

“How labor importation constrains talent policy for economic diversification: Evidence from Macao”

AUTHORS	Wai Cheung  Judy Wai-Teng Wong 
ARTICLE INFO	Wai Cheung and Judy Wai-Teng Wong (2026). How labor importation constrains talent policy for economic diversification: Evidence from Macao. <i>Problems and Perspectives in Management</i> , 24(3), 790–807. doi: 10.21511/ppm.24(3).2026.48
DOI	http://dx.doi.org/10.21511/ppm.24(3).2026.48
RELEASED ON	Thursday, 24 September 2026
RECEIVED ON	Wednesday, 04 February 2026
ACCEPTED ON	Tuesday, 21 July 2026
LICENSE	 This work is licensed under a Creative Commons Attribution 4.0 International License
JOURNAL	"Problems and Perspectives in Management"
ISSN PRINT	1727-7051
ISSN ONLINE	1810-5467
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

		
NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
79	3	11

© The author(s) 2026. This publication is an open access article.



BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Type of the article: Research Article

Received on: 4th of February, 2026

Accepted on: 21st of July, 2026

Published on: 24th of September, 2026

© Wai Cheung, Judy Wai-Teng Wong,
2026

Wai Cheung, Doctoral Student in
Public Policy, Department of Public
Administration, Faculty of Humanities
and Social Sciences, Macao Polytechnic
University, China. (Corresponding
author)

Judy Wai-Teng Wong, Doctoral Student
in Public Policy, Department of Public
Administration, Faculty of Humanities
and Social Sciences, Macao Polytechnic
University, China.



This is an Open Access article,
distributed under the terms of the
[Creative Commons Attribution 4.0
International license](https://creativecommons.org/licenses/by/4.0/), which permits
unrestricted re-use, distribution, and
reproduction in any medium, provided
the original work is properly cited.

Conflict of interest statement:

Author(s) reported no conflict of interest

Wai Cheung (China), Judy Wai-Teng Wong (China)

HOW LABOR IMPORTATION CONSTRAINS TALENT POLICY FOR ECONOMIC DIVERSIFICATION: EVIDENCE FROM MACAO

Abstract

As a small and open economy, Macao, a Special Administrative Region (SAR) of China, faces challenges such as labor shortage, talent competition, and economic diversification. This case study aims to examine how Macao's long-standing labor importation system has shaped talent policy and constrained economic diversification within the city's institutional and socio-economic context. This study adopts a qualitative-descriptive empirical case study design based on document analysis, descriptive statistics, and contextual analysis of selected Policy Addresses from benchmark years corresponding to specific socio-economic changes. The findings show that non-resident workers accounted for 41% of Macao's labor force in 2019, but the share of professional non-resident workers remained consistently low at 3%. The number of non-resident workers declined from 196,538 in 2019 to 154,912 in 2022 but rebounded to 183,679 in 2025. Macao introduced a talent recruitment system only in 2023, and 750 people were approved in the first two phases. Policy emphasis on local talent cultivation was accompanied by an increase in residents with tertiary education from 19% to 31%, but relatively weak early-career earnings and limited career choices remained. The 2024 rebound in the economic share of the gaming industry to 43.3% indicates uncertain diversification progress. This study concludes that labor importation, local human capital development, and talent recruitment should be integrated into a talent policy package to support economic diversification.

Keywords

Macao, talent, diversification, non-resident worker, labor governance, small economy

JEL Classification

J61, J21, O25

INTRODUCTION

As a special administrative region of China, Macao has developed into a tourism-oriented economy following the liberalization of the gaming industry in 2002. The number of visitor arrivals has surged by more than 2.5 times from 2002 to 2025 (Statistics and Census Service of Macao, 2003, 2026), leading to rising labor demand in service-related sectors such as gaming, hotels, and restaurants. While labor shortages have long been a problem in the city, Macao has relied on non-resident workers to supplement the local labor force since the 1980s. The fact that non-resident workers accounted for 37% of the workforce in 2025 (Figure 1) reflects the structural tension in labor supply. Rapid development of Macao's tourism and gaming sectors has contributed to sound economic growth in the past two decades, while highlighting an even bigger gap in labor supply. Although non-resident workers play a crucial role in resolving labor shortages, the current labor importation principles of prioritizing local employment, as well as the temporary and supplementary nature of non-resident workers (Law No. 21/2009, 2009), have created dilemmas in formulating a sustainable and long-term talent development system in Macao.

On the other hand, with tourism contributing to 86% of Macao's GDP and casinos accounting for over 90% of tourism revenues ten years after the gaming liberalization (McCartney & Weng In, 2016), the city exemplifies a small, open economy dominated by tourism and gaming. Although economic diversification has been placed on the government's agenda to avoid overreliance, plummeting tourist arrivals during the COVID-19 pandemic triggered a 56.3% contraction in real GDP in 2020 (Statistics and Census Service of Macao, 2021), illustrating Macao's reliance on a single industry and its structural vulnerabilities. Taken together, Macao provides a revelatory case of a small economy characterized by its high dependence on a single industry and imported labor. Confronted with the challenges of economic diversification and talent development, Macao should reassess its labor importation and talent governance frameworks to ensure compatibility with long-term development goals.

1. LITERATURE REVIEW

Although there is no universal definition of the term "talent", it generally refers to people who possess professional knowledge, skills, or expertise capable of driving economic or social development (Howe et al., 1998; Roberts, 2008; The State Council of the PRC, 2010). Recent literature on talent policy emphasizes that human capital is a key driver of innovation and competitiveness, while highlighting structural constraints such as brain drain, policy inefficiencies, and uneven regional development. In the era of globalization, countries are competing for talent. The challenges different countries face and the opportunities they have available are different, and because of these differences, their ability to compete for talent varies (Michailova & Ott, 2019). The effectiveness of talent policy lies not only in place-based incentives but also in complementary factors such as job opportunities, innovation ecosystems, and urban amenities (Cui et al., 2022). Industrial policy literature also emphasizes that skills, innovation, and sectoral development strategies need to be coordinated to support long-term growth (Valero & Van Reenen, 2023). In this sense, talent governance should reflect a strategic approach to attracting, developing, and retaining highly skilled workers (Bird & Beechler, 1995; Heinen & O'Neill, 2004).

Meanwhile, the development of local human capital, encompassing skills, knowledge, and innovation, is also important for long-term development and economic growth (Mincer, 1984; Pelinescu, 2015). Human capital accumulation not only enhances individual productivity but also generates positive externalities through knowledge spillovers and innovation (Romer, 1990). Immigration studies show that the labor-market effects of for-

eign workers vary across skill groups, sectors, and institutional settings, making the coordination between migration policy and local human capital development important (Borjas, 1995; Dustmann et al., 2016). Furthermore, the literature emphasizes that migration and human capital policies are deeply interconnected, as skilled migration can both complement and substitute domestic capabilities depending on institutional settings (Docquier & Rapoport, 2012). Consequently, the literature converges on the view that effective talent policy requires a systemic approach integrating migration, education, and institutional policies to balance global mobility with local retention.

