 68 million, the GBA accounts for less than one per cent of China's land and only about five per cent of the population. Yet in 2017, they contributed around 7.1 per cent to the national economy with a combined GDP of US\$1.74 trillion. Such numbers – achieved without the full benefits of integration and

co-ordination promised by the GBA – bodes well for the area's future.

During his visits to the nine mainland cities, Chief Executive Chui met with city leaders to discuss the construction of the GBA and to strengthen contact and co-operation. The delegation also toured a number of industrial facilities and explored various business opportunities, including new green businesses and innovative, high-tech projects.

Chui noted that, in the cities visited, he found room for co-operation and complementarity in the management and training of the tourism sector, youth entrepreneurship, and traditional Chinese medicine.

The GBA, concentrated in the Pearl River Delta of southern China, is one of 19 planned city clusters; yet only two others – the Yangtze River Economic Belt in the east and the Beijing-Tianjin-

-Hebei area – are under active development.

According to the official timeline, a globally competitive cluster of metropolises in the GBA will be almost fully established by 2020, while by 2030, it will become a global first-class bay area and city cluster, also a global advanced manufacturing, innovation, international shipping, financial, and trade centre.

China's central government is expected to announce details of the development process for the GBA in the second half of this year.

Team player

During his June meeting with Chinese Vice Premier Han Zheng, Chief Executive Chui acknowledged that, in the past, the appropriate diversification of Macao's economy was limited by a number of constraints and objective factors, including lack of staff and land, and acknowledged that the GBA will help diversify the economy and accelerate economic development.

He affirmed that the government is undertaking preparatory work to ensure the co-ordination of the

Five-Year Development Plan of Macao, the Governance Action Plan, and the construction of the GBA.

In an official statement, Chui acknowledged that the government is aware of the role and functions of Macao within the GBA and is committed to meeting the wishes of the Chinese authorities, who want Macao to co-ordinate its development with the other cities of the region in order to obtain benefits shared by all and establish conditions for the economic diversification of the Special Administrative Region.

By 2030, the GBA will become a global first-class bay area and a cluster of modern cities. It will also be a global centre for advanced manufacturing, innovation, international shipping, finance, and trade.

The statement noted that initiatives will be launched to create a high quality ecological environment and to make it easier for the citizens of Macao and Hong Kong to work and live in mainland China.

Efforts to develop infrastructure throughout the region are already well underway, creating critical transport links between the two SARs and the nine mainland cities of the GBA. The long-awaited Hong Kong-Zhuhai-Macao Bridge, set to begin operations this year, will enable the flow of people in the area – an important complement to

government efforts to ensure the sharing of information, capital, and logistics between all members of the area.

The recent visits by Chief Executive Chui and Secretary Leong highlight how Macao's ability to contribute extends far beyond powerhouse industries within its narrow borders, to the sprawling Portuguese-speaking world and the overseas Chinese community, strong ties that make the small SAR the perfect platform for those eager to access the many opportunities waiting in the Greater Bay Area. ●



Zhuhai

Macao co-operates with Hengqin, Zhuhai, in many sectors, including Traditional Chinese Medicine.



Guangzhou

Guangzhou's tourism sector and other economic areas will provide opportunities to Portuguese-speaking countries (PSC).

The city will strengthen relations with PSC in the areas of culture, education, technology and innovation.



Shenzhen

Shenzhen will work with Lusophone countries in finance and tourism, using Macao as a platform.



Zhongshan

Macao and Zhongshan will work closely to promote and develop Traditional Chinese Medicine.



Jiangmen

Macao is the platform to facilitate co-operation between PSC and Jiangmen, in finance, environment and other economic areas.



Beijing

The GBA will provide housing for residents from Macao and Hong Kong to live and work in mainland China.



Zhaoqing

A manufacturing and tourist centre, Zhaoqing will benefit greatly from the GBA and the new transport links the bay's development will bring.



Foshan

A historic city and a leading manufacturing base linked to the great metropolitan area of Guangzhou.



Huizhou

Base of leading Chinese electronic companies, thanks to its many top-grade industrial parks.



Dongguan

The city is an export powerhouse and has been a pioneer in attracting foreign investment as well.



Beijing

The 11 GBA is to fully utilise the area's combined advantages to jointly build a world-class, competitive group of cities.

21 June

22 June

25 June

28 June

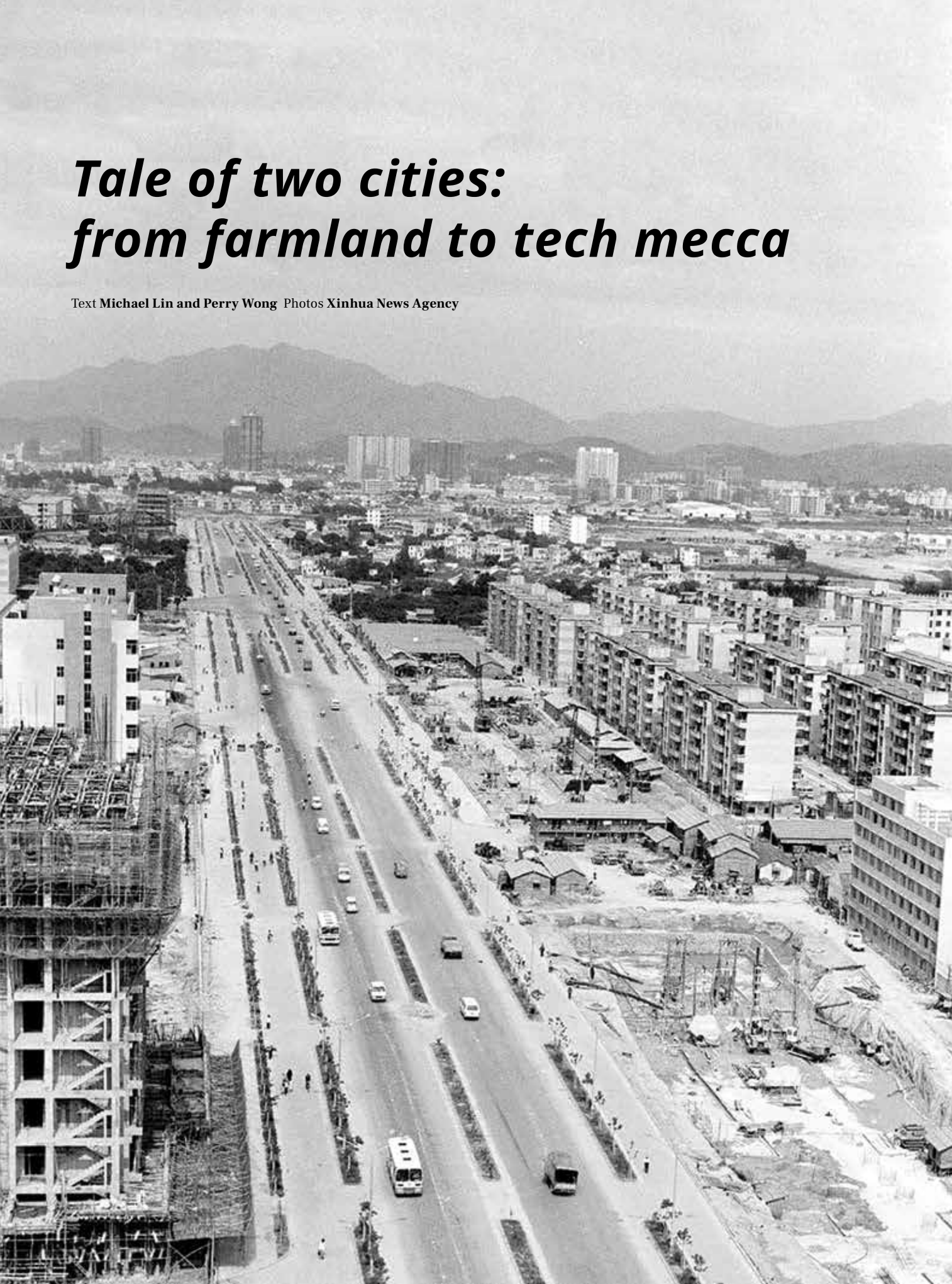
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Tale of two cities: from farmland to tech mecca

Text Michael Lin and Perry Wong Photos Xinhua News Agency



Shennan road, Shenzhen, in 1978 (left) and 2018 (right)





Shekou industrial zone in 1978 (left) and 2018 (right)

From 2010 to 2015, Shenzhen’s GDP grew at a rate of 79 per cent. This year, Shenzhen’s GDP is expected to reach US\$350 billion, surpassing the projected US\$345 billion GDP of neighbouring Hong Kong.

Bordering Hong Kong, Shenzhen began as a small farming and fishing village in the Pearl River Delta and more recently, a low-cost, labour-intensive manufacturing centre. Thanks to China’s reform and opening-up policy in the late 1970s, Shenzhen has become a modern and economically flourishing hub in the consumer electronics world. The city is now also known as ‘China’s Silicon Valley’ and ‘Silicon Delta.’

Around the globe, there have been numerous efforts to replicate the famed Silicon Valley. While some have been relatively successful, other efforts have proven mediocre or ineffectual. Within China, the Shenzhen special economic zone (SEZ) is by far the most successful one.

While the two clusters operate under two rather distinct political and economic systems – the Bay Area being a market economy whereas Shenzhen is a planned economy – both have been recognised as innovation and technology hubs with great economic success. Comparing these cases at the extremes of the institutional spectrum can provide different angles in understanding how the two clusters emerged, evolved, and proved sustainable.

Valley and Delta

The term ‘Silicon Valley’ in the US often refers specifically to the area around San Jose, California. Despite this, conceptually most people would also associate San Francisco with Silicon Valley, generally known as the San Francisco Bay Area, which encompasses both the San Francisco-Oakland-Hayward and San Jose-Sunnyvale-Santa Clara metropolitan areas. In 2015, the Bay Area had a population of 6.6 million across 13,357 sq km of land area meaning a population density of 495 people per sq km.

By contrast, the city of Shenzhen concentrates its much larger population into an area a

fraction of the size of the California metropolitan areas. Shenzhen’s 10 districts cover just 1,997 sq km of land area, and in 2015, it had a population of approximately 11 million with 5,697 people per sq km. It has grown into a vibrant city dotted with stores, restaurants, hotels, and offices along its commercial boulevards. In 2016, there were 128 skyscrapers completed around the world. China accounted for 70 per cent of the pool; Shenzhen alone had 11 skyscrapers, more than the entire US.

From 2010 to 2015, Shenzhen’s GDP grew at a rate of 79 per cent, easily surpassing the 29 per cent and 44 per cent growth rates of San Francisco-Oakland-Hayward and San Jose-Sunnyvale-

-Santa Clara metropolitan areas respectively. This year, Shenzhen’s GDP is expected to reach US\$350 billion, surpassing the projected US\$345 billion GDP of neighbouring Hong Kong.

Behind these staggering rates of economic growth, Shenzhen’s real transformation comes from the alteration of its industrial composition. In the past two decades, the city has evolved from being a base for hardware manufacturing to become a centre of higher-end manufacturing production and an innovation hub. It has had great economic success in recent years, coming in fourth in the Milken Institute’s “Best-Performing Cities China” rankings for 2016 and 2017.

Early success and evolution

The origin of Silicon Valley can be traced back to the leadership of Stanford University. Frederick Terman, then a professor at Stanford's School of Engineering, is widely credited as being one of the key facilitators in spawning this tech cluster. His leadership and efforts led to the emergence of many technology firms in the electronics industry including the Hewlett-Packard Company (HP).

In the early years, many firms in the region received defence-related funding. Terman's vision, by founding the Stanford Research Institute (now SRI International), brought industrial workers to Stanford's classroom to facilitate collaboration. By the late 1960s, the area had become known as an aerospace and electronics industry cluster.

Around the early 1970s, the area around San Francisco and San Jose developed expertise in

the semiconductor sector. In 1971, journalist Don Hoefler coined the term 'Silicon Valley' in Electronic News. Some well-known tech companies such as Apple and Oracle were founded there in the 1970s. By the 1980s, Silicon Valley had become the widely accepted centre of the computer industry and in the 1990s, renowned internet-related companies such as eBay, Google, and Yahoo were established there. Silicon Valley took advantage of the 1990s internet revolution and commanded its leadership in information technology.

Unlike Silicon Valley, there were no prestigious academic institutions at the onset of Shenzhen's establishment. Its humble beginning as a small village changed radically as it first gained municipal status in 1979, then became one of the nation's first of four special economic zones (SEZs) in 1980. Shenzhen's location in between the mainland Chinese and Hong Kong made it an important intermediary in commodity circulation and factory imports.

At the outset of the SEZ's establishment, the zone was set to focus on the electronics industry. Many electronics manufacturing and processing facilities relocated from Hong Kong to Shenzhen. Founded in 1986, the Shenzhen Electronics Group Company initiated China's first electronic parts supply market, nurturing entrepreneurship in the city.

From the 1980s to 1990s, Shenzhen's manufacturing base successfully evolved from being an assembly centre of household electronics such as telephones and calculators to focusing on PCs

and software, telecommunication, microelectronics, and new materials. In the 2000s, Shenzhen established its information and communication technology (ICT) industry. Subsequently, it has become an indispensable part of the global consumer electronic production networks.

In the last two decades, Silicon Valley has emerged as the world leader in high-tech industries. Several innovative companies – Airbnb, Facebook, Tesla, Twitter and Uber, to name a few – have strategically situated themselves in the region. This clustering demonstrates Silicon Valley's ability to foster an ecosystem ripe for entrepreneurial and innovative activities.

Since 2000, Shenzhen has become a global manufacturing hub for a variety of electronic products such as laptops and mobile phones. The municipal government established the Shenzhen Overseas Chinese High-Tech Venture Park within the Shenzhen High-Tech

Industrial Park (SHIP) to attract overseas Chinese scholars and students to start their businesses (particularly in the high-tech industries) in the city. Since around the mid-2010s, Shenzhen has been more actively transforming itself from an original equipment manufacturer (OEM) centre to a technology and innovation hub by cultivating its indigenous innovation capacity.

Drivers for economic success

Many scholars have used various theoretical frameworks, including international and comparative development theory, regional science and urban economics (RSUE), new economic geography (NEG), and the study of institutions for cities and regions development. Despite their different angles, these theoretical approaches cover some common ground including the roles of capital, labour, innovation,

entrepreneurship, universities, research institutes and cultures, along with institutions in determining the economic outcomes of cities and regions.

Through these lenses, we can compare the similarities and differences between the Bay Area and Shenzhen and identify the key factors contributing to their rise as innovation hubs and their economic prosperity.

Capital investment

The main funding source at the early stage of Silicon Valley's establishment came from military contracts. By the early 1970s, venture capital (VC) replaced military funding as the major source for financing startup activities. A key factor in Silicon Valley's early success is that many members of VC firms had their roots in the electronics industry and thus, could make sound investment decisions.



Yumin village in 1980 (top) and 2018 (bottom)



Shekou port, 1976



Shekou Taiziwan cruise port, 2016



Luohu district under construction (top) and in 2018 (bottom)

Venture capital has been an essential part of Silicon Valley's innovation and entrepreneurial activities. As Professors Michel Ferrary and Mark Granovetter put it, "understanding Silicon Valley's complexity and the hidden functions of VC firms can help policy-makers who try to create innovative clusters."

Unlike the case of Silicon Valley, foreign direct investment (FDI) was the main source driving Shenzhen's early economic development. In particular, the FDIs from Hong Kong and Taiwan spawned the early

formation of Shenzhen's electronic industry. Shenzhen offered preferential policies such as tax benefits and management oversight by investors to lure foreign investors.

In 1987, China's first bonded area, the Shatoujiao Bonded Zone, was established to attract FDI. All these efforts have led Shenzhen to become one of the leading recipients of private foreign funding in China. From 1980 to 2015, the amount of foreign capital actually utilised by the city increased dramatically, from US\$28 million to US\$6.5 billion per year.

