

Strategies for Talent Acquisition and Development: Policies for Enhancing University Talent Growth in the Guangdong-Hong Kong-Macao Greater Bay Area

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Abstract: Background: Blending our understanding of the influence of the increased use of technology with the effects of technological advancement on the management and organization of sports events shows that tremendous progress has been made. Currently, organized sports activities require complex networks and reliable data-transmitting technologies for effective functioning and provision of the best experience to consumers. These networks perform millions of tasks that are vital to different activities, thus prone to cyber risks. Objective: The purpose of this research is threefold: first, it is necessary to propose a comprehensive security framework for the defense of sports event networks against numerous cyber threats that can compromise the integrity, availability, and confidentiality of sports events' real-time data and communication systems. Methods: A multi-layered security framework was proposed, integrating network security, data encryption, authentication and authorization, and intrusion detection and prevention. The framework was evaluated using a combination of simulation and real-world testing environments. Performance metrics such as detection rate, false positive rate, incident response time, system uptime, network latency, user access compliance, and cost efficiency were used to assess the framework's effectiveness. Results: The evaluation demonstrated a high detection rate of 98.5% and a low false positive rate of 1.2%, indicating the framework's effectiveness in identifying threats. The average incident response time was 12 minutes, ensuring prompt detection and mitigation of security incidents. The framework maintained system uptime at 99.95% and network latency at 45 milliseconds, ensuring the availability and performance of the network. Encryption resulted in a minimal 3% decrease in network throughput. User access compliance improved from 85% to 97%, and user satisfaction ratings averaged above 4.5 out of 5. The framework also resulted in a 20% reduction in costs associated with security incidents. Conclusion: The presented security framework improves the security situation in sports event networks considerably by providing much better protection against cyber threats without affecting system efficiency and user satisfaction rates.

Keywords: Talent Acquisition, Talent Development, Guangdong-Hong Kong-Macao Greater Bay Area, Higher Education, Funding Policies, Talent Retention, Cross-Border Collaboration, Professional Development, Regional Policy Harmonization, International Partnerships

INTRODUCTION

Guangdong-Hong Kong-Macao Greater Bay Area (GBA) is an economically innovative world region consisting of nine cities in the Guangdong province and two Special Administrative Regions (SARs) – Hong Kong and Macau. Stretching for 56 thousand square kilometers, the GBA is to be a powerful innovational and financial center and a gateway to the country's foreign trade (X. Zhang et al., 2023). With a total population of more than 70 million people and a gross domestic product (GDP) that is equivalent to most regional economies of the world, the region aspires to develop into a world-class city cluster that will compete with the Tokyo Bay Area City Cluster and the San Francisco City Cluster (Wang). The GBA has now emerged as an important hub for using technology in innovation and as a hub for quality educated manpower. Its universities are important contributors to developing competent human capital to support the future development of the region (Liu et al., 2022). However, talent management, especially in attracting and developing high performers, remains difficult because competition with other regions and countries is high (Chan & Shek, 2021). This therefore requires strong policies and strategies that can facilitate sustainable acquisition and enhancement of HR quality (Liu & Coates, 2024). Further, as the Chinese Government forecasts the development of the GBA, several efforts have been made to strengthen comprehensive cooperation in the international research, educational, and technology sectors (Zhang et al., 2024). This aspect coupled with plans such as the “Outline Development Plan for the Guangdong-Hong Kong-Macao GBA” propel the area toward being a knowledge-based economy and make human capital a policy focal point (Lee & Wang, 2023). In this context, universities in the GBA are major players charged with creating a talent base for new economic sectors. Human capital management encompassing talent acquisition and development is considered as a core enabler of innovation and long-term economic development particularly in innovative and competitively evolving regions such as the GBA. Thus, an important feature of the GBA as one of the most significant economic zones in China is human capital to support hi-tech industries and knowledge-based services (Jiayu et al., 2023). To achieve its vision of becoming a global innovation, the GBA must work to attract, develop, and retain talent in a variety of fields (Wang et al., 2024). Hiring and sourcing solutions in the GBA need to be strategic to close skill gaps in new economy sectors including advanced manufacturing, fintech, and renewable energy (Chen et al., 2022). In this respect, universities

assume a key role by fostering an environment for research and development and subsequently for a constant supply of qualified human resources and professionals (Ba et al., 2022). To lure highly qualified talent into its ranks, various institutions of the region have offered production incentives, recruitment packages, international collaborations, and compatible cross-border programs that are consistent with the best international benchmarks (Agregado). On the other hand talent development is the creation of learning and development platforms to enhance skill performance. This can include career advice on the best practice, funding for research and development, and availability of highly sophisticated facilities that help the researchers and educators to be in line with current trends (Birou & Hoek, 2022). Commitment to funding development programs also means that staff and students are retained and turnover decrement is lowered; this means no talent drains out to other developed countries such as Singapore or South Korea (Tang, 2022). Talent management is therefore central to the need to offer the best and improve research productivity in the GBA's universities to extend their global outreach (Tang, 2022). The Guangdong-Hong Kong-Macao GBA is expected to grow into one of the world's most important cities of innovation. However, potential talent risks the region has included a lack of skilled workforce, talent management, and a shortage of high-caliber talent for development. However, there are recognized imperfections in the International regulation and national policies increasing talent circulation and establishing the appropriate academic environment for their training – there is a shortage of qualified specialists in the new knowledge-based fields such as artificial intelligence, biotechnology, and environmentally friendly technologies. Moreover, the current and prospective policies in Guangdong, Hong Kong, and Macao are frequently either uncoordinated or inconsistent, to a great extent, contributing to fragmentation and ineffectiveness of talent management. If the below issues are not solved, then GBA could face the danger of not being able to compete with other global innovation cities such as Silicon Valley and the Greater Tokyo Area. The purpose of this study is to review and synthesize existing Talent Acquisition and Development policies in the universities of GBA and provide tactical changes to those policies. The objectives of this study are:

- Analyze the talent introduction strategies adopted by universities in Guangdong, Hong Kong, and Macao.
- Assess the impact of financial support and talent development

programs on talent retention and growth.

