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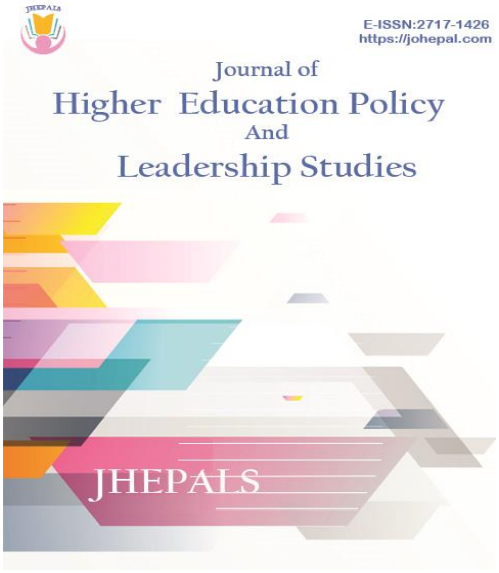

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Abstract

Impactful innovations in higher education are increasingly dependent on concepts generated through global engagement and international collaborations. Internationalisation of higher education tends to grow in complexity when universities from different jurisdictions are driven by dissimilar governance approaches and developmental goals. Yet, this complexity enhances opportunities for creativity, innovations and collaborations at the same time. In this paper, we examine how world-class universities in Hong Kong, Macao and Guangdong have worked to overcome incongruities and asymmetries inside the Greater Bay Area (GBA), a new and ambitious regional construct of China, by drawing on disparate legacies and capacities in internationalisation of research, education, and service in their jurisdictions. We explore the impact of international dynamics on the universities' efforts to create a more coherent agenda with respect to international partnerships in the region. The study contributes to conceptualisation of world-class universities' roles in shaping bridges and synergies regionally and globally, and infuses the rationales of internationalization in higher education with new perspectives.

Keywords: Higher Education; Internationalisation; Partnerships; Greater Bay Area (GBA); Innovation

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Introduction

The rise of the regional innovation system in the Pearl River Delta of China, increasingly known as the Greater Bay Area (GBA), cannot but appear to be remarkable (Summers, 2018; Tang, 2020). Academic innovators in the Guangdong-Hong Kong-Macao region have gained international reputation through cross-border collaborations, many of which are manifested for instance, by the rise of world-class universities and the growth of world-leading publications in major scientific journals (Summers, 2018; Tang, 2020; Web of Science, 2021). The GBA appears to be a reference in the post-colonial regions in Eurasia given its success in creating transformative powers with the help of its world-class universities that sustain international talent flows, and create an amalgam of the Western and Chinese approaches in education and industry (The World Bank, 2013; Wei et al., 2017; Yang, 2005). However, the transformative powers in creating world-class universities that use international collaborations for regional innovations are still poorly understood. The analytics in this domain require more depth amidst recognition that challenges persist amidst different stakeholder legacies and aspirations when they seek to develop international collaborations at a world-class university pursuing regional agendas.

This paper draws on insights from the GBA-based universities and explores how they employ these partnerships for regional innovation, and generate linkages and resources for world-class performance and global engagement. As some researchers argue, the world-class capacities in Hong Kong's universities have been largely developed with the help of internationally-connected research projects (Chan, 2018). However, it should be noted that universities and researchers in Guangdong and Macao were also engaged with international science projects – yet, their capacities in global engagement have remained under-developed (Han & Appelbaum, 2018; Wu & Vong, 2017). The universities that were more fully engaged in international collaborations appear to benefit more from convergence of scientific norms emphasising international peer review and quality assurance, which attract global talent and makes the processes of internationalization deeper anchored at the local universities (O'Neill, 2018; Xie et al., Huang 2020). Trying to understand these differences and divergences, this paper tries to understand what indeed works well and what challenges the universities tend to experience.

In this paper, we examine how the three jurisdictions – the Hong Kong Special Administrative Region (SAR), the Macao Special Administrative Region (SAR) and Guangdong Province – have engaged international collaborations in order to build capacities for global engagement and world-class performance. We explore how these partnerships infuse students and professors with creativity and critical inquiry, which put them on a par with counterparts in the Western system of higher education and science. In the following section, we examine how world-class universities differ in creating research capacity-building as well as engaging with local and regional forces for innovation and internationalisation. We also then exemplify how the world-class universities in the GBA galvanize opportunities for regional innovation through internationalization of higher education.