In economies facing labor shortages, migrant labor often fills gaps in local labor supply, particularly in low-wage and labor-intensive sectors such as construction and care (Brucker Juricic et al., 2021; Glaessel-Brown, 1998). Their functional role is often associated with labor market segmentation and institutionalized inequalities because migration regimes often channel them to precarious employment, leading to dual labor markets and social stratification (McGovern, 2012; Wright & Clibborn, 2019). Broader social and political tensions, such as concerns over wage suppression or job competition, may pose challenges to local labor markets and communities. Therefore, migrant labor's role in addressing labor shortages may also generate governance dilemmas (Meardi et al., 2012; Miracle & Berry, 1970; Omanović et al., 2022; Rye & Scott, 2018). High-skilled migrants can contribute to receiving economies when their skills are effectively utilized. Existing studies suggest that skilled migrants may support productivity, entrepreneurship, innovation, and technological diversification, but the effects depend on labor-market integration and institutional context (Atanguegnima et al., 2024;

Caviggioli et al., 2020; Mendoza, 2023; Tipayalai, 2020). In this sense, migration is increasingly conceptualized as a key driver to support economic restructuring and industrial upgrading, provided that migrants integrate well into the labor market and their human capital is effectively utilized. Underemployment or skill mismatch among migrants may represent a loss of potential productivity and innovation (Backman et al., 2021).

In the local context of Macao, the Macao government began importing low-cost labor to support the declining manufacturing industry in the 1980s (Choi, 2006), which was one of the pillars of the economic structure at that time. Since gaming liberalization in 2002, rapid industry-wide development has led to greater labor demand. While ensuring the employment of Macao residents at a reasonable wage level, the government intended to import more technical and professional workers to accommodate industrial development (Macao Special Administrative Region Government, 2005). The increase in non-resident workers has triggered social concerns in the local community over job competition, wage pressure, and limited upward mobility. As for non-resident workers in Macao, research indicates that they often face precarious conditions, marginalization, and social exclusion (Clayton, 2019; Leung, 2004; Yu & Tam, 2016), which have also drawn attention from the international community. The Human Rights Committee (2022) expressed concern about the protection of Macao's migrant workers against abuse and exploitation. The Macao government faces a persistent dilemma between economic needs and social stability. Labor importation is not merely a labor supply issue. It also shapes social perceptions and policy legitimacy, requiring a more strategic form of talent governance that balances labor demand, social stability, and long-term development goals.

To attain the goal of long-term economic upgrading and diversification, human capital development is identified as essential, particularly in economies that seek to reduce dependence on a dominant sector. Macao's labor force had a lower level of education, and the lack of high-end talent has prompted Macao to adjust its talent-import policy (J. Li, 2014). Neighboring regions, including Hong Kong, Singapore, and major Greater Bay Area (GBA) cities, have adopted proactive and compre-

hensive talent strategies, whereas Macao's policy framework remains comparatively cautious and fragmented (Chen et al., 2016; Li & Hong, 2024). Since the gap in skills is a key barrier to economic growth (Hanushek, 2013), Macao should seek ways to develop and strengthen human capital to address the emerging skills required for economic diversification. An open and transparent talent importation system should be established, and the importation process should be expedited (Chen et al., 2016). Though Macao's economy has been performing well after the gaming liberalization, economic diversification has drawn much attention from scholars, mainly showing concern about the overreliance on the gaming sector, the restricted growth of non-gaming sectors, and potential competition with other destinations (Choi et al., 2019; Vinnicombe & Sou, 2014; Zhang & Kwan, 2009).

In brief, existing studies have shown the importance of migrant labor, talent development, and diversification in Macao, but they have largely treated these issues separately. Insufficient attention has been paid to how a long-standing labor importation regime shapes the policy space for talent governance and diversification. This gap is important because the same labor system that supports short-term economic expansion may also affect the institutional capacity to pursue long-term structural transformation because of social concern or reliance on temporary labor. The city's unique status as a world-class tourism and leisure center along the southern coast of China, with heavy reliance on a single industry and imported labor, makes it a special case.

This study aims to examine how Macao's long-standing labor importation system has shaped talent policy and constrained economic diversification under its specific institutional and socio-economic context. Based on the above literature review, the following hypotheses are developed to guide this case analysis.

- H1: *Macao's non-resident worker system functions primarily as short-term labor supplementation.*
- H2: *The separation between labor importation and talent recruitment constrains the development of proactive talent governance.*

H3: The weak integration between labor importation, local human capital development, and talent recruitment limits policy capacity to support economic diversification.

The analysis is supplemented by data on population, industrial structure, and education to enable a more comprehensive examination of the socio-economic context.

2. METHODS

This study adopts a qualitative policy analysis approach combined with descriptive statistical analysis to examine the structural tension between labor importation, talent policy, and economic diversification in Macao. Document analysis is employed to review the evolution of Macao's labor and talent policies. Laws and regulations on non-resident workers, policy addresses, and official reports are analyzed to identify policy objectives, guiding principles, and implicit policy trade-offs. This method is suitable for policy case studies because official records provide evidence of institutional arrangements (Bowen, 2009).

Descriptive statistical analysis is used to examine labor market and demographic trends. Official statistics published by the Statistics and Census Service and administrative data from relevant departments, mainly covering 2019, the year before the COVID-19 pandemic, to the most recent available year, are used to identify the scale, structure, and temporal changes of non-resident workers. Earlier data are also included where necessary.

According to Ball's (1993) view of policy as text and discourse, policy addresses across five benchmark years of 2000, 2003, 2013, 2019 and 2023 are used to examine how labor importation, talent development, and economic diversification were framed in official policy discourse. These years were selected because they correspond to major institutional and economic turning points, including the first post-handover policy address (2000), the year following gaming liberalization (2003), the year following the population policy consultation (2013), the pre-pandemic peak of non-resident workers (2019), and the post-pandemic recovery period during which the new talent recruitment system was introduced (2023).

ROST CM6.0 is used as a supplementary tool to identify the frequency of specific Chinese terms in policy discourse. ROST CM6.0 is a software developed by Wuhan University in China for Chinese text processing. Policy addresses from benchmark years are imported into ROST CM6.0 to carry out word segmentation and obtain word frequency results. Subsequently, the results are processed manually to eliminate high-frequency terms that do not pertain to the concepts of labor, talent, indus-

Table 1. Analytical framework

Dimension	Materials	Period	Purpose
Labor importation	Non-resident worker statistics and reports	2016-2025	To assess the functions of the labor importation system
Labor market	Employment survey	2016-2025	To examine labor-market trends
Talent policy	Investment and technical immigration data	2008-2023	To review the formation of the talent recruitment system
	Talent recruitment data	2023-2025	
Human capital	Educational statistics	2019-2024	To assess local human capital development
	Population census and by-census	2011, 2016, 2021	
	Demographic statistics	2019-2024	
	Talent training and certification incentive plan	2019-2024	
Economic diversification	Trends and challenges of population ageing	2014	To assess diversification progress
	Analysis report of statistical indicator system for moderate economic diversification	2023, 2024	
Policy framing	Selected policy addresses	2000, 2003, 2013, 2019, 2023	To examine how labor importation, talent development, and economic diversification are framed in official discourse

Note: The periods shown in this table refer to the data coverage or benchmark years available for each empirical source, rather than a uniform analytical period. The main empirical focus of the study is 2019–2025, while earlier years are included where necessary to establish pre-pandemic baselines, trace longer-term policy development, or reflect the publication cycles and availability of official data. For example, population census data are only available for census and by-census years.

try, and governance, such as “society”, “service”, “cooperation”, etc. Chinese terms representing closely related concepts (for example, “cultivate” and “nurture”, “training” and “vocational training”) are merged to ensure consistency. Frequency results are then grouped into four categories to guide contextual reading of policy discourse.

Following the abovementioned methods, the analysis encompassing policy documents, official reports and statistics (Table 1) is designed to identify structural tension and institutional constraints, as well as how Macao’s labor governance framework shapes its capacity to pursue talent development and economic diversification.

3. RESULTS

The results are organized around the three hypotheses and draw on official statistics, policy documents, and the contextual reading of selected Policy Addresses.