- Compare the effectiveness of various regional policies in attracting and nurturing high-quality talent.
- Identify gaps and challenges in existing talent management strategies and provide evidence-based recommendations to address these issues.
- Suggest policy adjustments to promote greater collaboration and integration among the GBA's universities to enhance regional competitiveness.

To guide the study, the following research questions are posed:

1. What are the key strategies used by universities in the GBA to attract and recruit top-tier talent?
2. How do financial incentives and talent development programs influence the retention and growth of talent within GBA universities?
3. What are the comparative strengths and weaknesses of talent acquisition and development policies in Guangdong, Hong Kong, and Macao?
4. What are the main challenges faced by universities in the GBA in implementing effective talent management strategies?
5. What policy changes can be recommended to enhance the coordination and effectiveness of talent development in the GBA?

The rest of the paper is organized as follows. The Literature Review covers relevant research on talent policies. The Methodology details the comparative approach used to analyze talent acquisition across the GBA. The Results highlight key findings on funding and retention disparities, followed by Policy Recommendations for improving talent strategies through harmonization and collaboration. The paper ends with a Conclusion summarizing the key takeaways.

2. LITERATURE REVIEW

2.1 Overview of Talent Acquisition and Development in Higher Education

Recruitment and training of human resources have emerged as potent strategic initiatives in most higher learning institutions globally. The function is not only to educate people but also to contribute to the formation of a pool of talents that paves the way to the growth of academics as well as the economy (Walker, 2010). Talent acquisition strategies reported in higher learning institutions are; competitiveness in

the recruitment process, collaborations as well and research in the institution to attract proficient faculty, researchers, and students (James, 2021). Over the past few years, talent acquisition strategies in higher learning institutions have embraced the need to establish a pool of talent drawn from a diverse demography and nationality locally as well as internationally. Published scholarly works show that schools with good reputations, state-of-the-art equipment for research, and global networks are most likely to attract better professionals and students (Neri & Wilkins, 2019). In addition, the deployment of digital platforms and networks of social communication has become a vital component of the modern process of talent acquisition so that the institutions can expand the circle of contacts and declare their differences, and the uniqueness of the offers (Chethana & Noronha, 2023). On the other hand talent development focuses on cultivating the abilities as well as the capabilities of people in the academic environment. It involves, amongst others, training and development of mentorship and career development schemes that retain and update the staff and researchers to the current academic and technological changes (Tarique & Schuler, 2010). Talent development strategy does more than improve the institution's intellectual capital; it also increases employee satisfaction and retention rate (Cui et al., 2020). In the case of the Guangdong-Hong Kong-Macao GBA higher education institutions have to compete for talent with counterparts from around the globe and require talent with specific expertise in emerging cutting-edge fields such as artificial intelligence and environment (Xie et al., 2021). The situation indicates that GBA universities can still uniquely sell attractive career opportunities, abundant research funding, and international partnership opportunities as decisive factors for sustainable development (Liu & Li, 2024). However, policy support and funding first under Guangdong, then Hong Kong, and Macao often form a barrier to the efficient management of talents across the border (Xie et al., 2022).

2.2 Policy Frameworks for Talent Management in Universities

There are policy frameworks for talent management in universities whereby talent attraction, identification, development, and retention are offered as an organized procedure. In turn, such frameworks often incorporate a range of policy-related cues, such as recruitment strategies, funding tenders, professional development programs, and international links (Musakuro, 2022). Promising talent management policies are important when trying to increase the research capacity of universities and make them more competitive at the international level especially given that

a large number of academic disciplines are changing at a very fast pace (Parakhina et al., 2017). Over the last few years, most universities have developed coherent policy systems that correspond to National and Regional development strategies of the economy. For instance, there is an emerging practice in talent management policies that supports interdisciplinary research and innovation in universities to enhance knowledge exchange between sectors (White & Deevy, 2020). Furthermore, it has been seen that in the present time, many universities are also offering specialization programs to attract the concentration of the best talent with modern fields of interest like Artificial Intelligence and Environmental sciences (James-MacEachern, 2018). A policy strategy often integrated by universities around the world is the development of specific talent acquisition mechanisms, for instance, research chairs or distinguished professorships, that offer market salaries, funding for research, and career security (Ramaditya et al., 2022). Furthermore, more policies are being established in universities for mobility and international cooperation which allows researchers and faculty to engage in international projects as well as scholarships (Myhovich, 2019). It also increases the appearance and popularity of the institutions and fosters a stimulating academic climate for different talents availabilities. First of all, the policy frameworks on talent development are different because of the difference in governance and funding between the Guangdong Province and the Hong Kong and Macao GBA (Xie et al., 2021). For example, authors have testified that Hong Kong universities receive extensive governmental financing as well as discretion in academic policymaking, but Guangdong universities may confront regulations and restricted financing options (Wu & Jung, 2024). Such regional disparities make it important to duplicate policy that encourages better coordination and sharing of the talent base across the GBA to create efficiency (Li, 2023). Furthermore, policies and strategies in the GBA have been shifting to enhance the Industry-Academia connector with programs like Joint Research Centre and Innovation centers. The above-formulated initiatives are aimed at offering a floor for knowledge sharing and the mutual development of new technologies, which are likely to promote talent. Nevertheless, policy inconsistency and support for implementation across various sections in the GBA persist as crucial issues (Chen & Zhao, 2024). All in all, it can be concluded that the proper management of human capital in universities leaves for the development of a sound policy framework. Such frameworks should respond to the conditions of the worldwide academic environment in the future and should aim at strategic priorities, including internationalization,

interdisciplinary cooperation, and the long-term sustainability of careers.