In 2000, the city set up an International High-Tech Equity Transaction Center that specifically intended to facilitate high-tech equity transactions and promote venture activities in China. In 2007, the Shenzhen Venture Capital Services Platform (SZ VCP) of SHIP was established. More recently, the Chinese central government set a policy mandate to promote entrepreneurial and innovation activities and launched a US\$1.5 billion startup VC fund to cultivate innovation-driven sectors.

More recently, the Chinese central government set a policy mandate to promote entrepreneurial and innovation activities and launched a US\$1.5 billion startup VC fund to cultivate innovation-driven sectors.

Sourcing human capital

For more than a century, the US has been a nation where people are free to migrate of their own will. On top of a high rate of domestic migration among states, California in particular has been a melting pot consisting of a variety of ethnic and racial groups with varied backgrounds and talent.

Historically, migration for most people in China was discouraged, due to the country's hukou (household registration system). Despite the difficulty in getting a permit, many found loopholes to sneak into the SEZ. Gradually, as Shenzhen relaxed its limit on permits, more young Chinese graduates with ambition and vision have flocked to the city since the 1980s.

Human capital flowing into Shenzhen through both formal and informal conduits is recognised as the key for Shenzhen's economic success. A report released by Ant Financial (affiliate company of Alibaba), a Chinese fintech company, regarding the destination of recent university graduates in 2015 showed that the outflow of college graduates from

Wuhan to Shenzhen was number one in the nation.

Where the Bay Area has long been open to migration and immigration, Shenzhen initially had a tight control on labour and residential mobility but later relented. Ironically, the central government's early tolerance of informal and illicit practices helped the accumulation of capital and knowledge. If there is a shared value between the two cities that helped foster growth, it would be the openness of the society and the ability to attract talent. The two city-regions are more like 'sister' cities in that regard.

Universities and research institutes

The presence of strong research universities and institutes is associated with the formation and development of high-tech clusters. Stanford University played a key role in the formation of Silicon Valley. The Bay Area is also home to many universities anchored by the University of California, Berkeley. These academic institutions are essential sources to the local talent supply and are critical to the cultivation of innovation capacity and the growth of the Bay Area.

By contrast, Shenzhen had no strong research universities or institutes. Shenzhen University was founded in 1983 as one of the earliest academic institutions in Shenzhen. A decade later, Shenzhen Polytechnic was founded, and a number of Chinese renowned academic institutions such as Peking University and Tsinghua University have established satellite campuses in the city. Despite these efforts, some argue that such institutions did not contribute to the formation of Shenzhen's IT cluster.

Innovation and entrepreneurship

As Shenzhen became a global processing and assembly centre for telecom and mobile phone production, competition from other low-cost cities in China has also gradually eroded Shenzhen's cost advantage. To cope with these challenges, the city has been trying to upgrade its industries through bolstering its innovation capacity. By the second half of the 1980s, Shenzhen had attempted to nurture innovation and entrepreneurial activities by encouraging high-tech professionals to become shareholders of private enterprises.

One of the key strategies in fostering high-tech industries was to establish industrial areas such as the SHIP (founded in 1996). These industrial parks typically provide their customers with low-cost spaces and readily available equipment as well as streamlined administrative services to help jumpstart small tech-oriented businesses. In 2000, the Shenzhen Overseas Chinese High-Tech Venture Park in SHIP was established to attract overseas Chinese students to start their businesses in Shenzhen. This park provides entrepreneurs with physical infrastructure and services in financing, consulting, training, networking, and marketing.

In addition to cultivating high value-added industries such as IT and electric car production, Shenzhen has recently pushed for innovation and entrepreneurial activities. In particular, the city is trying to create more makerspaces where entrepreneurs can design, prototype, and create manufactured products.

The complete and low-cost supply chain for electronic manufacturing provides Shenzhen with huge advantages in innovation

and entrepreneurial processes. As a capital for hardware, it has a complete ecosystem that can offer easy and timely access to low-cost equipment and parts for all stages of electronics production and has attracted about a thousand startup accelerators to the city.

Shenzhen's persistent efforts in advancing its high-tech industries are reflected in the statistics. In 2001, the value of exports of the high technology industry was US\$11.4 billion. By 2015, this number jumped by more than 12-fold to US\$140.3 billion. From 2004 to 2015, the city's number of Patent Cooperation Treaty (PCT) international patent applications increased by 40 times, from 331 to 13,308.

Professional culture and institutions

According to one expert, the openness, culture of collaboration, and informal interaction between firms and talented professionals play key roles in the success of Silicon Valley. These factors also helped the Bay Area cope with the challenges from the tech bubble burst in the early 2000s. The rebirth of the Bay Area technology cluster after the tech bubble burst made the region stronger as a leader in both the technology world and in broader regional economic development.

Unlike Silicon Valley, research has found that there is no significant relationship between the spatial agglomeration of firms in Shenzhen's information and technology (ICT) industry and their innovative performance. This is due to a lack of interest in interaction among firms in the industrial clusters. As a result, the innovation of most firms mainly comes from their internal R&D activities rather than from technology transfer or knowledge spillover.

Although the designation of SEZ gave Shenzhen a relatively high level of autonomy compared with other Chinese cities, it was not quite an open economy. Nevertheless, the dramatic contrast in lifestyle and economic developmental status between Hong Kong and Shenzhen gave the city impetus to be more open and receptive to institutional changes. One of the key factors leading to Shenzhen's current success is its ongoing restructuring and streamlining of administrative institutions. For instance, the city has been reforming its industrial and economic management systems since 1981.

The ability of these regions to transform perhaps stems from the open culture and intense competition on the enterprise level or the ability of the government administrators to quickly retool policies to accommodate new economic and corporate needs – or some combination of the two.

Complexity of replicating success

The two city-regions clearly followed different paths: prestigious higher education institutions such as Stanford University played a key role in spawning Silicon Valley whereas Shenzhen had no such endowment at its early developmental stage. Both city-regions have been known for their electronics industries, yet where the Bay Area has been pushing the global innovation frontier, Shenzhen began with low-cost manufacturing and currently strives to nurture indigenous innovation capacity. The Bay Area operates within a market economy, whereas Shenzhen situates in a socialist market economy; a hybrid of a planned and market economy.

The developmental pathways of the Bay Area clusters and the Shenzhen high-tech economy cannot be more different in orientation, pace of development, utilisation of private funding, and most notably, the roles of government in the process of building these regional economies. As such, it is difficult to draw on the success of these two economies too broadly to define sets of policies or practices in 'making' a successful high-tech economy.

Assessment of contributing factors in both city-regions shows that an open policy that allows free flow of capital and labour contributes to a fertile environment for innovation and entrepreneurship. It also finds that while the role played by universities and research institutes may not be necessary for the formation of a tech cluster at its early stage of establishment, these institutes are essential to long-term economic development.

Passengers at a port linking Shenzhen to Hong Kong, 1978 (left)
Cross seabridge of Shenzhen bay, 2018 (right)



However, human capital and talents appear crucial in the formation of robust clusters. Innovation and entrepreneurship arise spontaneously within a market economy like the Bay Area. In a semi-market economy like Shenzhen, although policies that encourage innovation and entrepreneurial activities play some role, institutions that allow free flow of capital and talent and streamlined administrative processes for businesses would matter more.

Are their experiences replicable? Governments around the world may try to pull funding, attract talent, establish or strengthen universities and research institutes, craft policies that encourage innovation and

entrepreneurship, and shape the culture and institutions. However, as numerous cases have demonstrated, Silicon Valley cannot be easily replicated. Even within China, not all SEZs can achieve the same success as Shenzhen.

Many factors have to be mature enough, and be in place simultaneously, to succeed. In addition, just like the case of Shenzhen, some innovation was achieved through breaking the formal institutions or rules. If a government really would like to create another Bay Area or Shenzhen, its best bet may be to provide businesses with streamlined and transparent rules and services to facilitate a spontaneous and open ecosystem for innovation and entrepreneurial activities. ●



Construction site of an international trade centre, 1978 (left)
Shenzhen night view, 2018 (right)

This article is based on an earlier version published by Michael C.Y. Lin and Perry Wong (2018). "Tale of Two Cities: From Farmland to Tech Mecca." Santa Monica: Milken Institute.

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The water solution

Text **Cathy Lai** Photos **Leong Sio Po**

Three years after the central government authorised Macao to manage 85 sq km of waters, the Medium-to-long-term Plan for Usage and Development of the Waters of the Macao Special Administrative Region (2016–2036) was formulated in August 2018. Divided into 12 chapters, the Plan elaborates on the current situation of Macao waters and provides guidelines for future development. We recently sat down with Mi Jian, deputy head of the working group and the new director of the Policy Research and Regional Development Bureau, to understand the aims and objectives of the Plan.

Mi Jian

How does the Plan benefit the overall development of Macao?

We want to make sure that the Plan will be instructive and significant to the future development of Macao, therefore, we need to take the overall situation of Macao into consideration – this means two things. First, we need a comprehensive plan for land and marine development. As you may know, we are also working on the Urban Development Strategy for Macao, and we have to make sure the Plan integrates with this master plan. Theoretically, the Plan is an important part of master plan, and overall planning for land and marine development is pivotal.

Second, we have to take into consideration the overall development and all aspects of Macao society, such as politics, economics, culture and people’s livelihood, along with the expectations of the central government, which is to position Macao as “One Centre, One Platform,” and to maintain a moderate and diverse economic development of the city. Meanwhile, we are also mindful of the constant yearning for a beautiful living environment among Macao residents.

We also have to take a responsible approach, meaning, we need to have academic standing, and a genuine understanding of Macao’s waters. Based on this understanding, we think carefully about balancing Macao’s long-term social development and the preservation of its natural environment. We cannot reclaim area that is not suitable for reclamation and damage our precious water just because we want to expand our living space.

The Plan aims to achieve various short-, medium- and long-term goals. Can you explain more on them?

The short-term goals of the Plan, set to accomplish in three to five years, are to solve the key problems that affect people’s livelihood. These include transportation, environmental protection, disaster prevention and public leisure places, because Macao is small and people need more space for recreational activities.

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We have proposed an external circular path that would be built along shoreline of the Macao Peninsula to tackle the traffic problems.

Mi Jian

For transportation, we are now working on the Urban Development Strategy of Macao, in which we have proposed an external circular path that would be built along shoreline of the Macao Peninsula to tackle the traffic problems. It would start from Portas do Cerco (關閘口岸), and down the Avenida Norte do Hipódromo (馬場北大馬路), Avenida da Ponte da Amizade (友誼橋大馬路), through to Macao Science Centre at the southern edge, then A-Ma Temple, Inner Harbour, Fai Chi Kei (筷子基), and back to Portas do Cerco.

However, we have to consider cancelling the section along the Inner Harbour due to multiple factors, such as the nearby fairways and water facilities.

This will eventually make the external circular path like a flipped ‘C’ instead of a full ring. As for Portas do Cerco, we all know that it is highly vulnerable to bad weather, so we also contemplate whether it is possible to build a transportation hub in that area. We have a preliminary plan and a conceptual design, to which the central government has preliminary approved. Now, we are preparing more supporting data to submit to the central government. Once they are approved, we can proceed with the project.

The mid-term goals, simply put, aim to forge a path for Macao’s future development in five to ten years. Right now, Macao has a land area of 30.4 sq km. If we add all the reclamation land (Zones A–E) to the existing land area after their completion, the total land area of Macao will grow to 35 sq km. But Macao’s population has already reached 650,000 and the city is very crowded, especially in areas such as Iao Hon (祐漢) on the Peninsula.

We have invited a lot of experts to Macao to study its current situation, and all of them agreed that the city needs new spaces for future development. The central government also agreed with this at a certain level; however, for the sake of ecological development, China has issued a nationwide halt to all reclamation projects, including those in Hainan, Hebei, and Qingdao. We can’t say for sure whether China would allow Macao to expand its tiny territory, but we can still propose our plans, our requests, for approval.

We also proposed the notion of a ‘fourth space,’ which was put forward in the Urban Development Strategy. It would open up new space for development after the three natural spaces of Macao Peninsula, Taipa, and Coloane.



Theoretically, we would have the fourth space inside Macao waters, but after careful investigation into Macao's fairways, we found that only 12 sq km out of Macao's entire waters is available for development, and after deducting Zones A-E, there is only eight sq km left, and they are really scattered. Large-scale reclamation is impossible.

The long-term goals, which is set to accomplish in 10-20 years, is to integrate Macao's development with the national development strategy and to realise Macao's maritime economy. Macao is a coastal city, and it relies on the sea to build connections with the outside world. This is how it become a cosmopolitan city with distinct features. So, our future will be tied with marine development.

If our fourth space can be realised, it will be located at the maritime area of the south of Coloane, which is near Huangmao Island, with water as deep as 13-16 metres, making it possible to accommodate cruises and thus maritime travel. Macao waters are too shallow, with only a small area as deep as 5 metres, and cannot accommodate big ferries.

Our fourth space, together with Huangmao Island, and Gaolan Port at our west, will form a 'maritime golden triangle,' as Huangmao Island will support passenger transport and Gaolan Port will support freights. This can help promote Macao as the trade and cooperation platform for China and Portuguese-speaking countries. The maritime golden triangle and the coastal city cluster (comprising Zhanjiang, Beihai, Macao, Zhuhai, Zhongshan, Shenzhen, Hong Kong, Xiamen, Fuzhou and so on) are envisaged to be a core zone of greatest potential, vitality, and capacity for innovation.

How does the Plan contribute to Macao's participation in the Greater Bay Area (GBA) and the Belt and Road Initiative (BRI)?

I believe the Plan has significant meaning for Macao's participation in GBA and the BRI. Since we obtained management right to our waters in 2015, the Plan now offers us an advantage in the development and construction of the GBA, as we take careful steps to achieve our goal of promoting cooperation with other member cities.

Secondly, the Plan provides us with a safety net to participate in the GBA Initiative, because it aims to promote regional cooperation and has taken the country's development strategies into consideration. As to how to manage and regulate it, we already have preliminary ideas. It works the same for Macao's participation in the BRI.

Who are the experts participating in the development of the Plan?

Since the Working Group on the Medium-to-long-term Plan for Usage and Development of the Waters was set up in 2016, we have done a lot of work which hasn't been officially announced yet. The experts who participated in the planning can be divided into two categories: mainland and local. First, we have invited experts from scientific research institutions outside Macao to participate in it, such as the State Oceanic Administration and the Pearl River Hydraulic Research Institute. These are top-notch scientific research institutions related to water transport within the GBA. They helped us do a fundamental investigation and, based on the findings and our input, created a fundamental proposal for our

reference. We also worked with the Ministries of Transport and Water Resources.

From there we invited four experts – who are also the secretaries of the institutions – to be our consultants, and they have been really supportive. We let them review our reports and give feedback, which will be very useful for us in the future, when we seek approval from the central government for our Plan.

Meanwhile, we also worked with experts and scholars from University of Macau, Macau University of Science and Technology, and other relevant institutions in Macao. They helped us conduct research and investigations. We hosted rounds of discussions to receive feedback from several dozen local community associations, as well as relevant government departments such as the Marine and Water Bureau and the Land, Public works and Transport Bureau.

We have basically completed the Plan, and this is thanks to the support and participation of various experts and scholars, and all relevant associations and government departments.

Is there any way for the general public of Macao to become involved in the Plan?

We have consulted a lot of local associations to receive feedback, and I believe the local associations can represent Macao residents at a certain level, so in this way, we have heard opinions of local residents. We thought about conducting a public consultation, but we believe that people should have a genuine understanding of the planning first.

Right now, I don't think many people understand the condition of Macao waters thoroughly. They all



know that we have been granted 85 sq km of waters but what are the details in it? No one can say clearly. The maritime area is not just sea water, it also comprises water courses, waterways, underwater facilities, flood discharging, landfills, and four ports. If people are not aware of this complexity, they can form a lot of opinions that may not be very helpful. I believe we should invite public opinions after we have conducted a very responsible and scientific planning, to ensure a better effect. And when this is going to happen depends on the government's arrangement.