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Building World-Class Capacities for Local and Regional Research and Innovation

The rise of global competition for world-class scientific talents and an innovative economy has prompted universities and industries to seek cross-border partnerships and create an attractive environment for top-notch research and learning, locally, regionally and internationally (Cai & Liu, 2015). World-class universities are regarded as improving institutional orientations and capacities for innovation and competition (Huang, 2016; Luo, 2013; Tang, 2020). Research collaborations developed by these universities across disparate jurisdictions appear to produce influential transformative spaces for graduate training – thus shaping a new generation of R&D talents (Helms & Rumbley, 2017; Ma, 2018). Their internationally-infused research partnerships engage local stakeholders in creating better concepts and practices of management, performance and mobility, paving the way for more attractive knowledge products and processes contributing to social and industrial betterment (Hu & Chen, 2018; Shin et al., 2013, 2018). Embracing such partnerships, local researchers appear to acquire resources and ideas on a much broader scale beyond their jurisdictions (Oleksiyenko & Liu, 2021; Fabrizio, 2009; Hu & Mathews, 2008).

Partnerships at world-class universities can certainly be affected by the legacies or outdated practices in their jurisdictions. In China, for example, it took a significant time for some universities to overcome dependencies on the old Soviet model and to redress the Soviet-style management (Oleksiyenko et al., 2018). A significant number of Chinese universities deliberately pursued collaborations with America and Europe to reorient their scientific capacities for a more open environment of research, which appeared to be more attractive for global talents employed at Chinese universities as well as for the new generations of scholars returning home upon graduation in the Western institutions (Chan, 2018). Over time, Chinese scholars and managers then adjusted the innovative approaches borrowed from abroad, and made them more attuned with local and national traditions. World-class universities in China were faster than others in acquiring competences for international partnership building in research, as it certainly takes time to learn and navigate the complexities of knowledge development practiced in decentralised and chaotic Western systems of science (Kroll & Tagscherer, 2009; Yang, 2005). The most successful efforts have been made in STEM fields, where the Chinese government enthusiastically encouraged strategic partnerships with top American and European universities, and where there were few cross-cultural tensions in administrative approaches and value orientations (Ma, 2018; Ma et al., 2022). The STEM-focused partnerships have pushed for modernisation changes in the Chinese world-class universities, and hence spearheaded the adoption and legitimization of global norms of knowledge development and personnel retraining that allowed for greater mobility and exchange of academic talents (Chan, 2018).

Some observers argue that despite the rise of world-class universities, a large-scale innovation in China still appears to be weak, especially as the internationalisation of social sciences, and especially building a more profound dialogue with the dominant Western counterparts, can be concerned (Yang et al., 2019). These worries have been growing because of belief that social sciences are important for shaping the general concept and culture of innovation that keeps knowledge production cycles open for international visibility, review and participation, and thus precludes deterioration of inquiry and learning (Braun Strelcova et al., 2022; Zha & Postiglione, 2022). Many university stakeholders in social

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sciences cannot but be embroiled in the gamut of competing legacies, which define the organisational culture of their units and their academic work as well as inquiry and communication norms (Mok, 2017; Tierney, 2020; Yang, 2020). Innovation-oriented internationalisation in sciences necessitates collaborations in creating attractive discourses and developments for R&D agencies to attract and retain the world-leading research personnel whose intellectual powers depend on institutionally-advocated and -protected resilience in thinking, experimentation, and communication (Oleksiyenko et al., 2021). A more open science is viewed as allowing for building trust in international networks, as well as improving conceptualisation and implementation of research projects (Aghion & Jaravel, 2015; Brennan et al., 2014). To achieve proper innovative capacity in international science, it is an intense and open collegial exchange that becomes important for great ideas to emerge (Lanford & Tierney, 2022).

The internationalization perspective in that regard stimulates a new thinking about the role of world-class universities in producing influential ideas through open international exchange and collaboration, and integrating disparate cultural inputs for scientific innovation and societal impact. The cross-border collaborations of world-class universities have shown to stimulate a range of important questions about the prospects of internationalisation of higher education across the entire systems of higher education, and stimulate a more open space where innovative cross-border projects can emerge and bring together local and international scientific talents (Woldegiyorgis et al., 2018). When international trust prevails, cross-border research policies and projects stimulate transformative powers for institutional capacity building and sustain international R&D that can retain local talents while increasing their benefits in global science and networks (Bano & Taylor, 2015).