2.3 Comparative Analysis of Regional Talent Policies

It is seen that talent management policies today also vary and differ from each other since each area in the GBA has its own economic, social, and educational development. The three regions of Hong Kong, Guangdong, and Macao all aim to establish the GBA as an international innovation hub; however, talent acquisition and management strategies vary because of their different systems of governance, financing, and organizational arrangement differences (Ba et al., 2022). These policies are autonomic, powerful, and have enough financial backup from the government of Hong Kong. The “Hong Kong Research Grants Council” and other funding bodies offer generous research grants and fellowships with the intent of attracting the best scholars and researchers from around the world (Tang, 2023). Second, Hong Kong universities also possess strong external linkages and connections that will also help in attracting and maintaining of quality workforce (Postiglione, 2011). Moreover, the CPC, talent policies of Guangdong are in synchronization with that of the Mainland Central Government’s policies more oriented towards technical and vocational talents for Industrial support. The programs like “Guangdong Thousand Talents Program” target the Chinese who have served time abroad as well as local talent in sectors including manufacturing and Information technology (Wei et al., 2017). These policies have helped in producing more skilled personnel in Guangdong province but there persistent challenge of relating academic output with industry demands (Tang, 2022). Macao carries out the lowest development level yet it is most frequent in recruiting bilingual human capital and scholars to support the region’s growing tourism and service sectors (H. Zhang et al., 2023). Macao’s talent policies are formulated to align with general development strategies in the areas of cultural industries and gaming research. The problem with this is that while it enjoys some advantages over competitors like Hong Kong and Guangdong in terms of human capital, it lacks the funding and a large higher education sector to clinch the best talents (Udani, 2012). The comparative analysis shows that although it has academic advantages and broad overseas connections, Hong Kong lags in talent cultivation oriented to industries, thereby responding to the needs of the Guangdong manufacturing industry (Sharif & Chandra, 2022). In contrast, the following policies suggest what Macao has been emphasizing in its concentrated fields: However, to more effectively execute a sound talent management strategy in the GBA, there must be improved cooperation

and policy alignment. That could help the region lay focus on its strength within the sub-region avoiding talent competition within the different regions.

2.4 Gaps in the Literature and Research Contribution

Nevertheless, this study has identified several gaps in the literature considering talent acquisition and development in the context of the GBA. First, most of the current literature is targeted and limited to a narrow perspective of talent policies of Hong Kong, Guangdong, and Macao though the larger picture which is that of regional integration is not examined exhaustively (Yu, 2021). Such a fragmented strategy fails to consider some symbiosis that might be expected from a coherent GBA talent management strategy. Second, using the evidence on the effectiveness of existing talent policies in academic and research production, especially in relatively new areas of knowledge such as biotechnology, artificial intelligence, and green technology (Yuan & Jiang, 2021). The number and type of research output have not been measured against these policies to know the impact they have on the research productivity and innovation in the universities across GBA. Third, most of the existing sources do not pay attention to the relationships between universities and industries' internationalization in terms of the development of talent (Ba et al., 2022). Studies are carried out on single universities or some small regions and it is not hailed that regional policy co-ordination will make way for enhanced funding and academic mobility (Ma et al., 2022). This research seeks to address these gaps by undertaking an analytical overview of talent acquisition and talent development policies in the entire GBA. This research fills the literature gap by comparing the effectiveness of current policies and providing tactical suggestions on how to enhance regional collaboration for organizations in the GBA that are focusing on talent management of employees in higher learning institutions.

3. RESEARCH METHODOLOGY

3.1 Empirical Analysis of Regional Talent Policies

The method for this research is based on an analysis of data that concerns talent policies in the regions that belong to the GBA. This research adopts both the quantitative and the qualitative research approach to assess the current talent acquisition and development policies across the

region. The data collected comes from official government and education policies, University reports, and official statistics on talent mobility and academic performance.

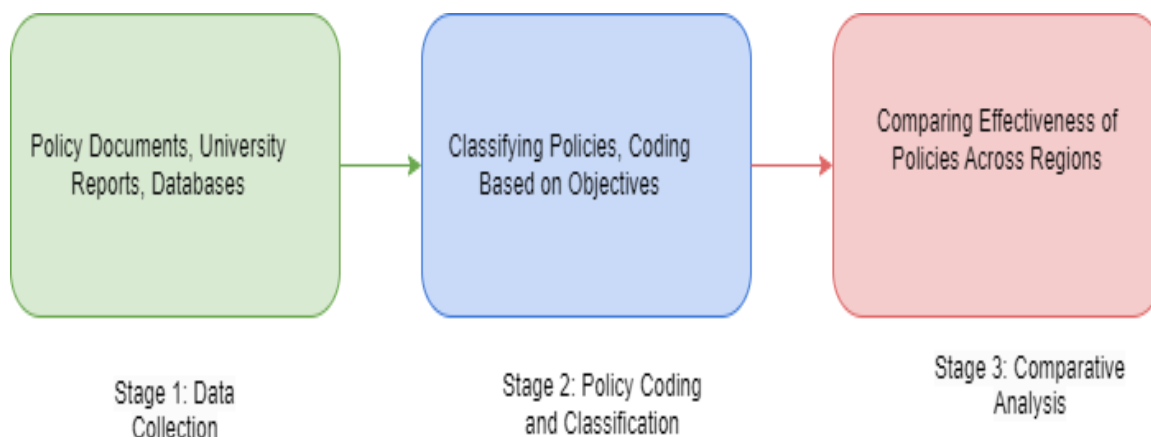


Figure 1: Research Methodology Framework

It can be seen that the research methodology framework Figure 1 illustrates the systematic process applied to conduct the empirical analysis of talent policies in the GBA. It shows the three key stages: Explaining the link between the ever four steps of policy evaluation including Data Collection, Policy Coding, and Comparative Analysis.

3.2 Comparative Study Framework

The comparative study framework is aimed at comparing and assessing the policies of talent attraction and cultivation in the Guangdong-Hong Kong-Macao GBA. This framework arranges the policies according to criteria such as funding, recruitment, and professional development from the Guangdong, Hong Kong, and Macao areas and their policies. Therefore, when evaluating such parameters, the study's goal is to determine the relative merits and demerits within each region for development.