3.1. Labor importation as a supplementation mechanism

Macao has been importing labor since the colonial period in the 1980s. After the handover to Chinese sovereignty, gaming liberalization in 2002 made Macao’s labor market more complex. The com-

plementarity and temporariness of non-resident workers, as well as the priority of local employment (Law No. 21/2009, 2009), are the core principles of Macao’s labor policy framework. Non-resident workers peaked at 196,538 in 2019, equivalent to 41% of the labor force. When the tourism industry came to a standstill during the pandemic, non-resident workers plummeted to a recent low in 2022 (Figure 1).

Non-resident workers can be categorized into professional, non-professional, and domestic workers. Professional non-resident workers are highly skilled or experienced professionals, but their share remained consistently low at approximately 3%, suggesting that most non-resident workers in Macao are imported to fill labor shortages (Table 2).

More findings can be drawn from industry and occupation distribution. 2023 marked the year of post-pandemic economic recovery in Macao. Non-resident workers were concentrated in labor-intensive industries such as hotels and restaurants, and construction (Table 3), with large increases in hotels and restaurants (+33.5%), transport and storage (+21.7%), manufacturing (+17.8%), and gaming and other services (+16.5%). Although little information is available regarding the hierarchical distribution of jobs held by non-resident workers, a report by the Labour Affairs Bureau (2016) showed that most non-resident workers

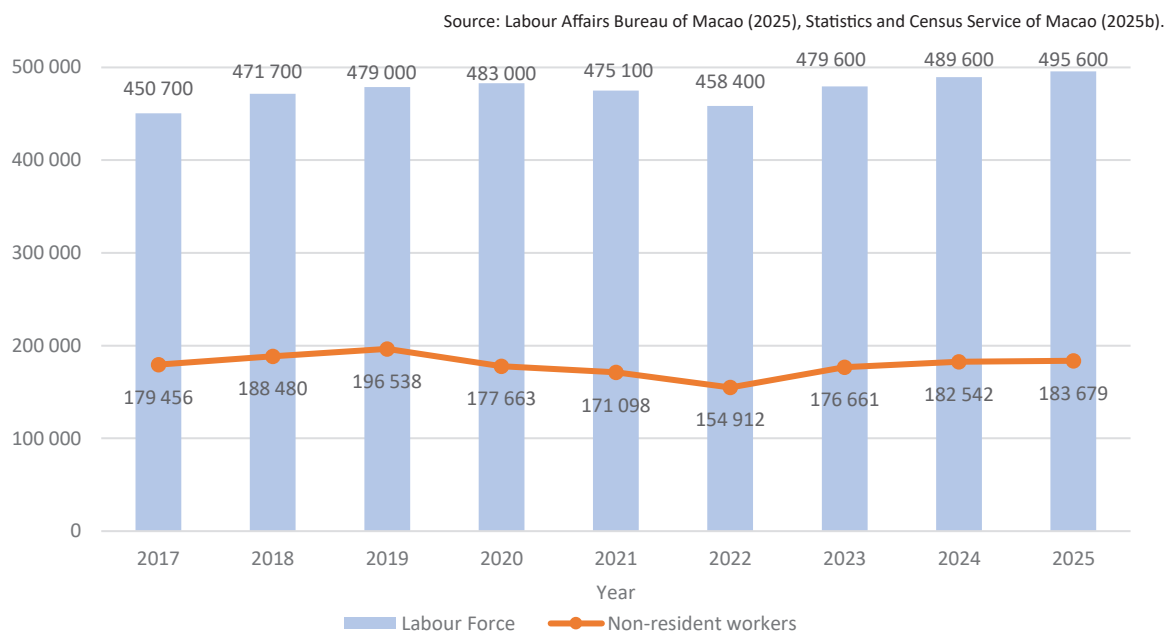


Figure 1. Labor force and non-resident workers in Macao

Table 2. Non-resident workers and unemployment statistics in Macao

Source: Labour Affairs Bureau of Macao (2025), Statistics and Census Service of Macao (2025b).

Indicator	2019	2020	2021	2022	2023	2024	2025
Total no. of non-resident workers	196,538	177,663	171,098	154,912	176,661	182,542	183,679
Non-resident workers (non-professional)	159,564	142,481	139,688	126,741	145,386	149,209	148,985
Share of total non-resident workers (%)	81.2%	80.2%	81.6%	81.8%	82.3%	81.7%	81.1%
Non-resident workers (professional)	6,468	5,777	5,377	4,987	5,518	5,898	6,083
Share of total non-resident workers (%)	3.3%	3.3%	3.1%	3.2%	3.1%	3.2%	3.3%
Domestic workers	30,506	29,405	26,033	23,184	25,757	27,435	28,611
Share of total non-resident workers (%)	15.5%	16.6%	15.2%	15.0%	14.6%	15.0%	15.6%
Unemployed population	6,800	10,300	11,500	13,900	10,000	7,000	7,200
Unemployment rate (overall)	1.7%	2.5%	2.9%	3.7%	2.7%	1.8%	1.9%
Unemployment rate (resident)	2.3%	3.6%	3.9%	4.8%	3.4%	2.4%	2.5%

were unskilled workers (31.1%), service and sales workers (29.4%), and craftsmen and similar workers (21.9%). While the number of local workers in these jobs was comparatively low (Table 4), this finding further supports the interpretation that non-resident workers are mainly imported to make up for insufficient labor in Macao. However, updated data on the occupational hierarchy of non-resident workers are not available. Therefore, Table 4 is used only as indicative background evidence instead of a direct description of the present occupational structure.

The above findings support the hypothesis that Macao's non-resident worker system remains large in scale but serves a supplementary function (Hypothesis 1). Non-resident workers peaked in 2019 but were followed by a sharp drop during COVID-19. The fast rebound after the pandemic suggests the structural importance of non-resident workers in Macao's labor market. However, the persistently low share of professional workers of 3% reveals a quantity-oriented regime instead of a strategically designed mechanism to optimize the labor force structure.

Table 3. Non-resident workers by category and industry

Source: Labour Affairs Bureau of Macao (2023).

Industry	2022			2023			Difference (%)
	Total	Non-professional workers	Professional workers	Total	Non-professional workers	Professional workers	Total
Agriculture, Fishing, Mining & Quarrying	422	422	0	472	472	0	11.8
Manufacturing	4,419	4,334	85	5,207	5,115	92	17.8
Electricity, Gas & Water Supply	83	43	40	85	46	39	2.4
Construction	29,297	28,889	408	30,209	29,774	435	3.1
Wholesale & Retail Trade	19,317	19,098	219	20,554	20,349	205	6.4
Hotels, Restaurants & Similar Activities	36,992	36,576	416	49,387	48,875	512	33.5
Transport, Storage & Communications	4,006	3,778	228	4,877	4,593	284	21.7
Financial Intermediation	949	576	373	983	515	468	3.6
Real Estate & Business Activities	21,450	21,028	422	22,624	22,174	450	5.5
Public Administration & Social Security	212	0	212	203	0	203	-4.2
Education	3,050	1,427	1,623	3,326	1,530	1,796	9.0
Health & Social Welfare	2,984	2,714	270	3,023	2,747	276	1.3
Recreational, Cultural, Gaming & Other Services	8,547	7,856	691	9,954	9,196	758	16.5
International Organization or Overseas Offices	0	0	0	0	0	0	0.0
Subtotal	131,728	126,741	4,987	150,904	145,386	5,518	14.6
Domestic Work	23,184	N/A	N/A	25,757	N/A	N/A	11.1
Total	154,912	N/A	N/A	176,661	N/A	N/A	14.0

Table 4. Non-resident workers and locally employed residents by occupations

Source: Statistics and Census Service of Macao (2017a), Labour Affairs Bureau of Macao (2016).