The Case of World-Class Universities in the Greater Bay Area (GBA)

The GBA-based world-class universities present an interesting case on how the idea of regional innovation can be enriched through international collaborations. The pursuit of international scientific exchange is particularly interesting in view of transformative powers generated by these universities when they go beyond institutional interests and appear to share their innovations with their peers in the same region as our previous studies have shown in the case of Central Asia (see, for example, Oleksiyenko, 2012). In the early 2000s, universities in Hong Kong Special Administrative Region (SAR) and Macau Special Administrative Region (SAR), many of which had attained world-class status by 2010, became part of the enhanced cross-border collaborations in the GBA engaging a greater number of students from Guangdong Province who sought opportunities to study in the English-speaking degree programmes provided by world-class universities in the SARs. English-speaking programs were of high interest to Chinese learners who aspired for a greater engagement with global production and exchange in higher education. By collaborating with universities in Hong Kong and Macao, universities in two major cities of Guangdong – Shenzhen and Guangzhou, became key beneficiaries of intense scholarly exchanges and thus could enhance their perspectives for world-class program development (Chapman et al., 2015; Mok & Han, 2017; Postiglione, 2013; Yang, 2005).

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There were several other reasons for building stronger relations with world-class universities across the jurisdictions in that regard. GBA presented itself as a beneficial cluster of economic and educational enterprises that could easily engage producers in Europe and North America into profitable offshore manufacturing in Guangdong while relying on R&D at world-class universities in Hong Kong and Guangzhou. In view of international investors, the supply chains in Guangdong Province provided "a strong manufacturing base" (KPMG & HKGCC, 2017, p. 5). Meanwhile, Hong Kong was offering a strong international financial industry and professional services, supported by high-ranking universities (Lo, 2016). At the same time, Macao has long played the role of "the world center of tourism and leisure" (Luo & Lam, 2020, p. 8). As a more integrated region, the GBA was predicted to enhance attractiveness for foreign direct investment and to generate flows of human capital and innovative knowledge (Fu, 2008; KPMG & HKGCC, 2017; Lui, 2015). The cluster of these exciting cities was thus creating an image of a dynamic transformative space where scientific talents, both Chinese returnees and international specialists, could work, live and pursue their fortunes.

World-class universities in the GBA acted strategically and focused on international partnerships, as much as served local and regional needs, in order to secure prosperity for all parties concerned (Luo, 2013; Tang, 2020). Hong Kongonese universities were particularly interested in engaging different institutions at home and abroad given that open systems of research provided for them access to the best knowledge abroad as well as enhanced international visibility of their own programs. Different forums emerged among university teams in the GBA in order to accelerate the exchange of ideas and coordination of disparate resources (Xie et al., 2020). These exchanges were very important in view of China's search for a harmonious development amidst diverse cultures, legacies, and jurisdictional dynamics in education, research, and industry, as well as aspirations for global leadership.

To provide more insights into these transformations, our research has engaged the review of policy documents at the governmental and institutional levels. We particularly examined and juxtaposed the key aspirations, development plans and implementation results reported by the stakeholders at world-class universities in the GBA. We then analysed these documents while triangulating key findings with the web-based literature and insights published by researchers and policy makers involved in the GBA development. While comparing how different jurisdictions – Hong Kong SAR, Macao SAR, and Guangdong Province – have engaged their policy instruments for international scientific collaborations, we sought to understand how the regional pursuits of innovation were contributing to building a stronger platform for international research and outreach at policy and organisational levels. The insights from those two levels can be important for understanding major transformations in the GBA and intentions of the key players who seek to enhance investment attractiveness of the whole region as well as of Chinese capacities in developing international scientific collaborations.

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Governmental Policies: Engaging World-Class Universities in Regional Innovation

The developments in the GBA can be viewed as coinciding with the Chinese Central Government's decision to undertake greater geopolitical restructuration and promote its ideas and products throughout the world. For example, China launched the Belt and Road Initiative to spearhead its own foreign direct investments (FDI) and woo the commercial interests and geopolitical commitments not only of the less developed countries on the continent but also of such European giants as the UK, Germany and Italy. Having engaged the UK and Portugal, for example, China was then able to build stronger connections with their former colonies (Le Corre, 2018). "According to a 2017 report by Merics and the Rhodium Group, Chinese investments in the EU reached a record $36.5 billion in 2016, up 77% from $23 billion in 2015" (ibid., p. 162). Hong Kong as a world-class centre of international finance was viewed as a strategic post for facilitating the cross-border investments. The city indeed had a reputation and trust for the FDI as most of its banks had strong relations with investors, bankers and multinational corporations in Europe and the US.