The framework involves the use of two key approaches including the comparative analysis of indexes concerning the efficiency of policies implemented. These quantitative measures are funding received for research purposes per capita, the number of international faculty members, and the student-to-faculty ratio. The qualitative indicators are aimed at policy innovation, administrative support, and outcomes of cross-border activities. Table 1 presents the factors constituting the comparative study matrix for the assessment of talent policies in the three regions based on specific indicators.

Table 1: Comparative Study Framework for Talent Policies in the GBA

Region	Funding Allocation	Recruitment Strategies	Professional Development	Policy Innovation
Guangdong	Moderate, focus on industry-academia collaboration	Local talent with experience in high-tech fields	Limited development programs and limited cross-border mobility	Emphasis on industry-academia integration
Hong Kong	High, significant research grants and fellowships	International recruitment, global partnerships	Comprehensive programs mentorship and research funding	Strong support for innovation and cross-border initiatives
Macao	Low, focused on local needs and cultural industries	Local bilingual professionals	Basic development programs	Integration of cultural and tourism elements

The comparative study framework for analyzing regional talent policies in the GBA. It highlights the differences in funding allocation, recruitment strategies, and professional development initiatives among Guangdong, Hong Kong, and Macao.

3.3 Data Collection and Sources

For this study, both qualitative and quantitative information that is deemed relevant to the case of the talent acquisition and development policies in the GBA was collected by the research from several sources. The data were obtained from three primary sources: information collected from government policy documents, University reports in addition to information found in publicly available databases. This exploratory study collected data from the official policy documents from the Education Bureau of Hong Kong, the Department of Education of Guangdong Province, and the Tertiary Education Services Office of Macao. They include Regional strategic plans, talent recruitment policy, and funding plans produced between 2018 and 2023. Using secondary data, the author identified talent management strategies based on annual reports and research funding details and strategic plans of major universities located in the GBA, including CUHK, Sun Yat-sen University, as well as the University of Macau. The records of academic performance and talents' movement were retrieved from international sources that include; QS World University Rankings, the Times Higher Education Rankings, and the China Education Statistics Yearbook. These sources offered

information on research productivity, globalization of faculty, and talent attrition rates.

Table 2: Data Sources and Types Collected

Data Source	Type of Data	Timeframe	Purpose
Government Policy Documents	Policy texts, strategic plans, talent programs	2018–2023	Analyzing regional talent strategies and policy goals
University Reports and Strategic Plans	Recruitment statistics, funding data, annual reports	2018–2023	Evaluating university-specific talent initiatives
Publicly Accessible Databases	Academic rankings, research output, faculty data	2018–2023	Assessing regional academic performance and mobility

A brief description of data sources and data types that are used for the empirical analysis of talent policies in the GBA is provided in Table 2. This structured approach, he noted, helps to make sure that the study will get a broad picture of the talent system in the region and compare the three sub-regions of the GBA sufficiently.

3.4 Data Analysis Methods

The research methods adopted in this study are both quantitative and qualitative in the assessment of talent policies in the GBA. Quantitative data, derived from university reports and public databases were analyzed using descriptive statistics and regression analysis. This is done for measuring such factors as revenue of research grants, faculty ratio, and talent retention.

To achieve this, comparative graphs and tables were developed that reflected these performance indices by region, illustrating policy effects on the attraction and nurturing of talent. An epigrammatic analysis of the policy agreements and source strategic plans was made to look at the reoccurring themes in the policies for talents. Key topic extraction was done using text mining methodologies which enabled the identification of areas of policy focus. To compare policies on a relative scale, the study adopts the comparative matrix method used to compare the level of effectiveness of activities between Guangdong, Hong Kong, and Macao. The matrix operates with the weighted scores, applying such criteria as policy innovation, funding, and cross-border partnership to allow for the comparison of different policies. The use of quantitative and qualitative approaches to assess talent policies guarantees accurate identification of quantitative results and context.

4. TALENT INTRODUCTION STRATEGY IN THE GBA

4.1 Analysis of Talent Attraction Policies in Universities

Policies developed for the universities of the Guangdong-Hong Kong-Macao GBA aim to set up the region as a preferred talent attraction area for academic and researchers. Every area has its ways and means to attract and retain talented workforce professionals. In recruiting international talents, Hong Kong uses strategies such as offering highly attractive salaries, research funds, and opportunities for international travel and work that come with programs such as the “Global Scholars Recruitment Program”. Based on this foundation, the universities in Hong Kong enhance their global image and international links by recruiting highly qualified researchers (Wong, 2021). The Guangdong Thousand Talents Program represents SUN Yat-sen University’s strategy of focusing on talent attraction that includes domestic talent and Guangdong people returning from abroad to boost the knowledge-intensive sector (Li et al., 2022). This approach is designed to increase the pool of skilled human resources development in high technology and applied research disciplines. Macao employs a somewhat more targeted approach, targeting working-professional bilinguals to fill growing cultural and tourism industries. Measures such as the ‘Academic Staff Development Program’ enable local and international scholars enticing them to commit their time to short-term research and teaching for the university (H. Zhang et al., 2023). Policies besides affecting talent attraction therefore differ throughout the GBA, due to differences in governing structures and regional priorities. While the outcomes such as internationalization and research are highlighted in the case of Hong Kong, Guangdong targets vocational and industry-oriented talent, and Macao at cultural and services talent development.