The planning involves a high level of professionalism, and we have tried our best to obtain opinions from different social aspects. Recently, we held two conferences, the first on urban planning strategy and the second on marine planning. During the Macao International Conference on Marine Administration, Utilisation and Development, we saw the participation of 47 guest speakers, including five fellows from different academies, and the leaders of Chinese government departments.

Meanwhile, we also invited people from different social aspects in Macao to participate in it – this is how we spread the information of Macao waters and our planning to society.

Since Typhoon Hato, Macao citizens have become very concerned about the measures for flood prevention. Are such provisions included in the Plan?

Disaster prevention is always our top concern and the damage done by Typhoon Hato last year makes it an even more pressing issue. Therefore, we devoted an entire chapter in the Plan to marine disaster prevention, which includes short- and long-term planning. For instance, we actually thought about implementing integrated traffic planning that would include building flood walls, optimising traffic systems and fairway safety around the Inner Harbour area. Ultimately, we discarded this idea: once the construction of the flood gates at the area begins, we will have no reason to build flood walls which serve a similar function.

On the other hand, the Inner Harbour area is really complicated because it is an old district. It has a very complex underground network, and above ground there are harbours and interlacing streets and roads. That's why we have decided to build a reversed-C traffic route and rely on the flood gates to deal with the water problems. As for Portas do Cerco, it was severely flooded during Typhoon Hato. The proposed transportation hub there would be designed to solve the problem by preventing the entry of the next flood.

We also aim to solve the problem of waterlogging caused by rainstorms by building rainwater sump pumps and box culverts. That's how we optimise the drainage system in the short term. Moreover, maritime disaster prevention, risk evaluation system, improving disaster emergency response cooperation mechanisms, and advanced warning and forecasting systems are also included in our planning. Macao residents will see the result in the future. ●

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Macao opens new paths to China's future

Text **Marco Carvalho** Photos **António Sanmarful**

Imagine: a chip that harnesses energy from thin air, another that uses body motion and temperature to recharge itself, or a third that allows energy transfer among different devices wirelessly. Researchers at the State Key Lab from the University of Macau are making this a reality. Their work may prove pivotal in China's bid to challenge the technological superiority of the United States.

Gaming is big business in Macao, but the best chips the city has to offer might not be the ones that clack all over the gambling tables of the many casinos of the SAR.

Behind all the glitz and the glamour of the bustling resorts, there is crucial research work being done that can help China fulfil one of its most elusive goals: to become a technological powerhouse, able to challenge and rival the United States' primacy in fields such as biomedics, data transmission or even the kind of wireless energy transmission, that was envisaged more than a century ago by Nikola Tesla.

At the Hengqin campus of the University of Macau (UM), a group of locally bred researchers have been working relentlessly for most of the last decade to assist China in becoming less reliant on foreign technology, namely on American chips and semiconductors.

The work conducted by Pui-in Mak, Seng-Pan U, Sai-Weng Sin, and several others gained a particular prominence last April, when China's second largest telecom-equipment maker – Shenzhen-based ZTE – was banned from buying US technological components for seven years for allegedly breaking an

agreement reached after it violated US sanctions against Iran and North Korea.

While a deal was struck between the company and the US administration that allows ZTE to continue buying its chips and integrated circuits from US companies, the incident exposed some of China's vulnerability in terms of technology and innovation.

"Integrated circuits, not oil, are China's main import. People think that China buys a lot of oil from its partners, but it buys even more silicon [modified sand] to be used in chips manufacturing,"

explained Rui Martins, vice rector for Research at UM, putting in perspective Beijing's reliance on foreign-made chips.

China imported US\$227 billion worth of integrated circuits in 2016, more than it imports of crude oil, iron ore, and primary plastics combined. The central government made chip development a key aspect of its Made in China 2025 drive to bolster its expertise and strength in technology against more developed rivals, such as the US, Japan, South Korea, and Europe. Unveiled in 2015, the Made in China 2025 policy defined

10 sectors – such as robotics, semiconductors, and advanced medical technology – in which Chinese companies are expected to dominate in the domestic market and compete globally.

In an ambitious drive, the government wants local chips to make up at least 40 per cent of China's semiconductor needs by the middle of the next decade. This goal means that the work being made by Martins and his students in the Beijing-backed State Key Laboratory of Analog and Mixed-Signal VLSI (microelectronics) will be at the forefront of China's technological policies for the next few years.

"Every year, China's National People's Congress sets out a handful of priorities in terms of technology. This year, the task of promoting the Chinese industry of integrated circuits tops the list," recalled Martins.

The vice rector, who also heads the Lab, claims that the drive for innovation has always been a concern for the Chinese authorities, despite a previous focus on Chinese manufacturers reverse engineering with the aim of replicating imported chips, rather than independent innovation.

Four years ago, in 2014, when President Xi Jinping visited the State Key Laboratory, he inspired the Lab's scientists to "lead by innovation" – something which the Lab has been doing since its inception, according to Martins.

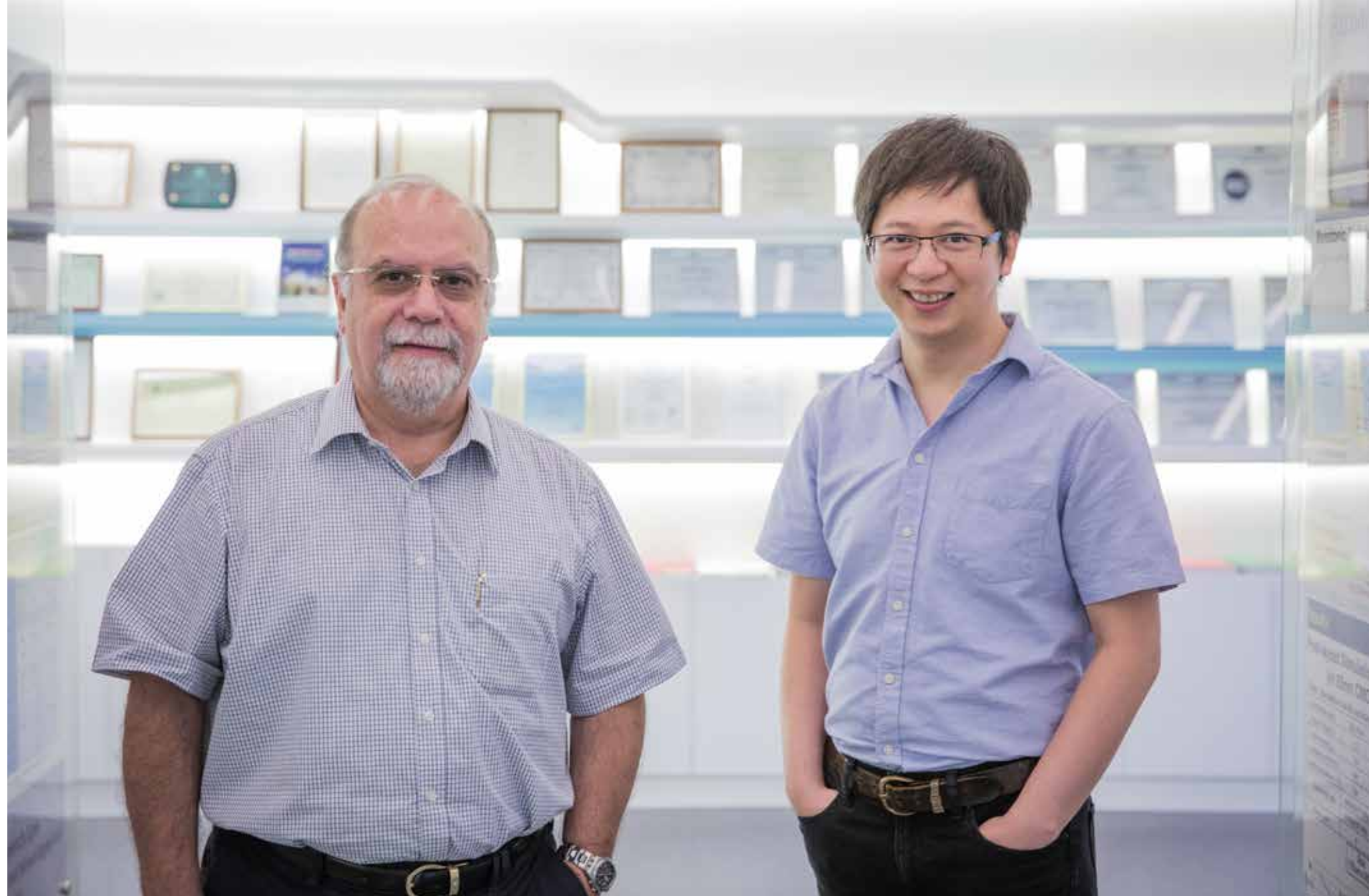


Talent ‘Made in Macao’

Young, hard-working and straight-laced, the researchers working with China to secure its technological autonomy are not the usual bunch of tech buffs. Far from household names in Macao, they are nonetheless among the very best chip designers available. Their work over the better part of the last decade, conducted under the supervision of Martins, transformed the University of Macau into one of the most respected institutions worldwide in the fields of microelectronics and integrated circuits design.

With a total of 30 patents registered in the US alone, the researchers of the State Key Laboratory of Analog and Mixed Signal VLSI (AMSV) are among a small group of elite scientists who managed to obtain extensive recognition at the International Solid-State Circuits Conference (ISSCC), the most competitive event in the world in the field of chip design. At this year’s edition of the conference, which took place in San Francisco this February, UM successfully submitted seven papers (and as many integrated circuits) to the organising committee of the event, making the State Key Lab one of the top six global institutions in terms of state-of-the-art chip conception.

“The ISSCC is a benchmark in the area of micro-electronics. It’s extremely difficult to have papers published in this event,” noted Martins. “The level of acceptance of research papers is fairly low: only 30 per cent of the papers submitted by universities or commercial ventures are accepted by the organising committee. We submitted eleven, seven of which were accepted and discussed in the conference.”



Rui Martins, vice rector for Research at UM (left) and Pui-in Mak, State Key Lab associate director for Research (right)

The biggest tertiary education institution in Macao was only outranked by technological giants such as Samsung and Intel Corporation, and a handful of distinguished research universities with which both companies have co-operation agreements, like the Korea Advanced Institute of Science and Technology (KAIST); Delft University of Technology in the Netherlands, or the Georgia Institute of Technology – better known as Georgia Tech – in the United States.

Such a showing at the world’s leading event on solid-state circuits and chip conception showcases UM as a leader in the field of microelectronics among Asian universities, in general, and Chinese universities in particular.

Together with a pre-doctoral Achievement Award and three student research previews, a team from the State Key Laboratory of AMSV received the 2017 edition of the prestigious Takuo Sugano Award for Outstanding Far-

-East Paper. The prize, which was awarded for the first time to a Chinese team, distinguished a project – and its corresponding chip – called “A reconfigurable bidirectional wireless power transceiver with maximum-current charging mode and 58.6 per cent battery-to-battery efficiency.”

Not the catchiest title to laymen, yet beneath those technical terms may lie the future of the devices that have become central to our lives. The project aims to make tangible

the technological process developed over 120 years ago by Nikola Tesla, the pioneering Serbian-American scientist who dreamt of creating a way to supply power without stringing any wires.

Tesla nearly accomplished his goal when his experiments led him to the development of the so-called Tesla Coil, a device that managed to harvest high-voltage, high-frequency alternating currents over short distances without having the ability to harness that same energy.

Today, wireless power transfer seems to be at the critical point of an explosive growth, and scientists stand on the brink of enabling mobile devices to charge others without any additional hardware.

“If you think about it, there’s nothing very unusual about the possibility of recharging devices wirelessly. Right now, most of the mobile phones are already equipped with technology that allows wireless data transfer. If, for any certain reason, you don’t have the possibility to use your data, I can transfer some of my data to your device,” explained Martins.

He sees a near future where mobile phones have power hotspots, too. No more lugging around a collection of cords or vying for a spot close to the outlets, power hotspots would allow for the wireless transfer of energy between two independent devices.

This, and other technological achievements that are being carried out by State Key Lab researchers, should have a decisive impact on near-future trends and concepts like the Internet of Things (IoT) or the plans to turn analog, linear cities into smart, planar ones. The future, maintained Martins, is all about autonomy and UM’s PhD graduates have been working the last few years on compact, state-of-the-art solutions that will allow future devices to operate without the need of external or complimentary power sources: “We are working, at the State Key Lab, to make chips and integrated circuits entirely autonomous.”

The IoT – a web of devices sharing data to manage processes and improve outcomes – cannot function properly if forced to rely on external sources of energy. “They will have to make use of their own capacity to generate the energy that will keep them connected to the web and to the world,” underlined Martins.

Tapping into the energy around us

Most of the work which is being carried out at the State Key Lab at UM is based on the premise that energy is all around us. It's simply a matter of capturing and processing it in the right way, whether that means using the body as a natural power station or developing the capacity to acquire and transform the flow of energy that surrounds each and every thing. Two of the papers accepted at this year's edition of the ISSCC focused precisely on self-sustaining chips able to run on bioelectric power or other types of low-range energy source.

"One of the papers that got accepted in the International Solid-State Circuits Conference was about a Bluetooth low-energy receiver, which is basically a semiconductor that makes use of Bluetooth technology to gather energy from the outside world," noted Martins. "Another one has at its core a bioelectric energy harvest rectifier – this is a circuit that was conceived to receive and transform energy from the human body, whether it is through the body's own movement or its temperature."

Authored by Yan Lu, Seng-Pan U and Martins of UM, along with Professor Mo Huang of the South China University of Technology (SCUT), the development of a microchip that will allow smartphones or tablets to recharge batteries in other gadgets is just one of the projects being researched at UM. Macao's biggest, and oldest, university is working to provide a solid, game-changing push in Beijing's ambition to challenge United States' technological superiority in areas ranging from the nano world of chips to the mesmerising expanses of the cosmos.



Developing ideas and innovators

Apart from propelling China to rival the United States' supremacy in microelectronics, the city's two State Key Labs – the other one, divided between UM and the Macao University of Science and Technology (MUST), has been focusing exclusively on traditional Chinese medicine since 2010 – it can help Macao in the drive to diversify its economy, which remains undeniably dependent on the gaming tables of the city.

Fuelled by the results obtained by both institutions over the last eight years, Macao is in the process of setting up two more state-level laboratories. China's Ministry of Science and Technology is set to give the green light to a new laboratory on smart cities and the IoT that will be based at UM. A second one, on planetary science, will be housed at MUST.

To "lead by innovation" is the main design of the research team commanded by Rui Martins at the State Key Lab of AMSV, but it's not the sole purpose of the institution. Apart from devising the future in fields such as wireless charging technology or biotech, the Lab's investigators have been training Chinese graduates to develop the kind of independent research that can make China a leading power in terms of technological development.

"We are an educational institute and we need to understand and focus in our position. If a university gives up on education, who will educate the next generations?" posited Pui-in Mak, the associate director for Research at the State Key Lab. In his view, the Lab's primary role is precisely to serve as an incubator to critical thought and to a new generation of researchers.

"We generate knowledge, we prepare it for the industry, and that's the most important thing that we can do. We generate wisdom, ideas and qualified people. If, instead, we were to focus on manufacturing, what would companies do?" Mak added. He believes, nevertheless, that the students that leave the Lab – and in the last few years several of them have joined the ranks of technological giants such as Qualcomm or MediaTek – must be prepared not only to excel in research, but also triumph as entrepreneurs, if that is the path they choose to take.

The metamorphosis of a scientist into a businessman takes time and a considerable financial effort, but money doesn't seem to be a problem in a country such as China eager to grow and advance.

The researchers at the State Key Lab of AMSV can hardly complain about financing. Since

2011, the Science and Technology Development Fund has granted the Laboratory between MOP9.7 million (US\$1.2 million) and MOP20.2 million (US\$2.5 million) each year, a more robust amount than granted to similar laboratories in mainland China.