While Guangdong Province provided a solid manufacturing base and Hong Kong SAR a reliable international finance base, the commercial framework seemed to be creating lots of advantages for world-class universities which were able to offer competitive remuneration to international professors and scholarships to international students joining academic departments in the region. Moreover, located at a distance of a shuttle train travel (up to 1 hour) among major cities – Hong Kong-Shenzhen-Guangzhou, the GBA allowed international scholars to use access to top universities in the region. The growing online infrastructure also facilitated linkages and appeared to be helpful during the COVID-19. The world-class capacities in furnishing the resources also attracted a good number of Chinese scholars who previously studied and worked in Europe or North America but preferred to return home and live in the dynamic and innovative mega-region connecting the above-mentioned influential cities.

Many of these returnees had a significant knowledge of trade and development frameworks that were used in other countries. These graduates acted as boundary-spanners while reinforcing trust in relations with foreign investors working in the GBA or elsewhere. While China was ascending in the global hierarchies as a world economy, Guangzhou, Hong Kong, Macau and Shenzhen were contributing to the Chinese symbolic powers and productive capacity-building in global science and industry. Global city rankers, for example, used to position Hong Kong on a par with London and New York (GaWC, 2018), while global university rankers regularly placing Hong Kong's universities among top 100 world-class universities – both adding to the impactful narrative about the Chinese global impact.

International technology exchange has become a central part of many policy documents boosting the engagement of world-class universities in the regional development. In these documents, the Western-savvy Hong Kong was often emphasised as a global centre that could contribute to both R&D as well as global trade and logistics in the region (HKUST, 2017; Sharif & Tang, 2014). To facilitate the regional connection and a greater flow of talents and knowledge, the State Council of the PRC put emphasis on making investments in the intercity high-speed rail transportation between Hong Kong, Guangzhou and Shenzhen. This would enhance cross-border mobility of intellectuals in the region. The PRC also invested more resources in strengthening Shenzhen-based universities (including

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the expansion of branch campuses from some strong universities in Hong Kong and Beijing) thus aiming at enhancing their world-classness (Harbour Times, 2018). The technology exchange benchmarked all of the globally important areas of R&D while making such trendy and promising areas of development as Artificial Intelligence (AI) the centrepiece of its innovative plans (KPMG and AUSTCHAM, 2018). At the same time, a range of memorandums were signed to enhance intellectual property protection in the increasingly vulnerable cybersecurity space (Law, 2019).

The transition to global science and industry necessitated a new management mode throughout the region. GBA's world-class universities (particularly their business schools) made a significant effort to train enterprise managers in the best MBA programs of America and Europe. This contributed to a more dynamic and competitive manufacturing in the region. However, the competitive knowledge-based economy also required a more significant retraining of the university personnel (Oleksiyenko & Liu, 2021). The region indeed required a larger number of professionals and experts trained in accordance with the new norms of education, science and industry who could speak with their counterparts across the world. Over the last 10-15 years, the GBA sought the rise of three major international partnerships among business schools in that regard. For example, HKU collaborated with partners in London Business School and Columbia Business School to train top executives through a joint Executive MBA program. Both Chinese and Western professionals were learning from each other on what it meant to develop mutual understanding and co-production while focusing on global standards of excellence and competition.

While business schools were doing an impressive work, other sectors still lagged behind. This became particularly obvious when top Chinese researchers had to respond to the challenge of building "harmony through diversity" in the sophisticated framework bringing together Confucian, Legalist, and Leninist types of management (Yang, 2020). The GBA became a platform where these approaches emerged as competitive and raised concern about the prospects of international education, research, and manufacturing when the Chinese geopolitics became affected by the pandemics and trade wars. The re-conceptualisation of these geopolitics urged local social sciences to be more creative – however, as Chinese researchers remarked, there was still a lot of work to be done in order to build more comprehension between different concepts and uses of social sciences in different cultures (Yang et al., 2019).