4.2 Strategies for Enhancing Talent Acquisition

Largely in a bid to secure high-quality talent, Universities in the GBA have had to devise wide and unique strategies to appeal to the region's institutional needs and desires. Key strategies include. To attract research talent from around the world, universities are beginning to develop targeted recruitment strategies at the researcher, professor, and postdoctoral fellow levels. Examples include Hong Kong’s “Global STEM Professorship Scheme” which targets bringing into the region professionals in science, technology, engineering, and mathematics (Chen et al., 2021). Salaries are competitive with other large cities within China;

employees are often offered relocation allowances; and GBA institutions have generous research grants. For instance, Guangdong has launched the “GBA Talent Program” with many incentives including researching funds and housing for domestic and global researchers (Long, 2019). Universities in Hong Kong and Macao are investing more in international collaborations and mobility in research to get credible talents around the globe. This not only improves international cooperation but also increases the popularity of these institutions so that it becomes important for leading scientists to enroll in them (Mok & Cheung, 2011). The presence of specialized research institutes and centers for new and progressing areas of interest including artificial intelligence and biomedical sciences supports the recruitment of researchers who are keen on doing well-funded research. This is true, particularly in the South China province of Guangdong where developing a highly specialized “Institute of Innovation and Technology” is a perfect example of how such special purpose centers can help attract talent (Wang, 2022). GBA universities are improving career advancement prospects through tenure, professional experience, and training, mentorship. These initiatives help in retaining talent mainly through establishing and proper support of the academic climate as well as proper career ladders (Liu & Li, 2024). In aggregate, these three strategies contribute to the building of the appeal of GBA universities, whereby more effective competition with other global education locations will be opened, which will contribute to the sustainable development of a skilled human capital stock.

4.3 Comparative Analysis of Talent Introduction Policies in Guangdong, Hong Kong, and Macao

First, the talent introduction policies of the three places show different concerns, second, the ways of implementation, and third, the outcomes of Guangdong, Hong Kong, and Macao talent introduction policies greatly vary. This paper compares the relative strategies that have been adopted by the respective regions and the effects on recruitment.

Table 3(a): Comparative Analysis of Talent Introduction Policies in the GBA

Region	Key Policies	Focus	Strengths	Challenges
Guangdong	Guangdong Thousand Talents Program	Attracting Chinese nationals with overseas experience and industry professionals	Strong alignment with regional industries and high-tech sectors	Limited international recruitment and competition from other provinces

Table 3(b): Comparative Analysis of Talent Introduction Policies in the GBA

Region	Key Policies	Focus	Strengths	Challenges
Hong Kong	Global STEM Professorship Scheme	Recruiting top-tier international researchers and faculty	High financial incentives, global reputation, strong international partnerships	High cost of living and limited availability of research positions
Macao	Academic Staff Development Program	Attracting bilingual professionals and researchers in cultural studies	Focus on cultural and tourism-related disciplines, local talent development	Limited funding and a smaller academic ecosystem

Table 3 shows the comparison of the emphasis, advantages, and weaknesses of specific talent introduction policies in the GBA regions. Guangdong also sets great value in experience in industry and technology; its financial benefits are competitive but it has issues with international recruitment. The high cost of living is one reason that acts as a hindrance in the process of talent acquisition in Hong Kong. Hong Kong provides attractive incentives to attract talent from across the world due to its reputation.

Macao targets bilingual talent for the culture and tourism industries; however, there is limited money to finance it. This analysis shows that although different parts of the GBA have adapted their measures to the local surroundings, further integration, and policymaker convergence is necessary to leverage the talent attraction potential across the whole of the GBA.

5. TALENT DEVELOPMENT IN THE GBA

A major aspect of talent management serves as the foundation for sustaining the competitiveness and innovation capital of the universities within the GBA region. The different regions in the GBA have put measures in place to enhance provisions of academic and research capabilities to foster professional development research infrastructure and cross-border cooperation.

Table 4: Talent Development Programs and Initiatives in the GBA

Region	Program/ Initiative	Key Features	Target Audience	Impact
Guangdong	High-Level Talent Training Program	Provides research grants, mentorship, and skill-based training programs	Junior faculty and postgraduate students	Enhances research skills and local talent retention
	Industry-Academia Innovation Fund	Supports collaborative research with industry partners, focusing on practical applications	Academic researchers and industry professionals	Increases industry-relevant research output and innovation capacity
Hong Kong	Research Talent Development Scheme	Offers professional development workshops, research funding, and leadership training	Early-career researchers and postdoctoral fellows	Strengthens research capacity and international collaboration
	Postgraduate Research Fellowship Program	Competitive scholarships for postgraduate studies, research opportunities abroad	Postgraduate students and visiting scholars	Attracts high-quality research talent and promotes academic mobility
Macao	Academic Staff Training and Development Program	Professional development workshops, short-term exchanges, and language training	Academic staff and research fellows	Enhances teaching quality and cross-cultural competency
	Macao Research Funding Initiative	Financial support for local research projects, conferences, and international publication fees	Local academic and research community	Boosts local research output and academic visibility

Major talent development programs and initiatives in the GBA and an analysis of their structure, the intended learners, and effects are summarized in Table 4. To achieve this, Guangdong has emphasized skill development, integration of research into practice, and industry

partnerships in which the university engages in active partnerships with the various industries to integrate into practice the researched knowledge. Overall research funding and early career researcher support for basic and applied research in Hong Kong focuses on quality, collaboration, and competitiveness. That is why, Macao pays attention to professional development and culture embedded in the educational academic workforce and aims to develop a strong international academic workforce that is closely connected with the local culture. Although these efforts have greatly enhanced the professional learning of academic personnel in the region, even more, can be achieved if the process is driven as a regional common effort enhanced by cross-border mobility.

5.1 Analysis of Financial Support and Funding Policies

Grants and funding strategies are critically central for talent development programs of the universities of the Guangdong-Hong Kong-Macao GBA. Each region offers distinct financial incentives and funding structures to attract and retain top-tier academic and research talent. This section first identifies major funding policies and then compares the effectiveness of different policies and the allocation of funds for talent development using quantitative data. The major source of funding programs of Guangdong universities mainly concentrates on sectors/industries. There is the pre-established finding of the “Guangdong Provincial Talent Fund” which mainly finances the projects that may find market application within Guangdong province, particularly in areas of technology transfer and technology-oriented applied sciences. The above strategy has resulted in a growth of joint universities and industries outputs in terms of research activities.