	Occupation	Non-resident Workers	Local Employed Residents
1	Association leaders, company directors, and managers	2,715	21,900
2	Professionals	1,901	14,600
3	Technicians and associate professionals	9,164	37,100
4	Clerks	14,125	95,400
5	Service and sales workers	52,292	50,100
6	Skilled agricultural and fishery workers	1,067	N/A
7	Craftsmen and similar workers	38,826	17,200
8	Plant and machine operators, drivers, and assemblers	2,358	14,900
9	Unskilled workers	55,190	24,800

3.2. Delayed and fragmented talent policy development

Macao's talent-related policies have come a long way in their development. The colonial government recognized the importance of investors and high-quality talent before the 1999 handover to China. Eligible investors and professionals may apply for temporary residency (Decree Law No. 14/95/M, 1995). However, the investment and technical immigration scandal uncovered in mid-2018 was found to involve bribery, forged documents, and public power abuse (Commission Against Corruption of Macao, 2018), leading to a sharp drop in approvals (Table 5).

In fact, there have been concerns about the migration system in the local community. In a three-month consultation on the Population Policy Framework in December 2012, "optimizing the migration mechanism" was most frequently mentioned among the 2,102 opinions collected. There were also concerns about diminishing residents' welfare or hindering locals' career opportunities (Policy Research Office of Macao, 2013). The Macao Population Policy Research Report was finally released in 2015 without mentioning any new policies in professional or technical migration.

A new talent recruitment initiative did not emerge until eight years later. The government established a new talent recruitment system in 2023 to opti-

Table 5. Residency applications and approvals based on major investment and technical qualifications

Source: Commerce and Investment Promotion Institute of Macao (2023).

	Major investment			Technical qualifications		
	Applications	No. of approved cases	No. of persons approved	Applications	No. of approved cases	No. of persons approved
2008	20	22	63	596	618	938
2009	31	17	34	753	549	836
2010	36	22	41	542	538	847
2011	65	10	18	490	412	643
2012	84	8	18	540	240	382
2013	105	41	83	587	251	453
2014	80	45	104	436	277	506
2015	79	7	14	482	81	150
2016	24	4	11	305	99	209
2017	23	10	24	308	231	412
2018	11	2	7	232	25	51
2019	3	0	0	111	13	32
2020	6	0	0	88	6	7
2021	1	0	0	74	1	2
2022	0	0	0	24	5	7
2023	0	0	0	16	35	68

Note: Approved cases include applications from previous years.

mize population structure and to attract professionals to support the development of the 1+4 industries. The 1+4 strategy was first set out in the Chief Executive's 2023 Policy Address (Macao Special Administrative Region Government, 2022) and later incorporated in the *Development Plan for Appropriate Economic Diversification of the Macao Special Administrative Region (2024-2028)* (Macao Special Administrative Region Government, 2023). "1" refers to the diversified development of integrated tourism; "4" refers to the development of four major industries, namely *traditional Chinese medicine and big health, modern financial services, high technology, and convention, exhibition, trade, culture and sports*.

The talent recruitment system is open to three levels of talent, namely *high-end talents, outstand-*

ing talents, and advanced professionals (Talent Development Committee of Macao, n.d.a). The second phase was extended to fresh bachelor's degree graduates from renowned universities, as well as non-local graduates with excellent grades from specific key-industry-related programs offered by local universities. However, the talent recruitment system does not provide a transition pathway for professional non-resident workers, even though they contribute their expertise and experience to local industries. The Talent Development Committee adopts very detailed scoring lists to evaluate the applications, but information on approvals is limited. No public statistics are available, but the Chief Executive revealed that in the first two phases, 750 people were approved (Aomen Ribao, 2025).

Table 6. Further education situation of Macao and Hong Kong secondary education graduates

Source: Education and Youth Development Bureau of Macao (2024), Education Bureau of Hong Kong (2024).

Region	Indicator	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Macao	Rate of further education ⁽¹⁾	96.7%	96.6%	96.6%	98.3%	97.9%	98.3%
	Rate of university education ⁽²⁾	93.9%	93.0%	95.3%	96.4%	96.8%	97.3%
Hong Kong	Rate of full-time education ⁽³⁾ of which:	92.0%	93.9%	93.7%	93.7%	94.3%	94.5%
	Bachelor's degree or higher education courses ⁽⁴⁾	78.3%	78.8%	79.8%	79.0%	79.6%	82.2%

Note: (1) Rate of graduates admitted to higher education courses. (2) Rate of graduates admitted to higher diploma or bachelor's programs. (3) Covering Form 6 graduates who replied to the survey. (4) Including bachelor's degree, associate degree, and higher diploma courses.

Source: Statistics and Census Service of Macao (2012, 2017b, 2022).

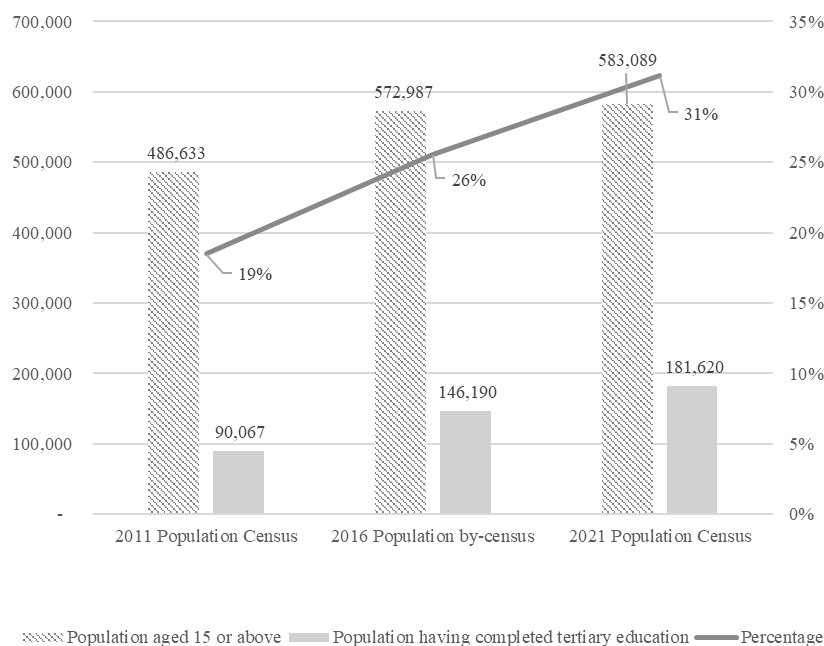


Figure 2. Population with a tertiary education level in Macao

As for nurturing local talent, the government invested substantially in education to provide adequate opportunities. Compared with neighboring Hong Kong, reported further-study rates were higher in Macao than in Hong Kong (Table 6). Proactive education policies have accelerated the educational level of Macao's population. Residents aged fifteen and above with tertiary education level have increased from 19% in 2011 to 31% in 2021 (Figure 2).