Nevertheless, the budget of the institutions shall be reinforced in the upcoming months, after Beijing's announcement that, under new directives issued by President Xi, the two State Key Laboratories based in Macao – and the 16 currently operating in Hong Kong – will enjoy greater access to state funding.

While important, financing has never been an issue for Martins' research team. Instead, technology transfer – or the ability to turn promising research papers into revolutionary products – has posed the biggest challenge to researchers.

The leadership team of the State Key Laboratory in microelectronics has been trying to tackle the issue of technology transfer in two ways: by giving technical support to some of its former students that have shown interest in starting their own business, and by striking co-operation deals with mainland companies, such as HiSilicon, a subsidiary of tech giant Huawei.

"We are working on a project with Huawei in the so-called analog to digital conversion field. Analog to digital conversion is very important," revealed Mak. "Our Lab is very good at analog to digital conversion, it is one of our main focuses of expertise. Our work with Huawei is very important."

Mak could not reveal any details about the ongoing project, only that their performance target is "very high" and the success of the Made in China 2025 policy "depends on this technology."

From world quality to national quantity

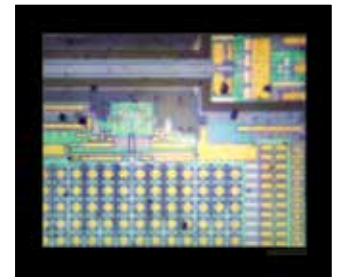
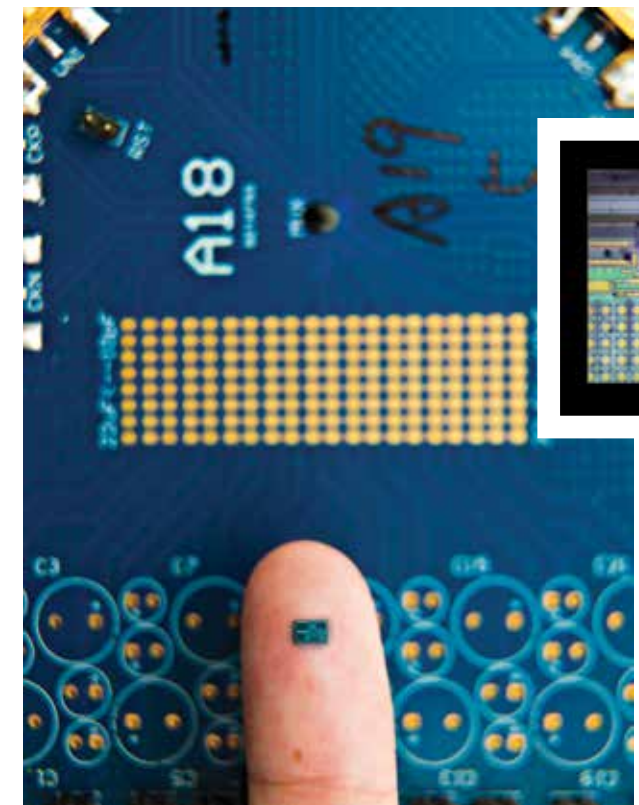
The best way the State Key Lab can fulfil its duty to help China, is by keeping faithful to his motto: "Locally, from world quality to national quantity."

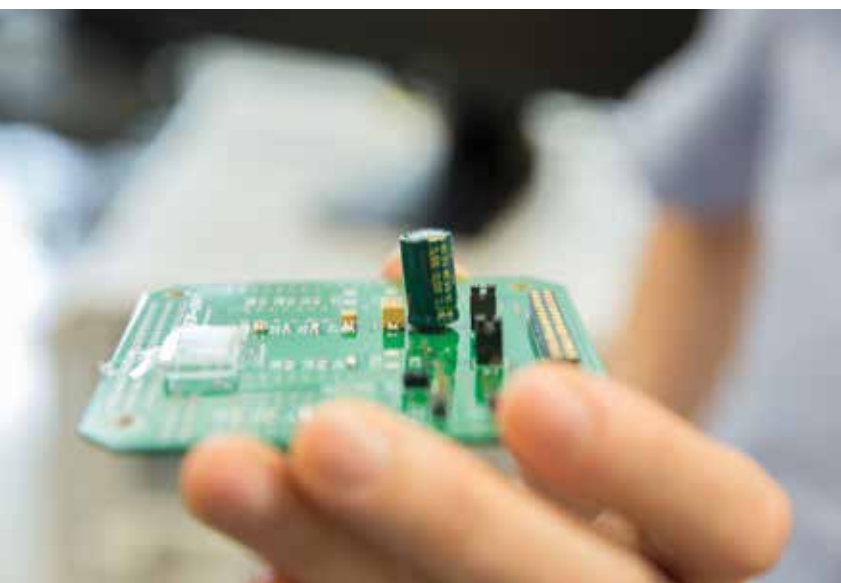
Over the last decade, the institution has been running under the slogan, which summarises not only its ambition but its main purpose as a state-backed research centre: "'Locally' because most of our researchers were born and raised in Macao. 'World quality' because our work has been broadly recognised in the most important events in the field of microelectronics and 'national quantity' because we have the duty, as a State Key Laboratory, to give our contribution to the development of science and technology in China," Martins explained.

Martins, who moved from Portugal to Macao in 1992, believes the laboratory significantly bolsters the advancement of technology in China through the transfer of knowledge it generates to Chinese companies with the financial resources to transform their ideas into something tangible. "If we follow this path and manage to keep the know-how in China, in ten years' time we probably won't have to import any more chips from the United States," Martins asserted.

Notwithstanding the international recognition that their work has obtained, the award-winning chips that are being developed at the University of Macau are still a world away from becoming readily available solutions for users.

The most evident exception comes from a pioneering field in which UM is a world leader: "In





the last few years, we developed a new area that bridges biology and microelectronics. We are world leaders in this domain and a former student of ours is currently at Harvard developing some projects in this very area,” Martins noted.

“In our State Key Lab, we developed a few prototypes that allow virus detection and medical diagnosis in a faster, less aggressive way. You know CSI? This device will allow the kind of diagnosis that the CSI investigators make, but without all that bulky equipment,” he explained.

The project caught the eye of the Science and Technology Committee of the neighbouring province of Guangdong. The state organisation will partially finance the production of the device by a private company, under the supervision of a few former students of the State Laboratory of Analog and Mixed Signal VLSI.

The project, Mak Pui-in believes, might trigger a revolution in the way health care services are provided: “Our vision, with this device, is to decentralise medical care. We are talking about a small portable device, the size of a mobile phone. You just need to put a small sample, wait for the results and it will tell you about a lot of diseases and a lot faster,” he claimed.

“This is a very big vision, not only for China, but also for a continent like Africa,



where people, most of the times, live very far from centralised hospitals. In Macao, we are also a platform for the Portuguese-speaking countries. This device’s contribution can be very significant for the African countries where Portuguese is spoken,” maintained Mak.

This device too has a long road to cover before it sees the type of widespread use predicted by Mak. Reliability, he noted, is a key issue and often means the difference between failure and success when projects of this magnitude are developed. “What we want is to have a very robust solution and this might take time. The biggest challenge is that this kind of device cannot fail. It must be very reliable. We need to ensure that device will still maintain the quality after massive manufacturing,” he pointed out.

If the device succeeds, it will bring Macao one step closer to the vision Martins nurtures about the future of Macao, a city he has called home for almost thirty years now. “Macao was always known for its casino chips. Now, it might be also known for its electronic ones,” reflected Martins, with a smile on his face. ●



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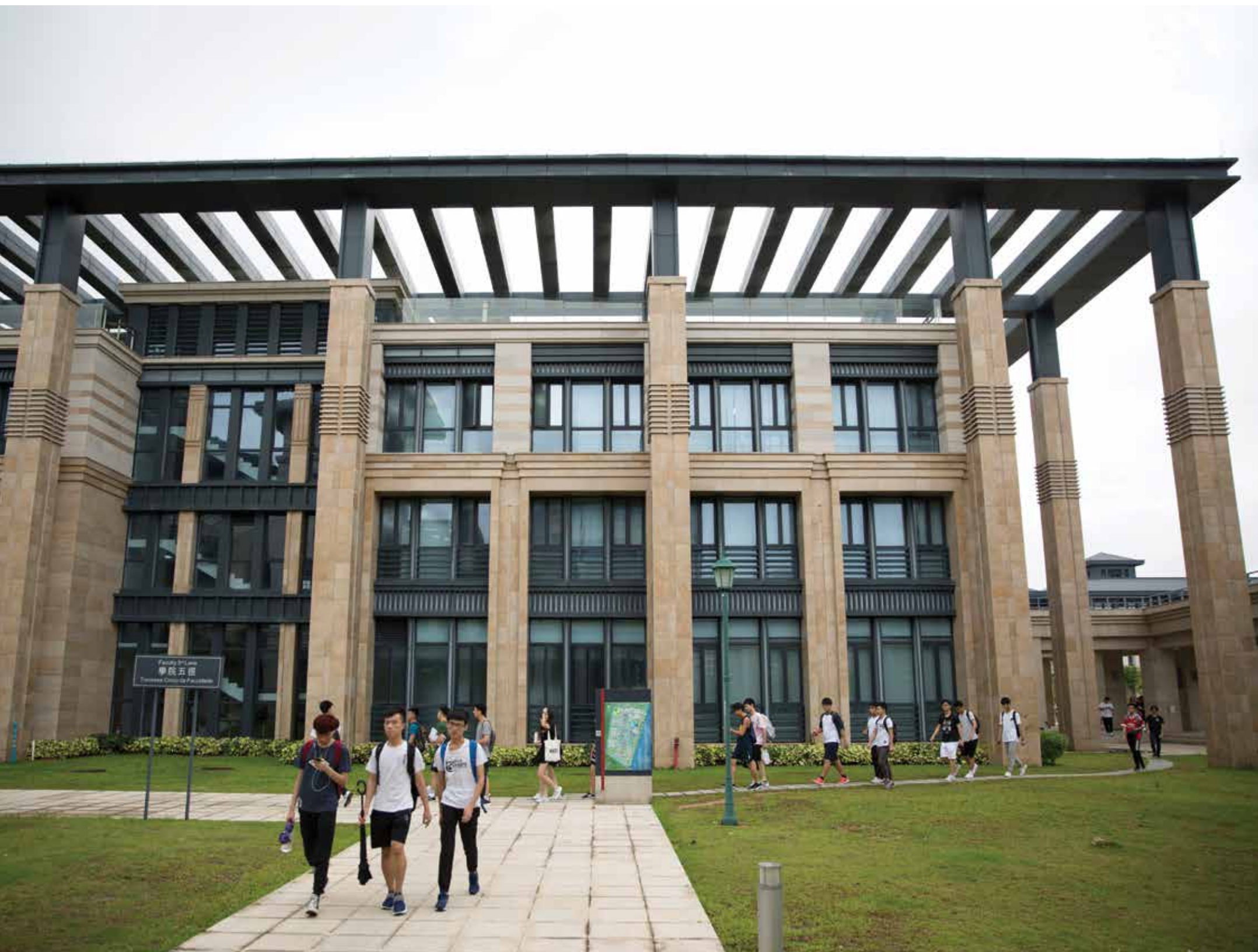
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University of Macau

Higher education blossoms in Macao

Text Mark O'Neill Photos António Sanmarful and Cheong Kam Ka

As the number of institutions in Macao has rapidly increased, so has the quality of educational services as the universities respond to the demands of a fiercely competitive environment.

Macao aims to be the training hub for leisure and tourism for the Greater Bay Area (GBA), as well as the premier centre in Asia for the study of Portuguese, said Sou Chio Fai, head of the Tertiary Education Services Office (GAES) of the Macao government. Operating under the Secretary for Social Affairs and Culture, GAES has overseen higher education in Macao since its establishment in 1992.

The sector has made astonishing progress in the intervening years: Macao now boasts ten tertiary educational institutions, which served 32,750 students and employed 2,265 teaching staff during the 2016/2017 academic year. They offer 267 programmes, including doctorates, master's and bachelor's degrees. In addition, 19 overseas institutions

were granted approval in 2016 to offer 34 tertiary education programmes.

The 2016/2017 academic year also saw 17,341 Macao students opt to study abroad, primarily in mainland China (7,450 students), Taiwan (4,959), and Hong Kong (1,849).

"This year, 93-94 per cent of Macao secondary school graduates went to university," said Sou. "If they do not, it is not because of financial problems; the government offers loans and scholarships."

An impressive achievement given that the first university in Macao, the University of East Asia, was set up only in 1981. Renamed the University of Macau following a government takeover a decade later, it paved the way for the other nine tertiary institutes, all established since 1991.



Sou Chio Fai, head of the Tertiary Education Services Office of the Macao government

Moving up the ranks

In 2011, Macao welcomed two State Key Laboratories, one in Analog and Mixed-Signal VLSI at the University of Macau (UM) and one in Chinese Medicine Sciences jointly established by UM and the Macau University of Science and Technology (MUST). This year, we are expecting the central government to approve two more: Smart City Internet, to be located at UM, and the Lunar and Planetary Science Laboratory at MUST.

For Sou, the presence of these labs demonstrates Macao’s importance in the national scientific plan. “Last Friday [15 June] President Xi Jinping sent a letter to the University of Macau and MUST, saying that he hoped

they would make a contribution to the national effort in science and technology and nurture talent for the GBA,” Sou said. “It showed his support and concern for education in Macao.”

Of the ten institutes in Macao, four offer a comprehensive range of courses while the other six specialise in particular fields, like tourism, nursing, management, and policy.

The most spacious and best equipped is UM, which moved to a new 1.1 sq km campus in 2014. Located on the neighbouring island of Hengqin (part of Zhuhai city), the central government agreed to place the site – nearly 20 times larger than the university’s original campus – under the jurisdiction of Macao.



On 15 June President Xi Jinping sent a letter to the University of Macao and MUST, saying that he hoped they would make a contribution to the national effort in science and technology and nurture talent for the GBA. It showed his support and concern for education in Macao.

Sou Chio Fai

“This was not easy to do,” Sou noted. “Macao is very short of land. The conditions and study environment in the new campus are very good. This is one of the strong points of the tertiary education sector in Macao. It also shows the support of the central government for the SAR.”

As the number of institutions in Macao has rapidly increased, so has the quality of educational services as the universities respond to the demands of a fiercely competitive environment. Universities in mainland China, Hong Kong, Taiwan, and overseas compete intensely with each other for students, faculty, and funding, from both public and private sources.

In 2018, UM ranked among the 351–400 in the Times Higher Education (THE) World University Rankings; when the rankings started in 2004, it wasn’t even on the list.

“UM appeared in both the THE and the QS [World University] rankings,” said Sou, noting that another Macao institution, MUST, was ranked among the top 100 institutions in Greater China. He also pointed to the engineering department at UM, recognised in 2014 by the Washington Accord, allowing graduates to apply to other member colleges and strengthening the programme overall. The Institute for Tourism Studies, recognised by the UN World Tourism Organization, ranks second in its field in Asia and in the top 20 worldwide in the QS World University rankings in 2017.

Both the Macao Polytechnic Institute (MPI) and MUST have been approved by the Quality Assurance Agency, a British non-profit dedicated to quality assurance in higher education. Sou noted that many programmes at local Higher Education Institutes have been approved by the quality assurance agencies of New Zealand, Britain, mainland China, Hong Kong, and Taiwan.

Of the nearly 33,000 higher education students in Macao, just under half – 15,000 students – come from the mainland. “Their scores in the university entrance exam [高考, *gaokao*] are rising each year. This shows that our institutions are becoming more attractive.”

Another measure of the progress of the universities is their research and development. Since its opening in 2010, the State Key Laboratory of Analog and Mixed-Signal VLSI at UM has made significant progress in enhancing the city’s scientific research capacity. In fact, according to Sou, the papers published on microelectronics by the UM laboratory accounted for half of those published on the subject in the Greater China area.