Apart from the existing GBA funding schemes, Hong Kong is the most fortunate region in terms of per capita research funding stemming from such home-grown programs as the “Research Endowment Fund” and the “Hong Kong Innovation and Technology Fund”. They provide grants for all levels of academic studies, including exploratory research through applied sciences, and are intended to help foster the globalization of research and the progress of innovative ideas. Local Macao funding schemes like the “Macao Higher Education Fund” target research from Macao and the offer of sponsorships for international conferences. While the funding sums are considerably smaller compared to Guangdong and Hong Kong, these policies should increase the academic status and research potential of domestic universities.

Table 5: Comparative Analysis of Funding Policies in the GBA (2018–2023)

Region	Funding Program	Annual Allocation (in Million USD)	Focus Area	Number of Beneficiaries (per year)
Guangdong	Guangdong Provincial Talent Fund	\$30	Industry-oriented research and technology transfer	200
	Guangdong High-Tech Innovation Fund	\$25	Applied sciences and technology development	150
Hong Kong	Research Endowment Fund	\$50	Basic and applied research, international collaboration	300
	Hong Kong Innovation and Technology Fund	\$45	Technology innovation, entrepreneurship	180
Macao	Macao Higher Education Fund	\$10	Local research projects, academic visibility	50
	Macao Research Support Program	\$8	Conference participation, publication support	40

Comparative overview of key funding programs in the GBA, highlighting annual allocations, focus areas, and number of beneficiaries presented in Table 5. By comparing the percentages of research funding about the population of the countries concerned and according to the priority areas of its spending, it is found that Hong Kong has offered the greatest funding per capita for these purposes, and for the goals specified above, the priority is given to international cooperation and innovations. Although less than Shenzhen's, the funding is well directed to high-tech industry relevance and thus is very effective for industry-driven research and training of talents. Specifically, Macao with the least funding concentration invests in local research and increases academic presence in international conferences and publications.

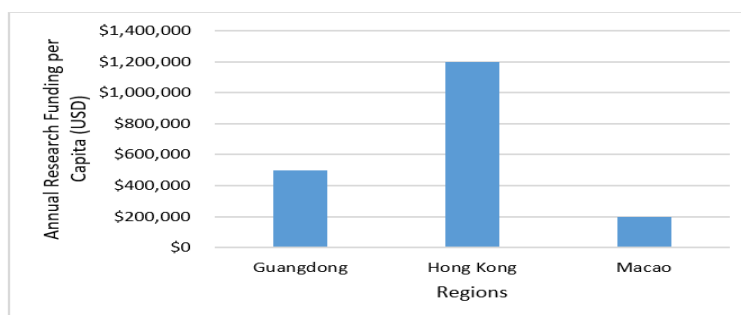


Figure 2: Annual Research Funding Allocation per Capita in GBA (2018–2023)

Figure 2 the annual research funding allocation per capita in Guangdong, Hong Kong, and Macao from 2018 to 2023. Hong Kong shows the highest allocation per capita, indicating a strong emphasis on research and innovation. Essentially, the fact that the funding policies are different means that they should shape talent development differently in every region. The high funding level in Hong Kong gives it a resilient international research positioning and tends to draw global talent. The emphasis on applied research also enhances the realization of the strategic proposition of making Guangdong a high-technology manufacturing and innovative base and promotes industry-university cooperation. Macao has restricted funding policies but these are in place to encourage local growth and visibility of academics. Specifically, the analysis reveals that each region has efficiently managed the resources, but there remains untapped potential for regional funding policy integration to further strengthen the development of talents and research capabilities in the GBA.

5.2 Impact of Fund Policies on Talent Retention

Therefore, the opportunity for measuring the appropriateness of the existing system of financial support and the implementation of funding policies and measures for talents in the GBA is extremely important for understanding the problem of talent attraction and retention in universities of the region. Competitive funding is not only essential in retaining the most qualified researcher but also a fundamental factor in consistently offering them developmental, resource, and financial support in their careers. Table 6 gives the retention rates of academic and research talents of major universities in GBA over the last five academic years, in which it is seen that funding indeed plays an important role in retaining talents.

Table 6(a): Talent Retention Rates and Funding Allocation in GBA Universities (2018–2023)

Region	University		Average Annual Funding (in Million USD)	Talent Retention Rate (%)	Key Contributing Factors
Guangdong	Sun Yat-sen University		\$30	75%	Competitive industry collaboration programs, housing benefits
	Southern University of Science and Technology (SUSTech)		\$25	70%	Research grants, career development opportunities

Table 6(b): Talent Retention Rates and Funding Allocation in GBA Universities (2018–2023)

Region	University	Average Annual Funding (in Million USD)	Talent Retention Rate (%)	Key Contributing Factors
Hong Kong	The University of Hong Kong (HKU)	\$55	85%	High research funding, global partnerships, long-term contracts
	The Chinese University of Hong Kong (CUHK)	\$50	80%	Fellowship programs, strong international reputation
Macao	University of Macau	\$12	65%	Local research funding, professional development workshops
	Macao Polytechnic Institute	\$9	60%	Limited funding, basic professional development

Table 6: Analysis of talent retention rates in GBA universities from 2018 to 2023, correlated with average annual funding allocations. Universities with higher funding levels, such as those in Hong Kong, exhibit higher talent retention rates. For instance, The University of Hong Kong retains approximately 85% of its academic staff due to its robust financial support and long-term career development programs (Lo & Li, 2023). In Guangdong, universities like Sun Yat-sen University have successfully retained 75% of their staff by providing funding targeted at industry collaboration, which offers researchers practical opportunities and financial incentives for applied research (Huang & Lu, 2023). Macao's universities face challenges in talent retention due to comparatively lower funding levels and limited research resources. The University of Macau, with a retention rate of 65%, has made efforts to improve through professional development programs but still lags behind its Hong Kong and Guangdong counterparts (H. Zhang et al., 2023).