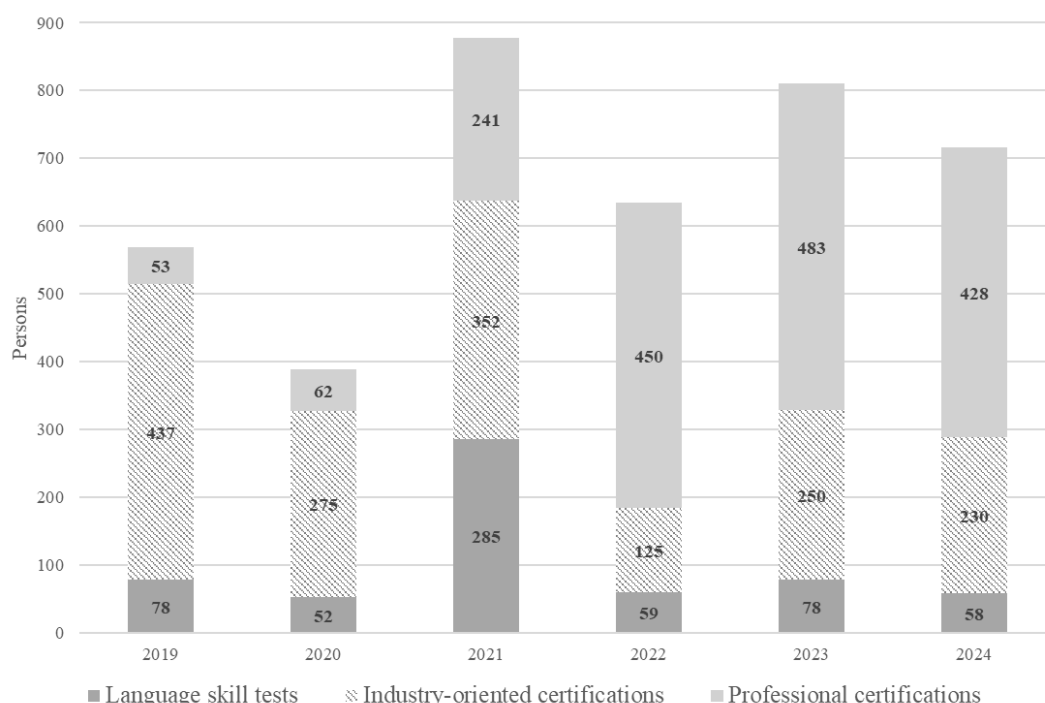
When looking at new labor market entrants, 88% of degree course graduates surveyed are employed and consider their jobs as related to their university majors. However, nearly 55% of the respondents earned less than MOP20,000 (USD1≈MOP8, i.e., the median monthly earnings of employed residents) on average in the past six months. Although nearly 90% of the respondents work in Macao, 10% are employed in other countries or regions (Education and Youth Development Bureau of Macao, 2021).

Apart from formal education, the Macao government has rolled out a continuing education

subsidy scheme since 2011 to subsidize residents aged 15 or above. The Talent Development Committee also launched a program in 2017 to provide a cash reward to residents who passed an examination listed in the reward catalogue (Talent Development Committee of Macao, n.d.b). The reward program covered vocational skills initially but extended to more professional qualifications in modern finance and new technologies to align with the development of new industries. In recent years, the number of residents obtaining professional certifications represented over 50% of the recipients (Figure 3).

These findings indicate that Macao's talent recruitment policy developed late and remains limited in scale. The focus of talent policy has shifted towards local human capital nurturing in response to public aspirations, but fragmented policies support the hypothesis that administrative efforts remain insufficiently coordinated (Hypothesis 2). Also, the relatively low earnings of new graduates suggest that investment in local talent has not fully translated into stronger early-career earnings.

Source: Talent Development Committee of Macao (n.d.b).



Note: Industry-oriented certifications mainly cover vocational skills, while professional certifications are mostly related to finance and information technology.

Figure 3. Reward recipients of the talent training and certification incentive plan

3.3. Human capital pressure and diversification constraints

A 2014 report anticipated that Macao would become an aged society in 2021 and a super-aged society in 2031 (Table 7) (Statistics and Census Service of Macao, 2014). Actual demographic statistics (Table 8) show that people aged 65 or above accounted for 14.0% of the total population in 2023, meaning that Macao reached the threshold of an aged society. Excluding non-resident workers and non-local students, the corresponding proportion was even higher (16.7%). Meanwhile, the number of newborns has declined to a new low in 2025, representing a sharp year-on-year decrease of 20.4% (Aomen Ribao, 2026). Population ageing may further aggravate labor shortages.

In a broader regional context, the Outline Development Plan for Guangdong-Hong Kong-Macao Greater Bay Area in 2019 and the Master Plan of the Development of the Guangdong-Macao Intensive Cooperation Zone in Hengqin

in 2021 provide the basis for deeper integration with mainland China. Most GBA cities, as well as Hengqin, have introduced competitive measures to attract talent, such as subsidies, housing guarantees, household (hukou) policies, research or start-up funds (Chen et al., 2016). Regional integration may also lead to talent competition with nearby cities.

As for the local economic context, the government has been trying to diversify the economy. In 2023, value added of the gaming sector and the non-gaming industries accounted for 38.3% and 61.7% of the industrial structure, respectively (Table 9). However, the 2024 diversification report (Statistics and Census Service of Macao, 2024) did not provide a detailed sectoral distribution of the economic structure, only noting that the gaming industry represented 43.3% of it, i.e., a year-on-year increase of 5 percentage points. The rise in the share of the gaming sector indicates that the progress of economic diversification remains uncertain.

Table 7. Population ageing in selected countries/regions

Source: Statistics and Census Service of Macao (2014).

Country/Region	Year in which the senior population reaches a relevant percentage		Years needed from 7% to 14%	Year in which the senior population reaches 20% of the total (Super-aged society)	Years needed from 14% to 20%
	7% (Ageing society)	14% (Aged society)			
Macao SAR	1981	2021	40	2031	10
HK SAR	1983	2013	30	2023	10
Taiwan	1993	2018	25	2025	8
Singapore	1994	2016	22	2025	9
Korea	2000	2017	17	2026	9
Japan	1970	1994	24	2005	11
China	2001	2026	25	2036	10
United States	1942	2015	73	2034	19
United Kingdom	1930	1975	45	2026	51
France	1864	1979	115	2020	41

Table 8. Total population, senior population, and newborn babies in Macao

Source: Statistics and Census Service of Macao (2025a).

Indicator	2019	2020	2021	2022	2023	2024
Year-end population	679,600	683,100	683,200	672,800	683,700	688,300
Year-end local population	555,000	564,100	570,100	570,700	571,200	568,700
Senior population aged 65 or above	80,800	83,600	83,200	89,400	95,600	100,200
Newborn babies	5,979	5,545	5,026	4,344	3,712	3,607
Percentage of senior population	11.9%	12.2%	12.2%	13.3%	14.0%	14.6%
Percentage of senior population excluding non-resident workers and foreign students residing in Macao	14.6%	14.8%	14.6%	15.7%	16.7%	17.6%
Birth rate	8.9‰	8.1‰	7.4‰	6.4‰	5.5‰	5.3‰

Table 9. Value added of the gaming sector and non-gaming industries at producers' prices and industrial structure

Source: Statistics and Census Service of Macao (2023, 2024).

Year	Value added of gaming sector (Billion MOP)	Structure (%)	Value added of non-gaming industries (Billion MOP)	Structure (%)
2019	222.5	51.2	212.2	48.8
2020	41.8	21.2	155.7	78.8
2021	63.5	25.9	181.9	74.1
2022	29.8	14.7	172.5	85.3
2023	136.9	38.3	220.7	61.7
2024	166.7	43.3	N/A	N/A

Note: The 2024 diversification report suggests that the sum of direct economic benefits of the industries should not be compared with the industrial structure due to the interconnected, synergistic, and overlapping nature of economic benefits across industries (Statistics and Census Service of Macao, 2024). While it reports that the gaming sector accounted for 43.3% of the industrial structure in 2024, a complete sectoral breakdown of the industrial structure is not provided, and the corresponding value and share of non-gaming industries are not available.