World-Class University Re-Orientations: Linking Regional and Global

GBA's world-class universities indeed became a major hope for building mutual respect, comprehension, and scientific collaborations locally, regionally, and internationally. Undoubtedly, enhancing cross-border collaborations far and wide has been deemed a crucial strategic direction for these universities to accomplish excellence, leveraging geopolitics, disruption, and spill-overs relevant to the GBA (Postiglione, 2020). Hong Kong's universities were particularly privileged to keep these positions resulting from multi-year investment in world-class research and recruitment of global talents, many of whom were Chinese scholars with degrees in world-class universities elsewhere. The latter were particularly ambitious to improve the country's capacities for globally competitive research and teaching (Jiao, 2018). Table 1 below indicates that most GBA-based world-class

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universities were clearly stating in their strategic plans the intentions for global engagement (Check Online Supplement).

University researchers actively engaged in international research collaborations producing a large number of publications in world-leading journals indexed in Web of Science. Table 2 below shows that in the past decade, research universities in the three jurisdictions excelled in some common fields (Check Online Supplement). The top categories of publications in the GBA have been engineering, electrical, oncology, materials science, and multidisciplinary research. These indicated that GBA had sustained and created powerful platforms for international research in these fields. Many of these platforms have been regionally connected and thus created a greater international impact. Several examples stand out. In cancer studies, the Chinese University of Hong Kong (CUHK) and SYSU have established the State Key Laboratory of Oncology which has been advancing cross-border research collaborations since 2006. As for electrical and material engineering research, the Hong Kong Polytechnic University (PolyU) and SUSTech have been co-organising Guangdong-Hong Kong-Macao Joint Laboratory for Photonic-Thermal-Electrical Energy Materials and Devices, facilitating talent flows and technology transfer in the GBA, with HKU, HKUST, UM and local industries affiliated. In the same vein, South China University of Technology (SCUT), HKU, UM, PolyU, City University of Hong Kong (CityU), and HKUST jointly established Guangdong-Hong Kong-Macao Joint Laboratory of Optoelectronic and Magnetic Functional Materials. In addition to research collaborations, major research universities in the GBA have jointly organised doctoral programmes for the sake of research talent cultivation, e.g. HKU-SUSTech, SYSU-PolyU.

The numbers of STEM focused publications in the reputational journals have been however 3-5 times higher than in social sciences. Moreover, in Guangdong this difference was even more significant – the gap was often 15-20 times larger between natural and social sciences. This indicates the powers of STEM in the region but also suggests that GBA-based social sciences still need a lot of work for internationalisation to achieve a greater impact in the global networks. Table 1 also shows that Chinese collaborations with partners in North America were often more significant than in Europe. The University of Hong Kong had been largely a more balanced university in that regard. Overall, however, all major research universities in the GBA were pursuing high-quality publications through international partnerships. While Chinese universities in the region were also engaging well with counterparts in Asia and Australia, the Euro-Atlantic perspective stands out in the greater spectrum of these partnerships.

The world-class universities have certainly had a greater advantage in generating internationalisation in comparison to the second- and third-tier universities (Oleksiyeko & Liu, 2021). A review of institutional reports from the lower-status universities, most of which are in Guangdong, suggests that they had very few international R&D projects despite the governmental and industrial expectations for universities to become more globally engaged (Huang, 2016; Siru et al., 2017). Many mainland scientists in the fields of social sciences and the humanities apparently found it difficult to go global on a par with many other Hong Kongese counterparts, as the mainland universities pursued the traditions which often remained poorly understood in the West (Yang et al., 2019; Zha & Postiglione, 2022). Some observers (see Oleksiyenko et al., 2018; Chen, 2012, Chan, 2018) have expressed concerns about the ability of the traditional universities to use the Humboldtian concepts of freedom

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to teach, learn and govern, and be on a par with their European counterparts, given the absence of advanced levels of "analytical and critical skills, quantitative skills, qualitative skills, communication skills, ability to appreciate cultural and global diversity etc." in provincial universities (Zha et al., 2019, p. 682).