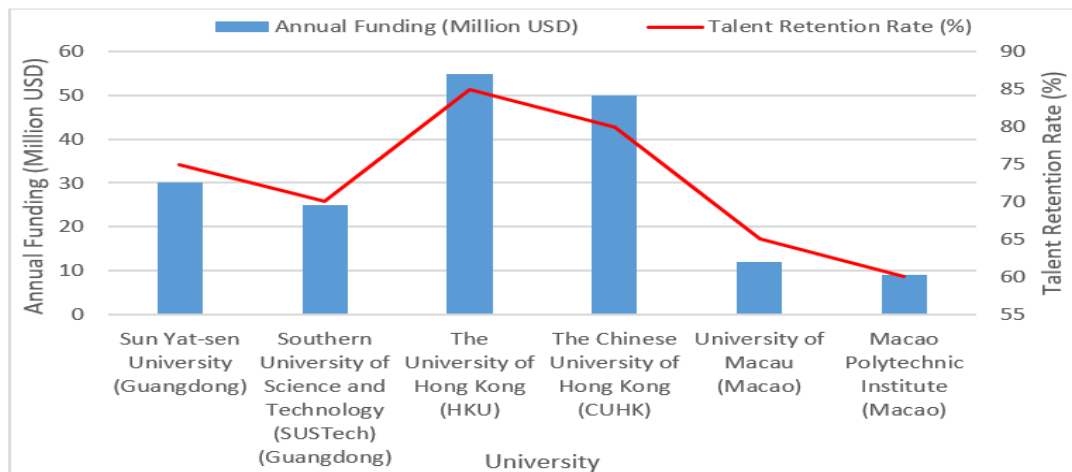


Figure 3: Talent Retention Rates vs. Funding Allocation in GBA (2018–2023)

The talent retention rate of universities in the GBA area from 2018 to 2023 with average annual funding allocation. Our talent retention map, is presented in the Figure 3. Admittedly, universities in Guangdong and Macao possess significantly less funding compared to Hong Kong Universities, this little funding is reflected in low retention rates as compared to Hong Kong universities that have the highest funding. The study reveals that policies for funding have significant effects on talent management and more specifically talent retention in the GBA. It means that the availability of increased funding allows universities to offer fairly well-paid positions and research equipment together with long-term perspectives for a successful career, which is also a powerful incentive for experts. On the other hand, some regions that receive little funding like Macao are yet to register high retention rates because they are constrained by the little funds and training opportunities. These results indicate that increased funding and directed support for professional development may help to increase the retention of the talented, especially in institutions in Macao and some from Guangdong. There is also a possibility of better proportional distribution across the GBA and thus, a better handle and control of retention rates in the favor of achieving optimal academic and research capacity of the region.

5.4 Best Practices in Talent Development

To improve its academic and research capacity, the GBA has adopted different best practices in talent development. These are effective practices that aim to support professional development, staff retention, and the establishment of a competitive academic environment. Hong Kong's universities have developed a defined organized system of leadership training and effective protégé programs. These programs involve matching

early career researchers with experienced mentors for advice such as guidance, and career mentoring, as well as assistance with the culture of the academic environment (Zhou & Lam, 2023). One of the priorities of developing the GBA is to actively develop cross-border partnerships. For example, Sun Yat-sen University in Guangdong Province with cooperation programs including a joint research center and exchange program facilitates the faculty of the University and the students for exposure to different atmospheres and resources from Hong Kong Universities (Xie et al., 2023). The “Hong Kong Research Fellowship Scheme” provides reasonable research funding for the applicant with excellent research performance and research productivity. This scheme not only recruits talent but also motivates the current human resources to be engaged in valuable research activities (Dunnagan et al., 2013). This Macao institution provides targeted continuing professional development sessions concerned with teaching effectiveness, research methods, as well as grant applications: University of Macau in Macao. All these workshops will help in the improvement of the competencies among the local faculty and will foster a culture of professional development (BAKER-MALUNGU, 2010). The universities in Guangdong have particularly developed links with the industry to offer students and researchers practical training. Activities such as the Guangdong Industry-Academia Talent Training Initiative ensure that education programs are market-oriented to ensure that appropriate skills are developed in the country (Xu & Guo, 2022). These best practices have greatly impacted the talent development of GBA nurturing an active academic community with growth characteristics for innovation and professionalism.

6. POLICY RECOMMENDATIONS

6.1 Strategies for Improving Talent Attraction and Retention

Based on the findings, the following recommendations are made to universities and regional governments that seek to enhance talent attraction and retention in the GBA. Raise research grants, salary, and accommodation allowances to develop competitive compensation packages that will attract the best brains from all parts of the world. Introduce specific funds for the particular emerging areas of business, such as artificial intelligence and biotechnology to promote specialization and advance (Long, 2019). Ensure that new joint academic appointments at the tenure-track level are provided together with promotion opportunities and

staff development programs that guarantee feasible career paths for the academic staff. These channels will align the employees with management goals and establish long-term commitment resulting in low turnover and brain drain (Wu & Jung, 2024). Increase the graduate enrollments of international students and foster international linkages through collaborative research, exchange, and visiting scholars programs. These will help enhance the visibility of GBA universities among the international fraternity and also create opportunities for cross-cultural academic mobility that will help ensure the needed talent for development in the region. Supply supportive academic resources and services which comprise counseling, health services for children who are school-going, and family support that consists of childcare facilities. Realizing the faculty and researcher's personal and professional requirements will enhance their retention and satisfaction levels. Enhance collaboration between industry and academia by converting innovation hotspots and joint research institutes into key locations that offer practical research experience and baby steps into the workforce. This strategy will ensure a continuity of the resource type and keep pace with the market demand for academic-orientated research.

6.2 Policy Harmonization and Regional Collaboration

The approach to policy formulation and implementation of talent management within the GBA needs coherent strategies. The following are the recommendations to increase policy coherence and regional collaboration. Develop the regional talent strategy architecture which will facilitate the achievement of the Guangdong-Hong Kong-Macao GBA cooperation agenda. There should be major lines for funding, academic mobility the professional development for the regions to work in unison in realization of the set goals. Establish cross-border talent mobility schemes that enable the researchers and academic staff to work and live in any region of the GBA with ease.