As an annual speech given by the head of the city to announce key directions and measures, the policy address is an important channel to share the strategic plan with the public (Lam, 2025). Using the word frequency analysis function of ROST CM6.0 to process the policy address of five benchmark years, core terms related to the concepts of governance, labor, talent, and industry are identified (Appendix A) to help understand how talent-related issues are framed in official discourse. The most frequently occurring governance-related terms include “Basic Law”, “Macao people governing Macao”, and “integrity”. Talent-related terms like “education”, “training”, “nurture”, and labor-related terms like “employment” and “human resources” record higher frequencies throughout the years, but terms like “importing labor” and “non-resident workers” show lower frequencies. Also, the policy goal term “appropriate economic diversification” records higher frequencies in more recent documents. The core terms are then used to guide the contextual reading to examine how talent-related issues are framed in general policy discourse. Original content from the policy address (Appendix B) indicates that the government has been making constant efforts to nurture local talent through education or training. Local employment has been reiterated as a priority, whereas content related to non-resident workers and imported talent appears in a more limited (with words like “an adequate number”, “fine-tune”, “control” and “adjust”) and cautious manner (in connection with “economic diversification” and “resident employment priority”). While the need for economic diversification is acknowledged, recent policy discourse often links it with the context of the GBA and Hengqin.

Taken together, although the government has strived to nurture local talent and realized the importance of imported talent for economic development, ageing, low birth rates, and regional talent competition indicate tightening labor constraints. The post-pandemic rebound of the gaming sector reflects that the progress of economic diversification remains uncertain. This finding supports Hypothesis 3 by showing that integrating labor importation, local human capital development, and talent recruitment would strengthen policy capacity for economic diversification.

4. DISCUSSION

The findings show that Macao's labor importation, talent policy, and diversification should not be treated as separate policy fields. This study aims to show how a labor importation regime that solves short-term labor shortages may also narrow the policy space for long-term talent governance.

The first finding is consistent with studies that identified migrant labor as a response to labor shortages (Meardi et al., 2012; Miracle & Berry, 1970), while highlighting its association with administrative governance and social tension (Clayton, 2019; Leung, 2004; Yu & Tam, 2016). Macao's non-resident worker system has supported labor supply in service-related sectors. However, the low share of non-resident professional workers suggests that non-resident workers in Macao serve as temporary labor supplementation rather than long-term talent.

Unlike Macao, Singapore provides a context in which residents regard foreign talent as important to prosperity, and foreign professionals often perceive themselves as welcome (Kuptsch & Pang, 2006). Macao's large number of non-resident workers may trigger public grievances over wage pressures and limited employment opportunities for local people, despite the government's emphasis on prioritizing residents' employment. Research on the social identity of non-resident workers in Macao reveals that locals generally hold a negative view towards them, and their identity as outsiders is constantly reinforced through daily social interactions (Ju & Sandel, 2019). The dissatisfaction of local people may impede the government's pace in implementing proactive talent recruitment policies so as not to risk social stability. Instead, local talent cultivation is emphasized, resulting in a policy trade-off and the late introduction of the talent recruitment system in 2023.

Although developing local talent is in line with existing literature that links skills and education to long-term growth (Hanushek, 2013; Mincer, 1984; Pelinescu, 2015), the second finding reflects that efforts in local talent development are limited by narrow industrial structures and few career choices in a small economy dominated by a single industry, such as Macao. Human capital development needs to be accompanied by industrial upgrading.

While previous studies highlighted the importance of diversification (Vinnicombe & Sou, 2014; Zhang & Kwan, 2009), the third finding emphasizes that a sustainable and long-term talent base is crucial to economic diversification because skilled professionals can positively affect innovation capacity (Atanguegnima et al., 2024). Macao's demographic challenges in population ageing indicate that local labor supply will shrink in the long run. To attain the policy goal of economic diversification, the government needs to foster an open and welcoming attitude towards incoming skilled and innovative professionals.

Also, the absence of a mechanism coordinating labor importation, talent recruitment, human capital development and return migration may limit the policy capacity for long-term talent development. While labor importation and talent recruitment are handled by separate administrative bodies in Macao, there is no well-established route for professional non-resident workers to be incorporated into Macao's longer-term talent base. Given their sector-specific expertise and experience, professional non-resident workers are potential human capital to drive further economic development and diversification.

Therefore, labor importation, talent development, and economic diversification are not separate policy fields. They are, instead, interconnected dimensions of the same governance problem. The study finds that short-term labor importation in Macao may narrow the policy space for long-term talent governance through various constraints, including public concern over employment and wage pressure, the institutional priority given to resident employment, the administrative separation between labor importation and talent recruitment, the low professional share within the non-resident worker system, and the absence of clear conversion routes for professional non-resident workers to become part of Macao's long-term talent base.

For small, open economies relying on a single industry and foreign labor like Macao, an open and inclusive talent policy should be developed to attract professional and innovative talent. The focus should be shifted from short-term labor supplementation to long-term human capital building. A more diversified market could provide broader career opportunities for locally educated graduates and returning Macao residents, thereby strengthening long-term human capital formation and sustainable economic development.

CONCLUSION

This study examines how Macao's long-standing labor importation system has shaped talent policy and constrained economic diversification. The findings show that the labor importation system in Macao remains large in scale but is primarily designed as a supplementary labor mechanism, with professional non-resident workers accounting for only a small share of the total. The study also finds that Macao's talent recruitment system was introduced relatively late and has developed separately from the labor im-

portation regime. Efforts in local human capital development were limited by labor-market absorption capacity. These findings suggest that the key policy dilemma lies not only in labor shortages but also in the weak institutional integration among labor importation, local talent cultivation, talent recruitment, and industrial diversification.

The Macao case further implies that small and open economies relying on imported labor and a single industry should not only evaluate labor governance by its capacity to fill immediate labor shortages but also assess whether it supports long-term human capital formation and structural transformation. A more integrated talent policy package linking professional non-resident workers, local graduates, returnees, and external talent may better support emerging industries and reduce dependence on a single dominant sector.

AUTHOR CONTRIBUTIONS

Conceptualization: Wai Cheung, Judy Wai-Teng Wong.
 Data curation: Wai Cheung.
 Formal analysis: Wai Cheung.
 Investigation: Wai Cheung.
 Methodology: Judy Wai-Teng Wong.
 Resources: Wai Cheung, Judy Wai-Teng Wong.
 Validation: Judy Wai-Teng Wong.
 Visualization: Wai Cheung.
 Writing – original draft: Wai Cheung, Judy Wai-Teng Wong.
 Writing – review & editing: Judy Wai-Teng Wong.

DATA AVAILABILITY STATEMENT

The supplementary dataset compiled for this study is based on publicly available official statistics, government documents, and policy reports cited in the reference list. The compiled dataset has not been used in any previous publication by the authors. The dataset is available from the corresponding author upon reasonable request.

REFERENCES

1. Aomen Ribao. (2025, August 1). *Macao tends to launch the third phase of talent recruitment* [Newspaper article in Chinese]. Retrieved from https://www.macaodaily.com/html/2025-08/01/content_1848447.htm
2. Aomen Ribao. (2026, January 2). *Two baby boys born at two hospitals early on New Year's Day* [Newspaper article in Chinese]. Retrieved from https://www.macaodaily.com/html/2026-01/02/content_1880948.htm
3. Atanguegnima, D., Boubtane, E., & Sodokin, K. (2024). Immigration, migrant international cash transfers, backward-externality of emigrant human capital, and total factor productivity in Africa. *Applied Economics*, 56(41), 4908-4924. <https://doi.org/10.1080/00036846.2023.2227415>
4. Backman, M., Lopez, E., & Rowe, F. (2021). The occupational trajectories and outcomes of forced migrants in Sweden. Entrepreneurship, employment or persistent inactivity? *Small Business Economics*, 56(3), 963-983. <https://doi.org/10.1007/s11187-019-00312-z>
5. Ball, S. J. (1993). What is policy? Texts, trajectories and toolboxes. *Discourse: Studies in the Cultural Politics of Education*, 13(2), 10-17. <https://doi.org/10.1080/0159630930130203>
6. Bird, A., & Beechler, S. (1995). Links between business strategy and human resource management strategy in U.S.-based Japanese subsidiaries: An empirical investigation. *Journal of International Business Studies*, 26(1), 23-46. <https://doi.org/10.1057/palgrave.jibs.8490164>
7. Borjas, G. J. (1995). The economic benefits from immigration. *Journal of Economic Perspectives*, 9(2), 3-22. <https://doi.org/10.1257/jep.9.2.3>
8. Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40. <https://doi.org/10.3316/QRJ0902027>