NUMBER OF STUDENTS AT HIGHER EDUCATION INSTITUTIONS IN MACAO

University of Macau
Local students 6,365
Non-local students 3,627
Total 9,992
Macao Polytechnic Institute
Local students 2,772
Non-local students 613
Total 3,385
City University of Macau
Local students 2,715
Non-local students 2,521
Total 5,236
Macau University of Science and Technology
Local students 2,011
Non-local students 8,915
Total 10,926
University of Saint Joseph
Local students 973
Non-local students 114
Total 1,087
Institute for Tourism Studies
Local students 1,291
Non-local students 309
Total 1,600
Kiang Wu Nursing College
Local students 370
Non-local students 46
Total 416
Macau Institute of Management
Local students 235
Non-local students 5
Total 240
Macau Millennium College
Local students 176
Non-local students 3
Total 179
Academy of Public Security Forces
Local students 35
Non-local students 2
Total 37

Building a global campus

Where Macao has developed gradually is in attracting foreign students. Currently, it has less than 1,000 non-Chinese students. Its institutions are still new and little known abroad. Increasing the number of foreign students is part of the city’s objective to internationalise its universities.

“Take the case of a Macao person who has lived all his life in the city, including school and university. In his early twenties, he has never seen the world. His vision is limited,” Sou explained. “If he can live with foreign students, that will broaden his horizons.”

Previously, foreign universities did not want to co-operate with those in Macao, which greatly limited opportunities to bring in students from abroad. “That is changing,” he said. “More and more are willing to do exchanges with our institutions.”

Colleges in Macao offer courses in additional languages – English, Mandarin, and Portuguese – making them more attractive to foreign students. While there are no set targets for foreign students, they remain an important asset in developing Macao universities. One group who are very willing to come are those from Portuguese-speaking countries and those who wish to study the language.

“In Europe, the best place to study Portuguese is Portugal. In the Americas, it is Brazil. In the Asia-Pacific region, it is Macao,” Sou pointed out. “Here we have the best environment for learning, with radio, television, and newspapers in the language and it’s being spoken on the street. We have over 80 professors of Portuguese who hold doctorate degrees and publish more material in the language than all the mainland universities put together.”

These same institutions rely on Macao to provide the human capital that powers their Portuguese-learning programmes. “In the mainland, about 38 universities offer Portuguese as a subject. Many of their teachers were trained in Macao. We invite teachers of the language from the mainland to come here.”

Ebb and flow of students

One challenge faced by all educational institutions in Macao is a lack of local students. In 2020, only 3,500 students are expected to graduate from the city’s high schools, down from 4,800 this year and a peak of 7,000. The main reason for this is the SARS epidemic of 2002–2003 in southern China, which led to more than 8,000 cases and 774 deaths in 37 countries, most of them in mainland China.

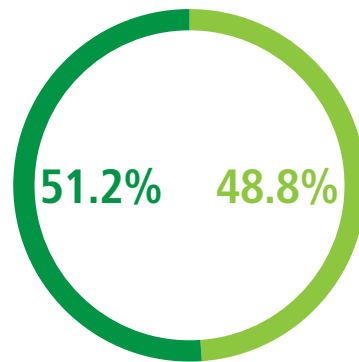
This drop in the number of local students, Sou said, will result in an adjustment in the percentage of mainland students that universities can admit.

“For private institutions allowed to admit mainland students, the maximum was 50 per cent, which was raised to 60 per cent this year. For public institutions, the maximum for the first-year intake in 2018/2019 is 20 per cent for mainland students. As the number of Macao students falls we will adjust these maximums.”

One institution, however, likely won’t be aided by these adjustments. The University of Saint Joseph, a comprehensive institution founded in 1996 by the Catholic University of Portugal, has no mainland students.

“I think that this is because of the lack of diplomatic relations between China and the Vatican. It is not an issue of the quality of

HIGHER EDUCATION STUDENTS IN MACAO



Total students **33,098**

- Local students **16,943**
- Non-local students **16,155**

its teaching,” Sou explained. “The Ministry of Education [in Beijing] supports the development of education in Macao, including St Joseph. I am optimistic on this. If relations are established between the two sides, the problem will be solved automatically.”

While the projected number for 2020 remains low, Sou said that the number of Macao high school graduates will bounce back during the 2020s, eventually returning to 7,000–8,000 a year again.

“By 2020, 40 per cent of permanent residents of Macao will have received tertiary education. We need a plan for the remaining 60 per cent,” he said.

Macao residents who do opt to study at university are eligible for an annual grant of MOP3,000 (US\$371) to buy materials. Different government departments also offer loans and scholarships, including for study abroad.

“Returning here to work is not a condition of these loans and scholarships,” Sou said. The loans

must be repaid, of course, through the type of earnings that higher education institute can offer.

Where Sou expressed hope that Macao students receiving government loans would choose to return to the city, scholarships offered by the Macau Foundation make returning a requirement. These scholarships apply to those earning bachelor’s degrees at any of the top 100 universities in the world, on the condition that recipients return to Macao (or the mainland) and work for three years.

Building something greater

For much of recent history, Macao has been known primarily as a gambling and tourism hub, drawing tens of millions of visitors each year. Yet the city is increasingly gaining a reputation as a centre for higher education, expanding beyond degrees targeted toward more traditional Macao fields – tourism, language, and translation – to strengthen its capacity in the sciences and more comprehensive education.

This, Sou believes, is why Macao’s tertiary education institutes will play an important part in the development – and ultimately, the success – of the Greater Bay Area. He pointed to the city’s well-cultivated status as a world centre for leisure and tourism as one important area where Macao can excel in training. Portuguese-language learning, a key asset as China looks to strengthen relations with the Portuguese-speaking world, offers another area of leadership for Macao.

The city’s State Key Laboratories provide a platform to elevate the region’s scientific capabilities, with the announced Smart City Internet lab offering an important regional foothold in the growing fields of big data and the Internet of Things – areas key to modern urban development.

Then there are relations with mainland China. “We can co-operate with universities in the mainland, with students doing two years here and two years there,” Sou said. “We can provide resources and do joint projects, such as in law.” ●



Solving solid waste management in Macao

Text **Morse Lei**, Executive Director of CSR Macao Infographics **Fernando Chan**



The government intends to support the development of an integrated organic waste valorisation strategy for Macao, by reviewing Macao’s existing waste recycling programme.

For such a small city, Macao generates a lot of waste. Between 2006 and 2017, the amount of municipal solid waste (MSW) generated in the city increased by a whopping 83.5 per cent – more than three times the population increase during the same period. This increase has been attributed to the city’s rapid economic development and to the lack of alternative waste management valorisation strategies – schemes to reuse, recycle or compost waste into something of value, such as raw materials. In 2017, the average per capita rate of solid waste generated was 2.2 kg per day, up nearly 44 per cent from 2006. More than half of that waste is organic, biodegradable waste

derived from plants or animals, most of which is food thrown out by residents and commercial entities. This isn’t unique to Macao: each year, roughly one-third of food – around 1.3 billion tons – produced for human consumption worldwide ends up in the trash.

Solid waste challenges

Macao MSW treatment is primarily focused on energy recovery by incineration, with the existing Macao Solid Waste Incineration Centre’s annual capacity at 630,720 tons. As the amount of MSW increases, the facility will soon reach design capacity, necessitating increased capacity and new strategies to tackle solid waste management.

Today, Macao sends most of its waste – including special waste with heat values (the energy produced through combustion) – to be incinerated for energy recovery. Non-combustible special waste is treated at the Special Hazardous Waste Treatment Station with neutralisation or solidification, and further disposed together with inert construction waste at landfill. The lightweight fly ash and heavier bottom ash produced during incineration are also sent to the controlled landfill.

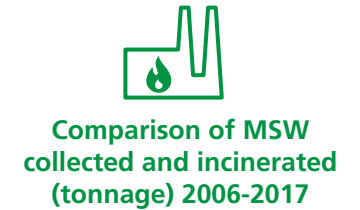
Within this scheme, the makeup of Macao MSW matters: having more than 50 per cent organic waste leads to a high moisture level that negatively impacts the performance of the incineration plant and the capacity utilisation of the local landfill.

One possible solution is organic waste valorisation by source separate collection and application of the latest technology, such as anaerobic digestion, which breaks down organic waste in an oxygen-free environment to produce biogas and biofertilizers.

Processes like this could provide a critical tool in combatting the growing waste volumes being generated in the city. It would also offer a source of renewable energy and an organic soil conditioner.

Although Macao is currently composting its food waste, the daily tonnage is still less than 1 per cent of the organic waste generated. As such, the government intends to support the development of an integrated organic waste valorisation strategy for Macao, by reviewing Macao’s existing waste recycling programme.

It shall also consider some areas of focus for future efforts: developing a new methodology for



Year	Waste incinerated (tons)	Changed +/- %
2006	286,358	2.7
2007	288,243	0.7
2008	298,243	3.6
2009	324,808	8.8
2010	321,409	-1
2011	329,154	2.4
2012	365,648	11.1
2013	396,691	8.5
2014	457,370	15.3
2015	509,111	11.3
2016	515,804	1.3
2017	525,727	1.9



source separation of organic waste; encouraging and implementing source separation of organic waste; treating all organic waste together; reducing the volume of MSW to be incinerated; jointly handling the municipal waste water sludge in circular technologies for energy recovery; reusing and valorising waste water; and lastly, using the digestate (product of anaerobic digestion) for composting to recover nutrients for soil amendment or solid fuel.

Producer-pay system

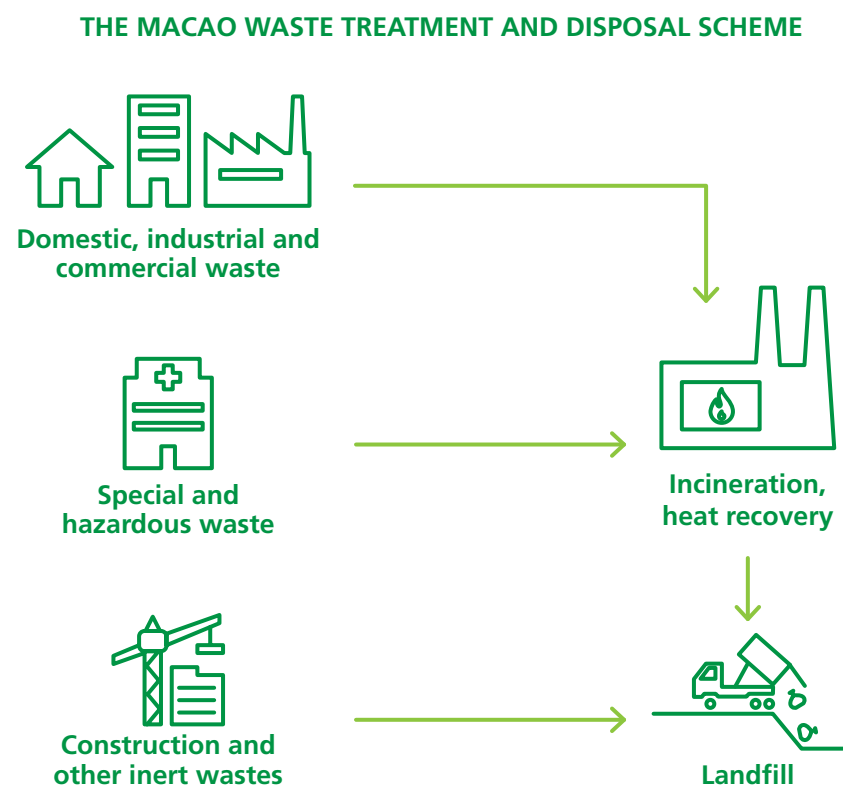
Another method for tackling increased MSW is to reduce it at the source. Macao categorises MSW into industrial, commercial, and domestic waste. Collection for domestic waste is paid for by the government, at no charge to residents.

Conversely, industrial and commercial waste producers operate on a producer-pay system which requires producers to pay collection companies directly. Since producers pay based on the amount of waste collected, there is a financial incentive to reduce waste generation.

With the increase in domestic waste, Macao should consider the producer-pay system – more commonly known as pay-as-you-throw – for all domestic waste producers.

Similar to the ‘polluter pays’ principle, this scheme encourages people in Macao to produce less waste and helps divert waste from landfill or incineration towards a circular economy. Where in a linear economy, products go from manufacture, to use, to waste, a circular economy works to reduce waste to a minimum and reuse, repair, and recycle existing products and materials.

A study conducted in 2016 found 95.7 per cent of Macao people reported a willingness to sort solid waste at home, if the government required them to do so.



The shift from extraction and consumption to renewal and restoration has been gaining ground in recent years, with countries around the world developing roadmaps for material recovery on a grand scale. This July, China signed a memorandum of understanding on the circular economy with the EU, paving the way for the two economies to co-operate and coordinate their efforts to minimise waste and optimise resource use.

Macao appears similarly willing to work on a more local scale: a study conducted in 2016 found 95.7 per cent of Macao people reported a willingness to sort solid waste at home, if the government required them to do so. The pay-as-you-throw scheme also netted an overwhelmingly positive response – 85.4 per cent – indicating that implementation of both would likely be embraced by the public.

Designing a new system

The existing collection practices in Macao rely on compaction containers or rear-end loader compaction vehicles collecting mixed waste. While this approach does reduce the overall volume of waste, it also makes it far more difficult to sort waste afterwards.

Implementing a source separate collection method offers the simplest solution to extracting organic waste for valorisation. Charging people for collection based on the amount of waste they produce would also discourage avoidable food waste and minimise the food surplus.

This approach to organic waste sorting would complement the existing waste-to-energy treatment of incineration by reducing the moisture content in the waste, while also generating revenue

through further valorisation. Biogas would add to energy recovery, rather than hindering the regular incineration process, and organic fertilisers could be used to improve soil quality rather than adding to the landfill.

A simple solution on paper, such a scheme nonetheless can only be achieved with a great investment in a strategic education and information for residents, with a supportive and inclusive approach. Should the Macao government adopt this possible solution to the issue of MSW in Macao, setting up a collection methodology and policy on how to implement Source Separate Organic Waste (SSOW) would be critical. Without adequate education and public campaigns for SSOW, targeted at both residents and commercial entities, this effort would not succeed. ●

02/12 2018

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Rediscovering Chinese ceramics

Text Mark O'Neill Photos António Sanmarful

Archaeologists have unearthed pottery in Shiwan dating back over 5,000 years, as well as pieces produced under the Tang (618–626 AD) and Song (960–1279 AD) dynasties, most for daily household use.

For centuries, one of China's most coveted ceramics hailed from Shiwan, a district in Foshan, Guangdong province. The ware – developed in the region during the 16th century, when skilled Ming dynasty craftsmen from central China brought their expertise to Shiwan, weaving it with local artisan culture – came to be recognised as its own style, fashioned in heavily glazed colours and initially designed mainly for practical purposes.

The mass emigration – known as Chinese diaspora – of the 19th century saw a number of Guangdong people leave the country, spreading Shiwan ware outside of China to Japan and East Asia. But the style remained a mainstay of Chinese ceramics design, its vivid hues of reds, whites, and blues an unmistakable sign of its region of provenance.

An extensive collection of Shiwan ceramics was exhibited at the Macao Museum of Art (MAM). With more than 500 pieces, it represented the highest quality collection in China. The “Exhibition of Shiwan Ceramics from the MAM Collection” presented 46 of these pieces – 34 by masters of the ware and 12 examples of traditional Shiwan ridge decorations, which characterised much of the architectural style of southern China from the 17th century. The exhibition ran from May to early August.