Working on the ease of doing business front, the professional community has suggested that the visa and work permit formalities should be simplified to encourage the flow of professionals across borders more easily. Create common research platforms integrated with university and industrial resources in the GBA. Perhaps these centers can follow a focused research domain of interest or organize interdisciplinary collaborative research, which would require integration rather than existing in separate solos. Adjust the funding standards and allocation policy based on comparison and elimination of the differences among Guangdong

Province, Hong Kong, and Macao. This harmonization will ensure institutions have sufficient resources to foster balanced development and also reduce talent competition in regions. Establish web-based tools that connect academia and research in the GBA. They can be effectively used as a storage or meeting point for resources, research, and talents, which would improve regional cooperation and information exchange. If embraced in its entirety, the GBA can therefore achieve harmonized talent management policy recommendations as indicated below and put itself at the vantage point of being the global education and research destination of choice.

6.3 Enhancing Financial and Professional Development Support

Training and financial support, which go hand in hand with an experienced workforce and sustainable support for professors, are key determinants affecting talent retention and growth of academic institutions, especially in the GBA. To strengthen these areas the following strategies are suggested: Launch new or enlarge current research grant schemes like the “GBA Research Initiative Fund” which can offer sustained research financing to intended high-impact research. Award more postgraduate scholarships to help more qualified students from all corners of the world. Create vitrine grants that support early career scientists and scholars during their first post-doctoral fellowships. This will help to achieve financial sustainability and promote a long-term perspective on the research and teaching staff positions (Sauer, 2018). Many mentors advocate that the center should provide professional development with training, mentorship, and skill development training. The platform should be open to academic staff in Guangdong, Hong Kong, and Macao to encourage cross-boundary training and learning. Invest more in the growing fields like IT, environment, health sciences, and other innovative fields of study since these fields attract talented and also intelligent people. This targeted funding approach can increase the volume of regional research activities and help the GBA build up specialized disciplines. You should propose financing of services that help to combine work and family responsibilities, including child care centers, health promotion, and counseling services. These will foster the creation of an enabling environment for the continuation of academics and staff hence improving their retention, and job satisfaction.

6.4 Long-Term Strategic Policy Adjustments

Therefore, to maintain the growth of talents in the GBA, it is crucial to establish long-term strategic policy developmental changes. The following are the recommendations that should be made to consider the following changes: Develop a sound talent management plan that can capture the developmental goals set for Guangdong, Hong Kong, and Macao. This should be a strategy for nurturing collaboration in research, education, and talent management in the region. Move away from formula funding models that reward or penalize institutions according to set parameters related to research, talent, and linkage. This of course will act as a factor that presses universities to ensure that they enhance their academic and research performance. Develop programs of joint degree and research involving universities from different areas of the GBA. It will increase students' and scholars' mobility and exchange, the exchange of materials and equipment, and will encourage more cooperative research, thus increasing the general competitiveness of academic institutions in the region. They should adopt lenient employment practices so that there is mobility of the academic staff according to their preferences of joint appointments, split appointments, and short-term appointments in other regions that comprise the GBA. This will help transfer knowledge and researchers will be granted permission to work on multisite projects without interference from administrative authorities. More support for new economy-based approaches, for example, technology incubators or programs that attract highly skilled individuals involved in commercializing research and creating new ventures. This focus on innovation will enhance the positioning of the GBA as a technology and innovations cluster focusing on the mid and high-technology levels and the entrepreneurial ecosystem. In this way, the GBA can improve its talent development system, alongside advancing sustainable development and preserving competitiveness in the global education and research arena by using such financial and strategic policy change facilities.

7. CONCLUSION

This research analyzed the talent acquisition and development policies in the Guangdong-Hong Kong-Macao GBA universities from the perspectives of policy implementation, financial backing, and cooperation within the region. The staking data show that Hong Kong provides the largest funding per capita for research and talent nurturing and thus enjoys better talent retention levels. Unlike the case with Macao where, Due to

inadequate funds, it cannot source and retain highly qualified staff. Currently, Hong Kong universities demonstrated great conveniences for attracting international talents with partnership programs and financial incentives. In contrast, Guangdong focuses on a variety of programs oriented to specific industries as it benefits from a developed industrial system. Moreover, all regions have established career development programs, while Hong Kong has a better perception of mentorship and professional growth programs. This focuses more on the contemporary and industry-based practice and research in Guangdong and also speaks incrementally to talent attraction and retention. However, there is no integration of the labor markets of the GBA regions which leads to various problems in talent management and collaboration. A coherent policy strategy can greatly enhance the competitiveness of the region, in particular at present.

7.1 Implications for Policy Makers and Educational Institutions

The results for policymakers and educational establishments in the GBA point to the fact that expanding spending on research and professional training, including Macao and Guangdong, would improve the competency to attract global talent in addition to countering competition from Hong Kong. Many academic agreements should also be developed to encourage cooperation and joint research projects to attract the international influx. Reducing formalities involved in the cross-region movement of staff would ensure that the talent stays within the GBA. Besides, in the field of staff development, educators should pay attention to long-term staff retention and raising qualifications, implementing tenure-track and leadership development for faculty members. Thus, policymakers should further promote the integration of talent policies in Guangdong, Hong Kong, and Macao to eliminate any barriers and promote common practice of talent management in the region.

7.2 Limitations and Future Research Directions

On the same note, this study is however subject to the following limitations: It covers the last five years, and information on how talent policies have influenced research productivity and innovation in the long run has not been well established. Besides, it is also noteworthy that the present study confines to the GBA. To build on this work, future research can compare talent management policies and practices in the GBA to other emerging global technology hotspots such as Silicon Valley and the Greater

Tokyo Area. Moreover, future research should investigate a decentralized approach to determining talent needed across other sectors that embrace the private industry and government subsectors concerning their talent contribution to the concept of an integrated regional talent management strategy. When the GBA overcomes these problems and improves policy coordination and cooperation in terms of policy harmonization and integration, it can strengthen its international competitiveness as an academic and research destination.

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