Successful international research projects, engaging world-class universities, are certainly possible to enact provided the competence and commitment of scholars who are eager to explore and experiment with opportunities offered by global science (Postiglione, 2013). In our study, Chinese scholars involved in these projects appeared to be more inclined to explore and experiment, especially when they had favourable institutional environments which encouraged freedom of thought and innovation. Innovative institutions and programmes turn out to be more capable to not only attract but also to retain international talents. These institutions are viewed as pursuing globally respected standards of investigation, including ethical standards of research and communication. Southern University of Science and Technology (SUSTech) in Shenzhen, for example, emerged as one of the ambitious regional universities that appeared to engage internationally and thus enhance their standards for global science and communication. Over the last decade, SUSTech has leveraged entrepreneurial techniques and innovative designs by drawing on collaborations with the best universities in Hong Kong and Macao that had top-notch international networks in S&T, social sciences and humanities (e.g., in the UK, the US, Canada, and Europe, as well as with leading institutions in the East: e.g., in Japan, Singapore, South Korea and Taiwan). However, to grow exponentially, many mainland universities still need a much greater pool of world-class research centres and talents connected to the best universities in the world-leading scientific institutions, primarily located in the countries whose universities rank at the top of world-class university leagues, and thus engage with world-leading ideas and project aiming at global impact in research and development.

Concluding Remarks

The case-study presented above indicates a significant value that world-class universities can create in regional development and innovation. The world-class universities in Guangdong Province and Hong Kong and Macao SARs have laid ground for collaborations in global science as well as for a greater synergy in the internationalization of higher education and international partnerships in the Greater Bay Area. These universities' international networks have been indeed important for enhancing the ambitions of the region to advance innovation capacities and attract globally recognised scientific talents who can contribute to developing a knowledge-based economy in the GBA and beyond. Panoramically analysed, the GBA's world-class universities have been bringing together global, national and local research agendas and resources, which could galvanize world-class scholarship and regional innovation at the same time. These world-class universities infuse international partnerships with leading ideas in global science and thus create opportunities for academic innovation at home.

However, the world-class universities appear to flourish in the cities that allow for greater resources, mobility, freedom and flexibility of thinking and experimentation, thus allowing innovators to connect across disparate social, economic and political stakeholder groups in the region and abroad. The GBA has been certainly privileged to have major cities

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with significant international infrastructure (airports, logistics, global finance and insurance as well as international schools and colleges). Hong Kong stands out in that regard while playing a role of super-connector, according to Chan (2018). Indeed, being recognised by powerful stakeholders globally for its world-class excellence in higher education and financial services, Hong Kong serves as an important gateway for Chinese science and education, especially in South China, to champion global standards of research, teaching, and networking, while providing its researchers, students, and collaborators with significant resources to pursue the highest possible standards of knowledge development.

Over the past twenty years, the GBA-based world-class universities have created a significant platform for world-class performance in research and education which galvanizing academic development across the entire region. Not all cities or regions enjoy that privilege. In the post-Soviet countries, for example, neither cities nor universities appear to be eager to leave the old template of management and budgeting. The performance of those universities is unsurprisingly lacklustre as a result. One could argue that they GBA could be an example in how transformative powers of world-class institutions could be engaged for stimulating change across the entire system. However, that would also require from the outdated institutions to learn how to cultivate locally-significant and globally-relevant formats for teaching, learning and governing while drawing on Humboldtian principles of university. As China's and GBA's case indicate, the most difficult job is usually located in making locally- or nationally-bound social sciences to acquire global recognition, visibility and comprehension (Yang et al., 2019). Without re-orientations in the softer sciences, making the entire global engagement impactful is exceptionally difficult.

What GBA world-class universities offer in that regard is a lesson that transformative powers for academic excellence increase only when scholars learn to reach out to best practices in the universities elsewhere and develop productive collaborations across cultures, languages and organizational approaches. The international collaborations provide insights for comparison, learning, and experimentation and contribute to reconciling tensions coming from differences in governance and communication. By learning from others across continents, the local universities of GBA have been able to develop capacities for global science while also strengthening their own identity and ability to work and communicate internationally. This enhanced their opportunities for innovation as well as their confidence for international research and world-class performance.

These investments appear to become more fruitful when university managers place more trust in faculty members and encourage them to pursue creative ideas while relying more on self-management in re-organising their programs and projects for excellence in global science. While world-class universities move faster than their counterparts in the same jurisdictions, the GBA experiences demonstrate that it is possible to spread benefits generated in one place to others, especially when the government acts strategically and encourages to share good practices widely while furnishing resources for less advantaged partners to partake in scientific collaborations and international learning (Li-Hua et al., 2011; Ma, 2018; Ma & Montgomery, 2021). The expanding collaborative networks facilitate then a diversity of ideas and methods, and stimulate innovative thinking that attracts and retains scientific talents.

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