Exhibition of Shiwan Ceramics from the MAM Collection



Manuel da Silva Mendes

The Portuguese collector

The MAM collection came into being through the efforts of Manuel da Silva Mendes (1867–1931), a Portuguese lawyer and intellectual who moved to Macao in 1901. A well-respected sinologist, Silva Mendes took a strong interest in the ware, and began visiting Shiwan to write, research, and study its styles and expressions. In the span of a few years, he systematically gathered Shiwan ceramics from the Ming, Qing and contemporary periods, building what would become the world's first major collection of Shiwan works.

Silva Mendes' contribution to

the preservation of Shiwan's legacy wasn't limited to merely acquiring the china, however. He was also keen to explore the intersection of Chinese folk traditions and Western art forms, something which he pursued through close collaboration with one of the ceramics' most renowned masters: Pan Yushu.

He invited Pan to Macao, introducing him to classical Western sculptures and asking him to create a series of miniatures of traditional Chinese motifs inspired by the art forms of the Occident. Pan then took the miniatures to a ceramics company in Guangzhou where Pan Yushu

and his ceramic master partner Chen Weiyan used them as models for large-scale works.

"After Mendes died, many people worried about what would happen to his collection. Some believed the government should buy it, but it did not have enough money," said Lou Tai Seng, curator of Chinese Ceramics at MAM. "The collection eventually ended up at the Luis de Camões Museum of the former Municipal Council and was opened to the public in 1961."

In 1999, over 300 pieces comprising Mendes' original collection were transferred to MAM; Lou joined the museum the same year. "Since then, we have received donations from people in Hong Kong and Macao. We also bought a few items ourselves," Lou explained. "Now we have 545 pieces – no museum in China has a collection as good as ours."

Millennia in the making

According to Lou, historically, a place needed to meet three conditions to become a porcelain centre: access to hills for clay, to be used as raw material; a supply of timber for the manufacturing of kilns; and proximity to a river, necessary to transport the finished product. Shiwan satisfied all three. "The goods could be taken to Guangzhou [by river] and from there to markets in China and Southeast Asia," Lou noted. "Porcelain is very heavy, so transportation by water was the most efficient method."

Archaeologists have unearthed pottery in Shiwan dating back over 5,000 years, as well as pieces produced under the Tang (618–626 AD) and Song (960–1279 AD) dynasties, most for daily household use. "The ceramic was



Lou Tai Seng, curator of Chinese Ceramics at MAM

exported over the Maritime Silk Road to Southeast Asia and Arabian countries,” Lou said. “It was Arab traders who came to purchase it.”

These pieces were mainly sold to ordinary people. Shiwan ware as we know it developed later: “During the Ming dynasties [1368–1644], potters from the north, especially Henan, fled to the south to escape foreign invaders. They settled in Shiwan and brought a higher level of skill and craftsmanship to the area. A system of masters and apprentices developed, alongside small manufacturing factories.”

Artisan associations began

forming in the late Ming era, each specialising in a particular product in order to avoid unhealthy competition and encourage development. “Once you joined an association, you could not switch to another,” Lou noted. “Production was closely linked to demand by local people and what type of pieces they needed.”

By the Qing dynasty (1644–1911), the number of associations had grown dramatically, from 8 to 24. One of the most popular varieties of the ceramic was ridges – sculptures placed on the roofs of buildings that were the primary decoration in Lingnan (Cantonese)

architecture. Their production in Shiwan prospered during this era, propelled by Guangdong province’s booming economy and growing population, as well as the turning of Guangzhou into a foreign commercial port after the First Opium War (1839–42).

Those years also witnessed an unprecedented expansion in scale of production, improvement of techniques, and variety of designs, which became increasingly influenced by Lingnan culture. Many temples in Guangdong, Hong Kong, Macao, and Southeast Asia today have Shiwan ridges made during this period.



The Grand Hall of the Kun Iam Temple in Macao features the earliest such example, made by the shop of Wu Qiyu in 1817.

As the industry grew and developed, so did the decorative motifs employed by craftsmen. Where earlier pieces primarily featured flowers, fruit and auspicious designs from the Lingnan region, most of the motifs and figures used in the ridges originated from Cantonese opera, history, legends, and fables. Pearls glazed in red, double dragons, and dragon fish often appeared in the centre of decorative patterns. Lions, unicorns, and other auspicious animals accompanied them, as well as sun and moon deities and other spirits.

In the 19th century, as Western-style homes grew in popularity in Guangdong, Shiwan ridges began disappearing from the roofs and moved indoors instead, often adorning the rooms of wealthy private residences.

Descending from the heavens

By the time Silva Mendes commissioned Pan Yushu and Chen Wei Yan to create East-meets-West Shiwan wares in the early 20th century, the style of the pottery had greatly shifted. Craftsmen were no longer depicting dragons; instead ordinary people, national heroes, and historical figures were now the centre of their work. Exposure to Western sculpture also offered new motifs and technical skills to incorporate into their work.

Pan and Chen were two such craftsmen, as was sculptor Liu Chuan, a pivotal figure of modern Shiwan ware. These artists combined folk tales with history, daily lives with legends. Chen excelled in portraying human and religious figures, a skill passed on to



“
**Now we have 545
pieces – no museum in
China has a collection
as good as ours.**

Lou Tai Seng

his apprentice, Pan, a talented figure sculptor known for his depictions of women. *Imperial Concubine in a Bath* appears in the exhibition, a perfect embodiment of the elegance, detail, and expressiveness characteristic of Pan’s work.

These great artists rose to prominence just as the prosperity of the Ming era came to end. The Second Sino-Japanese War (1937–38), in particular, dealt a crippling blow to the ceramics industry. Some craftsmen were forced to take up new trades, others were not so

lucky; Pan died of hunger during the war, roughly a decade after losing Chen.

Yet together, these artisans brought the style into the modern era (Liu died in 2000, after a long career as a professor and academic), revitalising its traditions while enriching them with new ideas.

The MAM collection and exhibition offers a glimpse of all this – and a unique insight into the legacy of the ancient Chinese craftsmanship. ●



Ten years of Cultural Week of China and Portuguese-speaking Countries in Macao

Text Sha Kai Sa Photos Courtesy of Forum Macao

This October, Macao will host the 10th edition of the Cultural Week of China and Portuguese-Speaking Countries, organised by Forum Macao.

Painters, sculptors, writers, musicians, dancers, singers, and chefs from Angola, Brazil, Cabo Verde, Guinea-Bissau, Timor-Leste, Mozambique, Portugal, São Tomé and Príncipe, China, and Macao will gather in the city to show off the best of their countries or regions.

The nine-day event, 9-18 October, will usher in a huge diversity of activities with colours, smells, sounds, and dialects that offer residents and tourists alike a glimpse of the full spectrum of cultural richness within the Portuguese-speaking world.

Since the creation of the Forum Macao in 2003, the representatives of member countries have taken an active role in the ministerial conferences, defending the increasingly important role in cultural relations, exchange of experiences and the promotion of artistic groups and companies of cultural industries of the countries participants in Forum Macao.

At the most recent ministerial conference, held in Macao in 2016, the ministers in attendance gave more impetus to cultural relations, aiming to strengthen the exchange and co-operation between institutions and professionals in the cultural area of the member countries of Forum Macao.



Music and dance group from Guangxi, China



They also agreed to support the development of invited artists' projects, the direct and long-term co-operation of the cultural institutions of the countries participating in Forum Macao, and to undertake studies on the training of qualified professionals in cultural management, as well as cultural and artistic areas of the Portuguese-speaking countries of Africa and Asia of Forum Macao.

Each delegate from the member countries has committed to bring to Macao representatives of their cultures who can establish the necessary bridges for the development of cultural relations among themselves and with China.

Cabo Verdean delegate Nuno Furtado noted that "Cabo Verde is a country that lives the culture, in all its dimension. A culturally rich country that has been able to take advantage of this factor, to transform culture into an attraction for the

1. Yola Semedo, Angola
2. Klim Mota, Guinea-Bissau
3. True Blue, Goa, Damão e Diu
4. Diogo Piçarra, Portugal



Guilherme Carvalho, São Tomé and Príncipe



Nelson Carlos Ferreira "Pekiwa", Mozambique



Handmade necklaces and scarves, Timor-Leste

country while at the same time it has managed to occupy many international stages, through language, art, handicraft, music, literature, dance, and gastronomy."

Furtado considers shared language "one of the most important mechanisms" in the development of strong relations between China and Portuguese-speaking countries. "The Cultural Week is a stage of excellence in this multilateral relationship, of interculturality among our peoples."

For the Mozambique delegate at Forum Macao, Francisca Torcida Reino, "Lusophone culture is a project, an ideal, constantly under construction, which has brought us together." Shared language, she believes, has been instrumental in a developing clear and informed understanding of each member country. Their vision for this project, however, centres of highlighting unique qualities in the form of art, dance, and painting.

"Lusophony is an emerging political-social identity forged in cultural diversity and is shaping new and innovative forms of artistic production that nurture and drive the creative industry by exploiting our value systems

rooted in our rich traditions. Lusophony means 'diversity in unity,' in which language is the vector of political and social identity, and difference is the factor of oneness."

Maria João Bonifácio, delegate of Portugal to Forum Macao, believes that "culture shapes our identity and influences our behaviours, and cultural diversity makes us accept, and even to some extent, integrate and assimilate with other cultures. Cultural diversity is crucial in today's world."

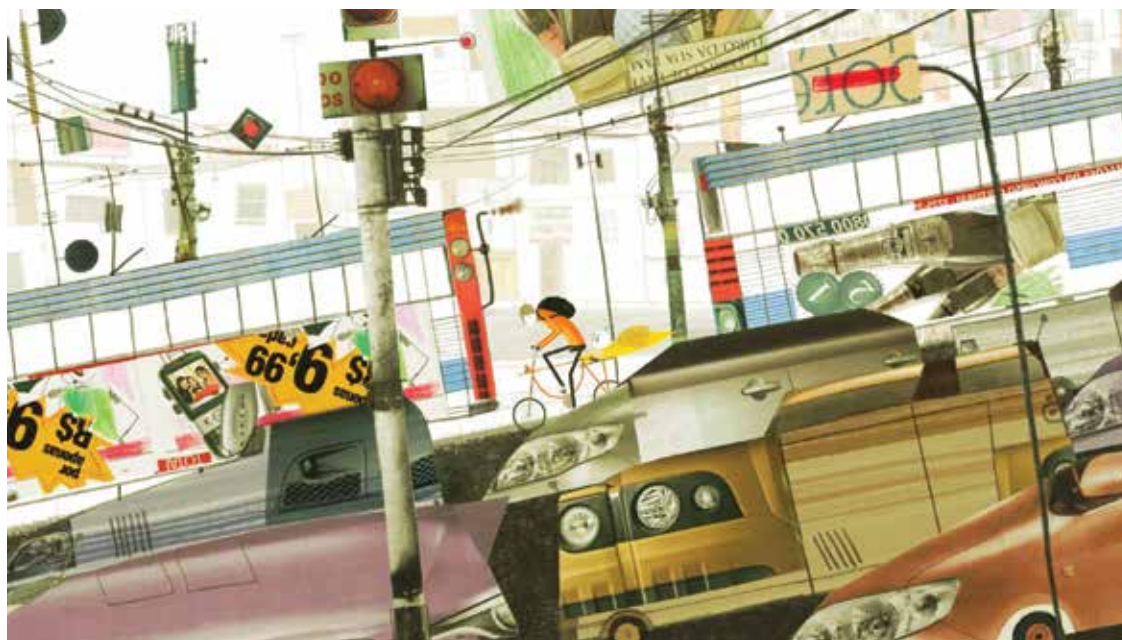
For Bonifácio, understanding the Portuguese-speaking countries' culture and language is fundamental for the development of trade, tourism, co-operation and investment. "The cultural sector helps support the economy through innovation, creativity, specialised services, customised products, information, technology, and education."

One illustration of the importance of cultural exchange and communication between governments and nations is the Belt and Road Initiative. "Macao, through its unique cultural characteristics and connection to the Portuguese-speaking countries, is a natural point of encounter of the Lusophone culture and contributes to the consolidation of the region as a platform for Sino-Portuguese cultural exchange and co-operation."

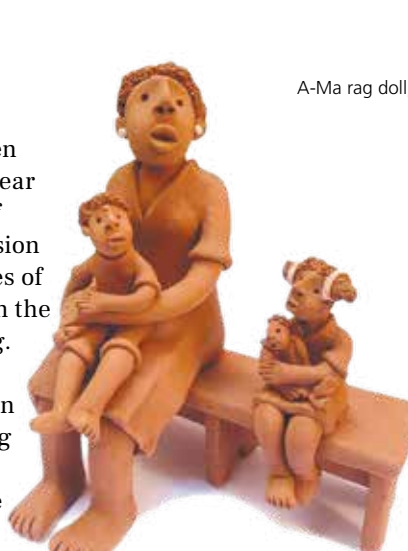
Gualter Vera Cruz, representative of São Tomé and Príncipe, said that "the different customs [on display at Cultural Week] constitute one of the fundamental pieces in the relations between people. The culture has great social and economic importance and, for that reason, capacity for co-operation, generating financial wealth and jobs."

For Forum Macao's newest member country, the Cultural Week represents a prime opportunity to strengthen ties with other countries and to showcase their own culture, with the potential to increase tourism to the African archipelago.

The Cultural Week offers also a unique opportunity for residents and tourists to contact new cultures, new ideas and new philosophies of life. ●



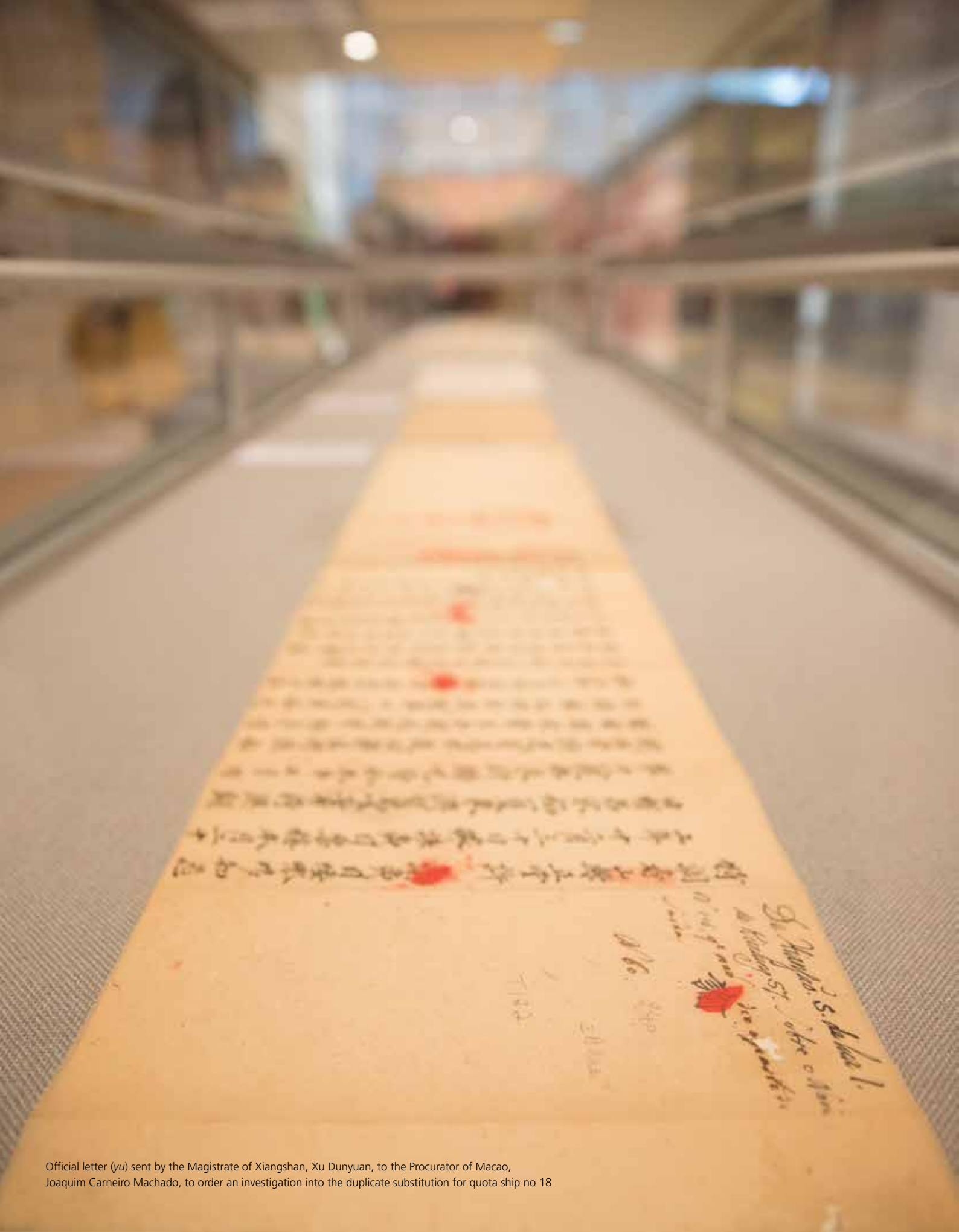
Alê Abreu, Brazil



Djoy Soares sculpture, Cabo Verde

A-Ma rag doll, Macao





Precious record of Macao’s history goes on show

Text Louise do Rosario Photos António Sanmarful

Over 100 documents of the Chapas Sínicas offer a window into many aspects of Qing-era Macao.