9. Brucker Juricic, B., Galic, M., & Marenjak, S. (2021). Review of the construction labour demand and shortages in the EU. *Buildings*, 11(1), 17. <https://doi.org/10.3390/buildings11010017>
10. Caviggioli, F., Jensen, P., & Scellato, G. (2020). Highly skilled migrants and technological diversification in the US and Europe. *Technological Forecasting and Social Change*, 154, 119951. <https://doi.org/10.1016/j.techfore.2020.119951>
11. Chen, Z., Zhang, S., Zhang, Q., & He, F. (2016). *Macao's talent policies in comparative perspective: Evidence from the Guangdong-Hong Kong-Macao Greater Bay Area* [in Chinese]. Macau Development Strategy Research Centre. Retrieved from <https://www.cdqq.gov.mo/zh-hant/research/other-research-talent-development/>
12. Choi, A. H. (2006). Migrant workers in Macao: Labour and globalization. In *Transnational migration and work in Asia* (pp. 144-164). Routledge. Retrieved from <https://library.oapen.org/bitstream/handle/20.50-0.12657/103083/9781134204090.pdf?sequence=1#page=159>
13. Choi, F., Hon, C. T., Mao, Y. H., & Lai, I. K. W. (2019). Sustainable development for small economy and diversification from a dominant industry: Evidence from Macao. *Sustainability*, 11(6), 1626. <https://doi.org/10.3390/su11061626>
14. Clayton, C. H. (2019). Multi-ethnic Macao: From global village to migrant metropolis. *Social Transformations in Chinese Societies*, 15(2), 145-160. <https://doi.org/10.1108/STICS-01-2019-0003>
15. Commerce and Investment Promotion Institute of Macao. (2023). *Data of temporary residency application*. Retrieved from <https://www.ipim.gov.mo/en/about-ipim/temporary-residency/news/statistics/>
16. Commission Against Corruption of Macao. (2018). *Investigation report on the vetting and approval of significant investment immigration and technical immigration by the Commerce and Investment Promotion Institute*. (In Chinese). Retrieved from https://www.ccac.org.mo/cn/news/rpt20180702_cn.pdf
17. Cui, C., Wang, Y., & Wang, Q. (2022). The interregional migration of human capital: The case of "first-class" university graduates in China. *Applied Spatial Analysis and Policy*, 15(2), 397-419. <https://doi.org/10.1007/s12061-021-09401-7>
18. Legal Affairs Bureau of the Macao Special Administrative Region Government. (1995). *Decree Law No. 14/95/M, Investment, managerial, and technical immigration scheme*. (In Chinese) Retrieved from https://bo.dsaj.gov.mo/bo/i/95/13/declei14_cn.asp
19. Docquier, F., & Rapoport, H. (2012). Globalization, brain drain, and development. *Journal of Economic Literature*, 50(3), 681-730. <https://doi.org/10.1257/jel.50.3.681>
20. Dustmann, C., Schönberg, U., & Stuhler, J. (2016). The impact of immigration: Why do studies reach such different results? *Journal of Economic Perspectives*, 30(4), 31-56. <https://doi.org/10.1257/jep.30.4.31>
21. Education and Youth Development Bureau of Macao. (2021). *Three-year post-graduation employment survey of Macao tertiary graduates*. (In Chinese). Retrieved from https://portal.dsedj.gov.mo/webdsejspace/internet/Inter_main_page.jsp?id=8493&ts=T&langsel=C&
22. Education and Youth Development Bureau of Macao. (2024). *Overview of educational statistics 2019-2024*. Retrieved from https://portal.dsedj.gov.mo/webdsejspace/internet/Inter_main_page.jsp?id=85814&langsel=E&
23. Education Bureau of Hong Kong. (2024). *Report on secondary 6 students' pathway survey 2019-2024*. Retrieved from https://www.edb.gov.hk/en/about-edb/publications-stat/figures/index_2.html
24. Glaessel-Brown, E. E. (1998). Use of immigration policy to manage nursing shortages. *Image: The Journal of Nursing Scholarship*, 30(4), 323-327. <https://doi.org/10.1111/j.1547-5069.1998.tb01327.x>
25. Hanushek, E. A. (2013). Economic growth in developing countries: The role of human capital. *Economics of Education Review*, 37, 204-212. <https://doi.org/10.1016/j.econedurev.2013.04.005>
26. Heinen, J. S., & O'Neill, C. (2004). Managing talent to maximize performance. *Employment Relations Today*, 31(2), 67. <https://doi.org/10.1002/ert.20018>
27. Howe, M. J. A., Davidson, J. W., & Sloboda, J. A. (1998). Innate talents: Reality or myth?. *Behavioral and Brain Sciences*, 21(3), 399-407. <https://doi.org/10.1017/S0140525X9800123X>
28. Human Rights Committee. (2022). *Concluding observations on the second periodic report on the implementation of International Covenant on Civil and Political Rights of Macao, China*. Retrieved from https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=CCPR%2FCD%2FCHN-MAC%2FCO%2F2&Lang=en
29. Ju, B., & Sandel, T. L. (2019). Adaptation of Mainland Chinese labour migrants in Macao. *Journal of Intercultural Communication Research*, 48(3), 257-273. <https://doi.org/10.1080/17475759.2019.1611624>
30. Kuptsch, C., & Pang, E. F. (Eds.). (2006). *Competing for global talent*. International Institute for Labour Studies. Retrieved from <https://researchrepository.ilo.org/esploro/outputs/book/Competing-for-global-talent/995264819602676>
31. Labour Affairs Bureau of Macao. (2016). *Overview of non-resident workers*. (In Chinese). Retrieved from https://web.archive.org/web/20240615073433/https://www.dsal.gov.mo/download/pdf/publicity_information/nonresident_workers/nonresidentworkers.pdf
32. Labour Affairs Bureau of Macao. (2023). *Macao labour market*