A pioneering Jesuit Chinese priest meticulously documenting the spending of his church in eastern China. A famous voyager, known as China’s Marco Polo, trying to recover a loan from his Portuguese debtor. A Robin Hood-style pirate in the South China Sea surrendering to the Qing government.

These colourful episodes and everyday realities of life in China under the Manchus come alive in over 100 historical records from the Qing dynasty (1644-1911) being exhibited in Macao this year. The selected pieces come from the collection of *Chapas Sínicas* (Chinese Sheets), a trove of 3,600 documents related to Macao, including more than 1,500 items of correspondence exchanged between Chinese and Portuguese officials, dating from 1693 to 1886.

On 30 October 2017, UNESCO inscribed the records on the Memory of the World

Register, an international initiative dedicated to protecting the documentary heritage of humanity. The Archives of Macao and the National Archive of Torre do Tombo of Portugal jointly nominated them for this honour.

“The UNESCO recognition is of great significance – it underscores Macao’s historical role in East-West exchange,” said Zhang Wenqin, professor of History of Sino-Foreign Relations at Sun Yat-sen University. Zhang has done extensive research and written many books about this invaluable collection of historical documents.

The public can examine these precious documents up close at *Chapas Sínicas – Stories of Macao in Torre do Tombo*, which ran 6 July to 7 August at the Handover Gifts Museum. Now the exhibition has moved to the Archives of Macao, where it will remain on display from 21 August to 7 December.

Official letter (yu) sent by the Magistrate of Xiangshan, Xu Dunyuan, to the Procurator of Macao, Joaquim Carneiro Machado, to order an investigation into the duplicate substitution for quota ship no 18



Mok Ian Ian, director of the Cultural Affairs Bureau

The two-phase exhibition is part of the inaugural “Encounter in Macao – Arts and Cultural Festival between China and Portuguese-speaking Countries,” a series of themed events in July. The Cultural Affairs Bureau (IC), which organised the festival, lauded the Chapas Sínicas collection as “[helping] to construct a vivid picture of Macao during the Qing dynasty.”

This most precious record of nearly 200 years of Macao’s history has been preserved in the Torre do Tombo in Lisbon for more than a century. The documents, many written in traditional Chinese ink on bamboo paper, describe the conditions of people’s lives, society, urban development, and trade and commerce during the period.

Reading through the various documents, one can sense the

significance of Macao to the world at the time. Macao was connected through its sea trade to Britain, France, Russia, the United States, and many other countries. According to Mok Ian Ian, president of the IC, the collection represents part of an “epic memory of the world that spans ancient and modern times, and links China and the West.”

Throughout the centuries, these precious documents were kept by the Senate (Senado) of Macao. Many of the documents are letters sent between the procurators of the Senate, sub-prefects of Macao, magistrates of Xiangshan, and other Chinese officials. Xiangshan, encompassing today’s Zhongshan and Zhuhai, was the county adjacent to Macao in imperial times.

From obscurity to publication

The records were later brought to Portugal and, by the end of the 19th century, were transferred to the National Archive of Torre do Tombo. For over half a century, the documents sat undisturbed in their boxes. Their Portuguese custodians had no linguistic expertise to decipher the mystery of these voluminous scrolls, but sensed their value and kept them safe in the Archivist’s room.

Even during the worst of the World Wars, the archives remained untouched by the destruction that swept across Europe as Portugal was neither invaded nor occupied.

In the summer of 1952, Fang Hao, a Jesuit priest and professor of history at Taiwan University, visited the Torre do Tombo. Well



known for his expertise in Sino-Western transportation, Fang realised at once the importance of the Chapas Sínicas despite a lack of organisation or classification. His findings would attract the interest of Chinese scholars around the world.

In an article he later wrote, Fang said of his time in Lisbon: “I saw JM da Silva Marques, the director of the Archive. I cannot describe how warm was his welcome to me. He had worked there for 30 years and knew that there had been no one who had been able to make use

of this material. He begged me to make a record.”

On 3 July, Fang started work, at a speed of one article every three minutes, recording the year, month and date, the author and recipient, the content and the most important details. Many documents had been damaged by insects and were difficult to read, and yet, he managed to increase his speed to one article every two minutes.

But the priest had other duties; Fang left Lisbon on 14 July, less than two weeks after beginning the project. Even at his rapid pace,

there was still much work left to do. He proposed to Director da Silva that he hire two Chinese students in Spain to complete the work, but the Archive had no budget for this.

Fortunately, numerous Chinese and Portuguese scholars followed Fang to conduct research on the collection, including: Pu Hsin-Hsien, Isaú Santos, Lau Fong, Tang Si Peng, Li Dechao, Zhang Wenqin, Jin Guoping, Wu Zhiliang, and Antonio Vasconcelos de Saldanha. Each contributed to the cataloguing, transcription, arrangement, and study of the collection.

A full survey of the documents was not conducted for another 30 years, when former director of the Archives of Macao, Isau Santos, went to Lisbon in the late 1980s. He took microfilms of the documents, catalogued them, and began the long and difficult task of preparing them for publication.

In 1995, using a version on microfilm, the IC published a catalogue of the Chapas Sínicas in Chinese and Portuguese. The Macao Foundation published the Chinese and Portuguese records in 1999 and 2000 respectively. The Chinese version was released in two volumes of 1,200 pages, by Zhang and Lau Fong, the current director of Archives of Macao. The Portuguese version, by Jin Guoping and Wu Zhiliang, was much longer at 4,000 pages in eight volumes.

A priest, a voyager, and a pirate

Although only a fraction of the Chapas Sínicas, the more than 100 documents selected for the exhibition offer visitors a window into so many aspects of Qing-era Macao.

There's an arrest warrant, issued in 1793 by the magistrate of Xiangshan, ordering a foreigner who killed a Chinese to be handed over to the Chinese authorities for trial. One letter, sent in 1804 by the commissioner of Customs in Macao, informs the procurator of Macao that foreign vessels leaving the city for Whampoa must have their licence with them. A contract reveals the Chinese contractor who did plaster and repair work on St Paul's Church in 1797.

From this broad spectrum of stories, Zhang Wenqin highlighted

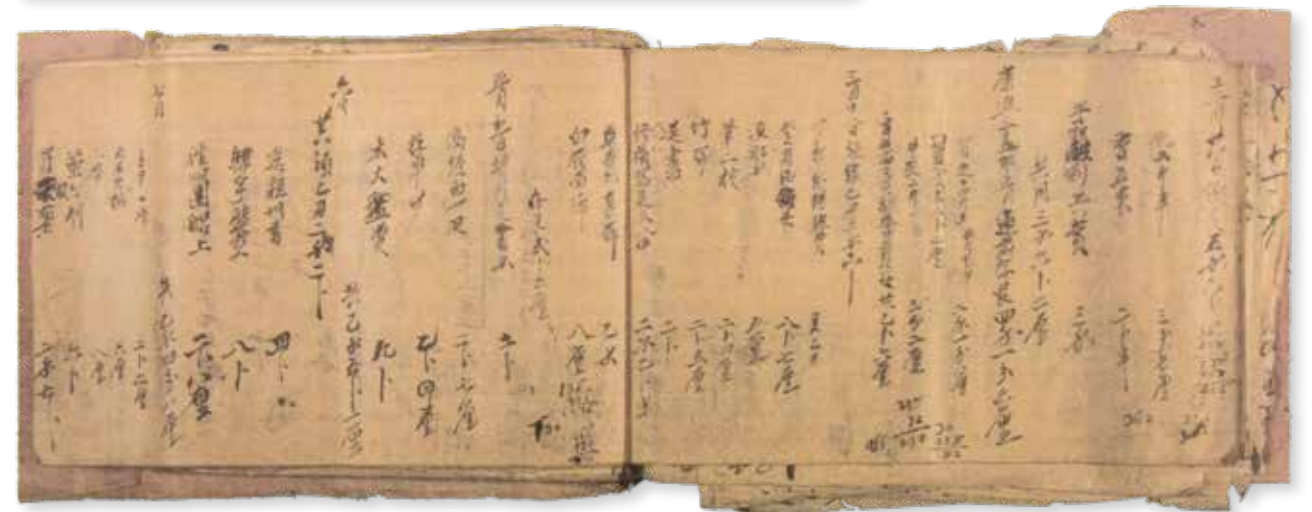
the lives of three particularly interesting personalities.

One is Wu Yu-shan, also known as Wu Li, a gifted landscape painter and calligrapher, as well as one of the first ordained Chinese Jesuit priests. He studied at St Paul's College in Macao from 1680 to 1683, then in 1688, he was consecrated a parish priest in Nanjing. Wu continued his missionary activities in Shanghai and Jiading until his death in 1718.

The Chapas Sínicas contain an account book kept by Wu for a church in Jiading, with entries for transactions related to food, supplies, tailoring, book stands, and repair works. "One most interesting detail," Zhang noted, "was the record of Wu paying for Chinese medicine on two occasions when he was sick."



Agreement drawn up by Mai Yaxing of trader Xing Yuan Hao, the contractor for plastering and repair works to St Paul's Church and other locations



Account book of a Catholic church, containing entries for transactions related to food, supplies, tailoring, books, stands and repair works, etc



Warrant (*qian*) sent by the Magistrate of Xiangshan, Xu Dunyuan, to order the handover of Manuel Dias, a foreigner who killed Tang Yazhen, to the Chinese authority for trial

The book runs to 231 pages; Wu was then serving as the parish priest of Jiading, the centre for the spread of Catholicism in the Jiangnan region of China.

The second figure of note, Xie Qing-gao, brings a taste of adventure – and the mundane difficulties faced by many Chinese of the day. The Chapas Sínicas contain five official records of a tenancy dispute between Xie and two Portuguese during 1806 and 1808.

Xie had an extraordinary life. At the age of 18, he became a crew member on a Portuguese trading vessel after being rescued when his own vessel sank in the open sea. His voyages brought him to Portugal, Britain and beyond, enabling him to acquire foreign languages and a good knowledge of the geography, customs, and traditions of different countries. Upon



Portrait of Wu Yushan



losing his eyesight, however, he returned to China and settled in Macao, where he made a living as a merchant and interpreter.

As the Chapas Sínicas records reveal, in 1793, Xie lent 150 yuan to a Portuguese named Antonio Fonseca; he failed to repay it despite many demands. In 1801, Fonseca signed a promise saying that Xie should collect the rent of his house as interest on the loan he had not repaid. The promise was broken, forcing Xie to write several times to the vice magistrate and magistrate of Xiangshan and the sub-prefect of Macao. His efforts failed.

During the Qing dynasty, there were many cases of Portuguese civilians and officials trying to evict Chinese tenants and demolish their homes and shops in order to redevelop the land. In these cases, the Chinese officials cited the relevant regulations and said that existing tenancies should remain in force: eviction and rent increases were prohibited.

If the tenants did not pay rent, the Chinese officials would work to recover the arrears and the Portuguese could not send their slaves to evict the tenants. The

public today can have a glimpse of such unfairness through the complaints detailed in these historic documents.

When Cheung formally surrendered on 20 April 1810, he handed over 280 ships, 2,000 guns, and more than 25,000 men. For their part, the Portuguese asked for no reward, which greatly impressed the Qing officials.

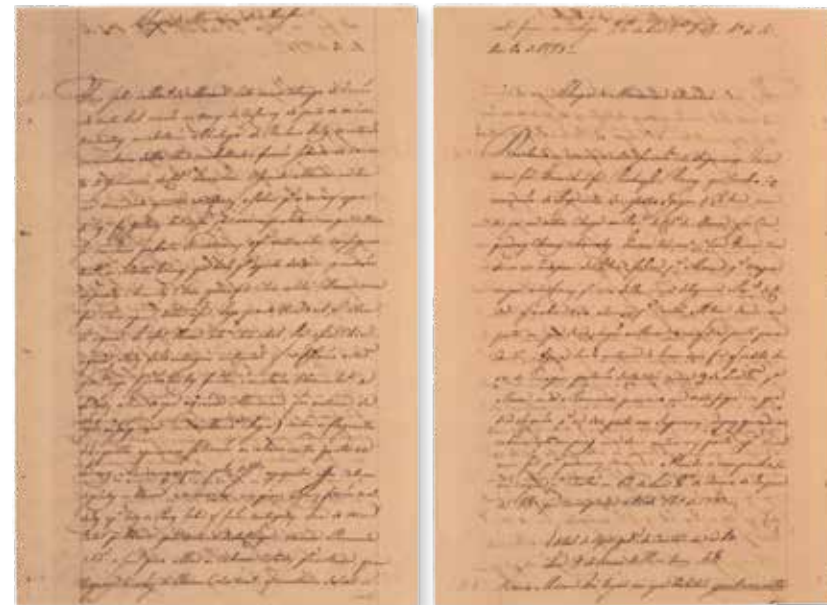
The third takes visitors to the high seas: Cheung Po Tsai, a pirate commander who later became a colonel in the Qing navy. Born in Jiangmen in 1783, he was abducted at 15 by a pirate. Pressed into piracy himself, his natural skill soon elevated him to a leadership position. But between September 1809 and January 1810, he suffered

a series of defeats at the hands of the Portuguese navy in the Zhujiang River Estuary.

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The Chapas Sínicas contain a number of documents relating to Cheung's short but dramatic life. One is an official letter from the Qing government to the procurator of Macao, announcing the arrest and decapitation of the pirates, and ordering the public display of their heads to prove the rigour of the law of the Qing Emperor. Another is a letter from the magistrate of Xiangshan to the chief justice of Macao on Cheung's capitulation.

After his surrender, Cheung settled in Macao and was appointed a captain in the Qing imperial navy, responsible for eradicating piracy. He reached the position of deputy general three years before his death in 1822; he was 39 years old. A street in Macao bore his name until it was destroyed during the Second Sino-Japanese War.



Official letter (yu) sent by the Commissioner of Customs in Macao to the Procurator of Macao, Manuel Pereira, stating that foreigner vessels leaving Macao to Whampoa must have their licences with them

Official letter (zha) sent by the sub-prefect of Macao, Wang Zhong, to the Procurator of Macao, Felix José Coimbra, on the tenancy dispute caused by the loan owed by António Fonseca to Xie Qinggao

Official letter (yu) sent by the Magistrate of Xiangshan, Peng Zhaolin, to the Chief Justice (Ouidor) et al. on the capitulation of Cheung Po Tsai





Silvestre de Almeida Lacerda, general director of the General Directorate for Books, Archives and Libraries of Portugal

Fight to protect the record

Preserving thousands of delicate documents is no mean feat and often involves mending the ravages of time. Dr Silvestre de Almeida Lacerda, general director of the General Directorate for Books, Archives and Libraries of Portugal, described the painstaking efforts taken to restore the centuries-old scrolls to legible form to a lecture audience in Macao on 8 July.

“We have ten staff devoted exclusively to the project, with the help of Archives of Macao as well. We compare information obtained from both the Portuguese and Chinese translations,” he explained. “We believe some of the documents were first translated from Chinese into Latin before Portuguese, probably because the Church was involved in the translation in those days and Latin was a common language among Westerners.”

By 2015, Torre do Tombo had assessed 1,501 documents of the Chapas Sínicas and listed 1,606 preservation tasks for the individual records.

There are four classifications of the state of the documents: no damage, limited damage, damage not exceeding 50 per cent, and severe damage of more than 50 per cent. The damage was caused by rot and infestation by insects and moths, relatively common issues which can arise from everything from environmental factors to accidentally leaving a bookmark between the pages.

The restored Chapas Sínicas documents have been digitised and made available online, providing valuable resources for scholars, researchers, and other interested readers. The collection from Torre do Tombo is only part of a much larger cultural trove: experts estimate there are nearly two million historical documents worldwide that relate to the history and culture of Macao. ●

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Silvestre de Almeida Lacerda



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Capela da Guia: 10:00-17:00

Endereço: Colina da Guia

Portuguese-speaking countries

Angola chases the tourist dollar

Text Neil Ford in Luanda Photos CLBrief

The Angolan government is investing US\$125 million in setting up six regional schools for hotel and tourism to provide the skilled workforce needed for the sector in Luanda, Huíla, Huambo, Moxico, Uíge, and Benguela.

The World Economic Forum last year forecast that Angola, alongside Mozambique, would be among the ten fastest growing leisure tourism destinations worldwide over the next decade. The sector has the potential to generate a great deal of employment in a way that the ever-present oil industry so palpably fails to do. There is a long way to go before Angola becomes a popular tourist destination, but there are signs that the new government of President João Lourenço is taking real steps to help the industry take off.

Tourism was one of nine sectors listed by the government as prime candidates for foreign investment in July. Even during the worst of the slump in oil and gas revenues between 2014 and the start of 2018, hydrocarbons accounted for more than 90 per cent of export revenues, with most of the rest generated by diamond exports. Oil

and gas prices may have bounced back since then, but if Lourenço is serious about economic diversification, then tourism is the obvious long-term option.

‘Long term’ should be a given because millions of overseas visitors will not turn up overnight. Angola’s image needs even more improvement than the country’s infrastructure, but it is possible that a large tourism industry could grow if the seeds are planted now. Crucially, the sector has the ability to create employment outside Luanda and in many small businesses, boosting the private sector development that is so badly needed.

An Angolan tourism consultant, Amélia Carlos Cazalma, said: “What we need to do now is to work on our image as a unique tourist destination. We need to identify which sector we want to focus on first. It needs to be done step by step, we can’t do it all at once.”



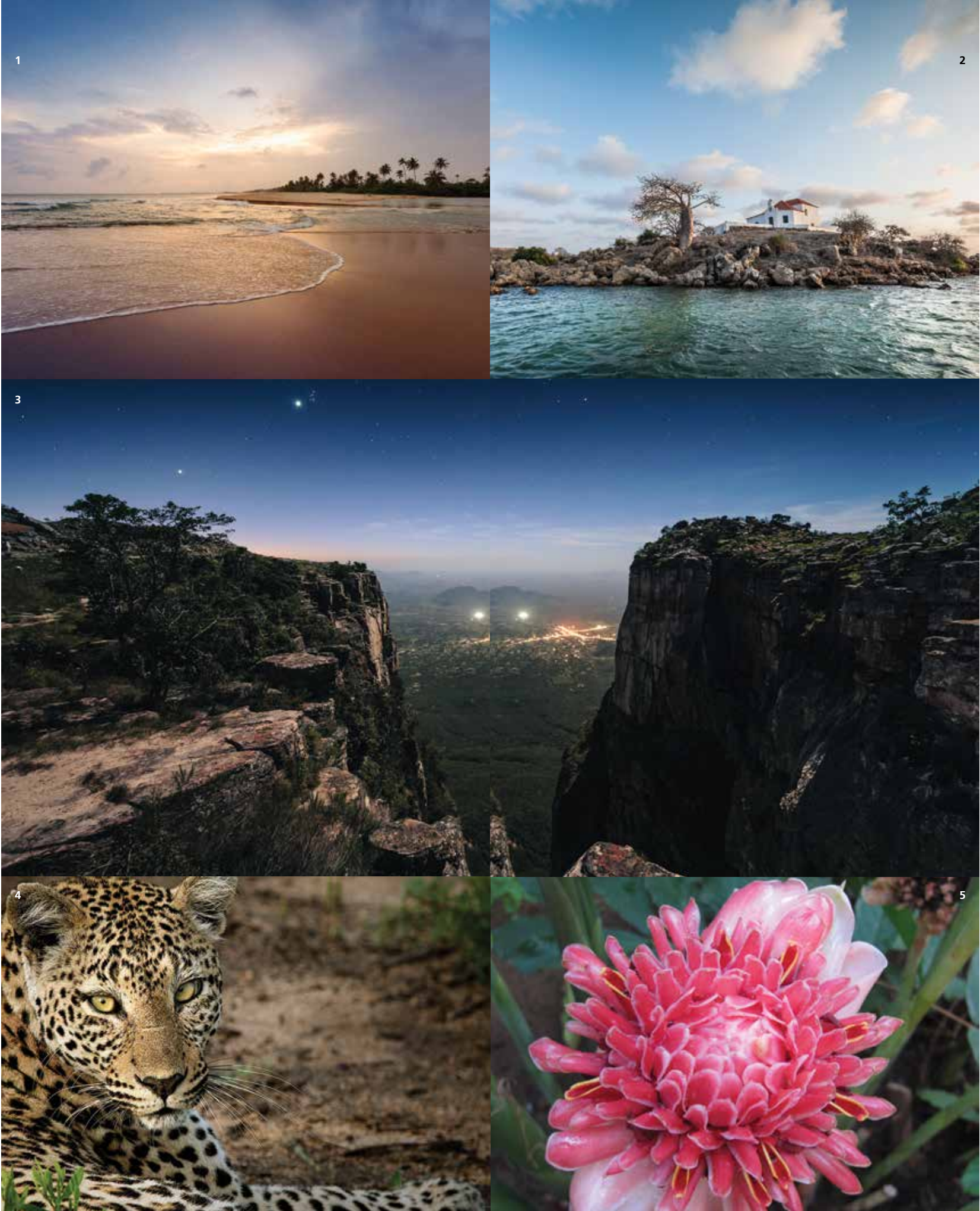
Hotels, restaurants, cafes, tour guide operators, and many more businesses have the potential to create hundreds of thousands of jobs in the areas that most need job creation. Luanda's target of creating one million tourism jobs by 2020 seems unrealistic but such a figure should be possible in the longer term if the government actually enacts all of the policies it has promised.

Both state and private sector investment has been forthcoming. The government is investing US\$125 million in setting up six regional schools for hotel and tourism to provide the skilled workforce needed for the sector in Luanda, Huíla, Huambo, Moxico, Uíge, and Benguela. Private companies have begun to invest in high class rural accommodation. A total of US\$35 million has already been committed to the Pululukwa eco-lodge resort in Huila Province on a 210-hectare site, where 99 per cent of the workforce is Angolan.

Potential competition with East Africa

Nowhere on the west coast of Africa has managed to develop a tourism sector to rival those of Kenya and Tanzania on the east coast but Angola has all of the ingredients needed to do just that. Its attractions are obvious, including its many natural landscapes and stunning wildlife, which are far less well known than they deserve to be. The country could offer the same twin centre holidays as its more illustrious east coast competitors. Visitors could be offered comprehensive wildlife and waterfall tours, followed by a week on the 1,600-km long coastline, enjoying the Atlantic Ocean sun, sea, and sand.

Ruacana Falls should be one of the biggest natural attractions in Africa. Located in Cunene Province on the border with Namibia, it is one of the biggest waterfalls in Africa, at 700m wide and 120m high during the March-May wet season. There are hiking trails in the area and outdoor adventure companies have begun to offer canoe and white water rafting trips. Other stunning waterfalls include Epupa Falls on the Kunene River, where there are hundreds of natural pools, and the 400m drop of the Kalandula Falls. The Fenda da Tundavala is an incredible 1,000m drop that hosts a variety of waterfalls. One of the biggest obstacles to Angola offering the same kind of holiday experience



as East Africa is the impact that poaching has had on fauna in much of the country. Quicama National Park, which lies just 75km from Luanda, was re-established in 2001 when many large animals were airlifted into it, but poaching continues to affect animal numbers. An African tour operator, who did not wish to be named, said: "The government needs to put the resources into anti-poaching forces if we're going to offer a real wildlife experience." However, it covers 11,900 sq km and has the potential to offer attractive safaris.

A recent report by the World Travel and Tourism Council concluded: "Although the [civil war] damage is still widespread, the country is gradually recovering. The national parks are slowly being restocked with wildlife from neighbouring states, and tourism is set to grow exponentially."

The Minister of Hotel and Tourism, Ângela Bragança, says that infrastructure is the key to developing the Angolan tourism sector. She set the Tourism and Hotel Multi Sector Commission up in December 2017 to co-ordinate the work of all ministries with influence over the provision of the required infrastructure.

Some steps have already been taken to put the required infrastructure in place, including upgrading the nation's airports. The fact that the new Luanda International Airport might have the approval by the International Civil Aviation Organization (ICAO) this year has received lots of attention, but eight other airports that are also in the process of being approved by the ICAO, including Catumbela Airport, which is due to open this year. All of them will be operated by the airport management company Enana.

Indeed, the government is relying on airports to help promote regional development. A tender has been launched for the contract to build Mbanza Congo Airport in Zaire Province. The government acknowledges that there is little demand for the project at present but the government hopes that its presence will stimulate economic activity in the area.

1. Mussulo beach
2. National Museum of Slavery
3. Rift of Tundavala
4. Leopard
5. Porcelain rose

Air travel

Even under the current air travel regime, the new airports should help to attract more visitors to the country. However, it is vital that the government liberalises air travel in order to attract new airlines, enable additional services and push air fares down. Aside from the main tourist destinations in Africa, such as South Africa and Kenya, reaching many African destinations can be very expensive, partly because of the lack of competition but also because of a lack of direct flights. Many international visitors are currently forced to take two flights in order to reach Luanda, while a third would be required to reach Angola's provincial cities.

Under the 1999 Yamoussoukro Decision, African governments were required to enact an Open Skies agreement, granting free access to each other's airlines but progress towards achieving it has been glacial. Local governments and tourism authorities in Cape Town have signed an agreement with Angola's TAAG Airlines to offer daily flights between Cape Town and Luanda during peak periods using Boeing 777-300s. At present, tourism traffic on this route is mainly from Angola to South Africa but the Angolan government hopes to attract more South African visitors in the future.

In May, the government listed TAAG among the companies it was prepared to privatise, although it is not yet known whether this would involve a full sell-off or the sale of a fixed stake in the business. The fact that the government has to subsidise the firm makes divestiture more likely. TAAG is currently more than US\$1 billion in debt.

TAAG has already formed the Air Connection Express with other Angolan carriers in order to

improve connections across the country. Air Namibia, in particular, is keen to launch new Angolan services. It currently flies just four times a week between Windhoek and Luanda but wants to start direct flights between Windhoek and Benguela, Namibe, Ongiva, and Lubango from October.

New bilateral agreements allow visitors from 61 countries to acquire visas for 30-day single stays and 90-days over the course of a year upon their arrival.

Relaxed visa regime

Over the past year, the government has taken real steps to simplify the laborious visa application process. Until recently, the visa system was designed to provide access for foreign experts in specific industries but all visitors were required to provide an invitation letter from someone within Angola.

However, new bilateral agreements allow visitors from 61 countries – from the end of March – to acquire visas for 30-day single stays and 90-days over the course of a year upon their arrival, including the entire European Union, the other member states of the Southern African Development Community (SADC), Russia, the United States, China, India and Japan. Those arriving will be required to provide accommodation details, means of supporting themselves, a return ticket, and vaccination certificates.

Attracting visitors from within the SADC region is the obvious place to start. Tourists from eight countries, mainly in SADC, are now totally exempt from visas: Botswana, Mauritius, Mozambique, Namibia, Seychelles, South Africa, and Zimbabwe, plus Singapore. Visitors from other countries are to be awarded visas within a maximum of three days by diplomatic and consular missions as standard. Expedited visas are currently only available at high cost.

Many foreign hotel investors shelved their investment plans as a result of the severe economic downturn in the country. Even the hotel sector is overly reliant on the oil industry: most modern hotel capacity is in Luanda and most visitors are in some way connected to the oil sector. There is little doubt that very high hotel prices deter visitors. Average daily room prices stood at US\$200 for a three star hotel in Angola last year, with US\$380 for a five star hotel. Hotel occupancy rates fell from an already low 39 per cent in 2016 to 35 per cent last year. Occupancy rates of 80 per cent are generally considered healthy by the hotel industry.

The pressure on foreign investors to partner with Angolan companies has deterred development. In February, AccorHotels pulled out of Angola, leaving 50 hotels in the hands of its Angolan partner AAA. The French firm had signed an agreement to gradually take over and rebrand the hotels under the Ibis flag, but AAA had been unable to meet its share of investment. However, it was reported in June that Accor was keen to re-enter the Angolan market, but this time without any domestic partner. If the government is serious about attracting foreign investment, it needs to allow foreign firms to pick their own investment projects. ●

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Asian Games 2018 – Jakarta-Indonesia

Macao brings home gold, silver and bronze medals

Text Sha Kai Sa Photos Xinhua New Agency, AFP and Cheong Kam Ka

Macao athletes won one gold, two silver, and two bronze medals in the Asian Games 2018 held in Jakarta.

Huang Junhua won a gold medal in the Men's Nanguan and Nangun All-Round and Li Yi won the silver medal in the women's Changquan, both in wushu.

In karate, Sou Soi Lam won the silver medal in Women's Kata and Wong Sok I won the bronze medal in Women's 55 kg.

Hoi Long won a bronze medal in the women's triathlon individual competition.

Macao competed in both Jakarta and Palembang, with 110 athletes in 16 competitions: swimming, diving, synchronized swimming, athletics, badminton, bowling, boxing, canoeing, cycling, fencing, judo, karate, squash, table tennis, taekwondo, triathlon, and wushu.

Previously, in the Asian Games 2014 held in Incheon, Republic of Korea, Macao's athletes won seven medals (three silver and four bronze).

The Asian Games 2018 was hosted by Indonesia and took place from 18 August to 2 September.

Ninety-six countries and regions took part in the games that were held in Jakarta and Palembang.

More than 11,000 athletes participate in the games held under the motto "Energy of Asia."

The Asian Games have 462 events in 40 disciplines and is the second largest programme in Asia Games history.

The first Asian Games were held in New Delhi, India, in 1951. The Indonesia games are the 18th Asian Games.

Hangzhou, China and Nagoya, Japan will organise the 2022 and 2026 Asian Games respectively.





Opening Ceremony of the Asian Games 2018 - Indonesia





Huang Junhua, gold medal in Men's Nanquan and Nangun All-Round in wushu



Li Yi, silver medal Women's Changquan in wushu





Sou Soi Lam, silver medal in Women's Kata in karate



Wong Sok I (left), bronze medal in Women's 55 kg in karate



Hoi Long (right), bronze medal in Women's Triathlon Individual



Macao's medalists at the Asian Games 2018

Macao Yearbook 2018



The CD ROM special edition of Macao Yearbook 2018: 60 patacas

The CD ROM special edition of Macao Yearbook 2018 in Chinese, Portuguese and English, an annual publication compiled by the Government Information Bureau (GCS) of the Macao SAR, was released on 13 September 2018.

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