- report. (In Chinese). Retrieved from https://web.archive.org/web/20250805032321/https://www.dsal.gov.mo/download/pdf/publicity_information/labor_market/2023.pdf
33. Labour Affairs Bureau of Macao. (2025). *Non-resident workers statistics 2019–2025*. Retrieved from https://www.dsal.gov.mo/en/standard/download_statistics/folder/root.html
 34. Lam, P. (2025). “Telling the good stories of Hong Kong” through the political speech of policy address. In *Unlearning Languages that Control the Mind* (pp. 110-126). Routledge. Retrieved from <https://research.polyu.edu.hk/en/publications/telling-the-good-stories-of-hong-kong-through-the-political-speech/>
 35. Law No. 21/2009. (2009). *Law for the Employment of Non-Resident Workers*. Retrieved from https://www.dsal.gov.mo/download/pdf/en/dsallawc/Law_No.21_2009.pdf
 36. Leung, K. Y. (2004). Living conditions and social exclusion of migrant workers in Macao [in Chinese]. *Journal of Macau Studies*, 10, 155-162. Retrieved from <https://www.macaudata.mo/periodical/detail?periodicalId=31&periodicalNo=24>
 37. Li, J. (2014). Human resources in Macau: Scale, quality and structure [in Chinese]. *Journal of Macau Studies*, 3, 49-56. Retrieved from <https://www.macaudata.mo/showbook?bno=j360075>
 38. Li, S., & Hong, C. (2024). The evolution, experience, and implications of Singapore’s development as a global talent hub. *Zhongguo Gaodeng Jiaoyu*, (Z3), 76-80. (In Chinese). Retrieved from <https://zgkj.cbpt.cnki.net/WKG/WebPublication/wkTextContent.aspx?colType=4&yt=2024&st=Z3>
 39. Macao Special Administrative Region Government. (2000). *Policy address 2000*. (In Chinese). Retrieved from https://www.gov.mo/zh-hant/wp-content/uploads/sites/4/2017/11/cn2000_policy.pdf
 40. Macao Special Administrative Region Government. (2002). *Policy address 2003*. (In Chinese)]. Retrieved from https://www.gov.mo/zh-hant/wp-content/uploads/sites/4/2017/11/2003_policy_cn.pdf
 41. Macao Special Administrative Region Government. (2005). *Policy address 2006*. (In Chinese). Macao Special Administrative Region Government. Retrieved from https://www.gov.mo/zh-hant/wp-content/uploads/sites/4/2017/11/cn2006_policy2.pdf
 42. Macao Special Administrative Region Government. (2012). *Policy address 2013*. (In Chinese). Retrieved from https://www.gov.mo/zh-hant/wp-content/uploads/sites/4/2017/10/cn2013_copies.pdf
 43. Macao Special Administrative Region Government. (2018). *Policy address 2019*. (In Chinese). Retrieved from https://www.gov.mo/zh-hant/wp-content/uploads/sites/4/2018/11/2019_policy_cn.pdf
 44. Macao Special Administrative Region Government. (2022). *Policy address 2023*. (In Chinese). Retrieved from https://www.gov.mo/zh-hant/wp-content/uploads/sites/4/2022/11/2023_policy_c.pdf
 45. Macao Special Administrative Region Government. (2023). *Development plan for appropriate economic diversification of the Macao Special Administrative Region (2024–2028)*. Retrieved from https://www.dsepd.gov.mo/uploads/attachment/2024-03/e-book_E.pdf
 46. McCartney, G., & Weng In, W. L. (2016). House of cards – An analysis of Macao’s resident support for tourism and casino development. *Tourism and Hospitality Research*, 16(2), 144-157. <https://doi.org/10.1177/1467358415600215>
 47. McGovern, P. (2012). Inequalities in the (de-)commodification of labour: Immigration, the nation state, and labour market stratification. *Sociology Compass*, 6(6), 485-498. <https://doi.org/10.1111/j.1751-9020.2012.00470.x>
 48. Meardi, G., Martín, A., & Riera, M. L. (2012). Constructing uncertainty: Unions and migrant labour in construction in Spain and the UK. *Journal of Industrial Relations*, 54(1), 5-21. <https://doi.org/10.1177/0022185611432388>
 49. Mendoza, C. (2023). International immigration and entrepreneurship in rural areas of the Spanish Pyrenees. *Hungarian Geographical Bulletin*, 72(2), 119-131. <https://doi.org/10.15201/hungeobull.72.2.2>
 50. Michailova, S., & Ott, D. L. (2019). Talent management in small advanced economies. In S. Michailova & D. L. Ott (Eds.), *Talent Management in Small Advanced Economies* (pp. 51-75). Emerald Publishing Limited. <https://doi.org/10.1108/978-1-78973-449-220191005>
 51. Mincer, J. (1984). Human capital and economic growth. *Economics of Education Review*, 3(3), 195-205. [https://doi.org/10.1016/0272-7757\(84\)90032-3](https://doi.org/10.1016/0272-7757(84)90032-3)
 52. Miracle, M. P., & Berry, S. S. (1970). Migrant labour and economic development. *Oxford Economic Papers*, 22(1), 86-108. <https://doi.org/10.1093/oxford-journals.oep.a041154>
 53. Omanović, V., Tarim, E., & Holck, L. (2022). Practices of organizing migrants’ integration into the European labour market. *European Management Review*, 19(2), 173-184. <https://doi.org/10.1111/emre.12533>
 54. Pelinescu, E. (2015). The impact of human capital on economic growth. *Procedia Economics and Finance*, 22, 184-190. [https://doi.org/10.1016/S2212-5671\(15\)00258-0](https://doi.org/10.1016/S2212-5671(15)00258-0)
 55. Policy Research Office of Macao. (2013). *Consultation report and collected opinions on the population policy framework of the Macao SAR*. (In Chinese). Retrieved from <https://www.dsepd.gov.mo/zh-hant/download?page=5>
 56. Roberts, J. L. (2008). Talent development: A ‘must’ for a promising future. *Phi Delta Kappan*, 89(7), 501-506. <https://doi.org/10.1177/003172170808900710>
 57. Romer, P. M. (1990). Endogenous technological change. *Journal of*

- Political Economy*, 98(5), S71-S102. Retrieved from <http://www.jstor.org/stable/2937632>
58. Rye, J. F., & Scott, S. (2018). International labour migration and food production in rural Europe: A review of the evidence. *Sociologia Ruralis*, 58(4), 928-952. <https://doi.org/10.1111/soru.12208>
 59. Statistics and Census Service of Macao. (2003). *Tourism statistics 2002*. Retrieved from <https://www.dsec.gov.mo/en-US/Statistic?id=401>
 60. Statistics and Census Service of Macao. (2012). *Population census 2011*. Retrieved from https://www.dsec.gov.mo/getAttachment/7a3b17c2-22cc-4197-9bd5-ccc6eec388a2/E_CEN_PUB_2011_Y.aspx
 61. Statistics and Census Service of Macao. (2014). *Trends and challenges of population ageing*. (In Chinese). Retrieved from <https://www.dsec.gov.mo/getAttachment/f5ecd4bb4-ad4e-47fb-9937-98850909b844/pdf1.aspx?disposition=attachment>
 62. Statistics and Census Service of Macao. (2017a). *Employment survey 2016*. Retrieved from https://www.dsec.gov.mo/getAttachment/39e853e3-0555-4e7c-bea0-36c8501b8906/E_IE_PUB_2016_Y.aspx
 63. Statistics and Census Service of Macao. (2017b). *Population by-census 2016*. Retrieved from https://www.dsec.gov.mo/getAttachment/e20c6bab-ada4-4f83-9349-e72605674a42/E_ICEN_PUB_2016_Y.aspx
 64. Statistics and Census Service of Macao. (2021). *Gross domestic product 2020*. Retrieved from https://www.dsec.gov.mo/getAttachment/dc6a398e-3f7a-4b69-a271-2615dd84eaa9/C_PIB_PUB_2020_Y.aspx
 65. Statistics and Census Service of Macao. (2022). *Population census 2021*. Retrieved from https://www.dsec.gov.mo/getAttachment/6cb29f2f-524a-488f-aed3-4d7207bb109e/E_CEN_PUB_2021_Y.aspx
 66. Statistics and Census Service of Macao. (2023). *Analysis report of statistical indicator system for moderate economic diversification of Macao 2023*. Retrieved from <https://www.dsec.gov.mo/en-US/Home/Publication/SIED>
 67. Statistics and Census Service of Macao. (2024). *Analysis report of statistical indicator system for moderate economic diversification of Macao 2024*. Retrieved from <https://www.dsec.gov.mo/en-US/Home/Publication/SIED>
 68. Statistics and Census Service of Macao. (2025a). *Demographics statistics 2017-2025*. Retrieved from <https://www.dsec.gov.mo/en-US/Statistic?id=101>
 69. Statistics and Census Service of Macao. (2025b). *Employment survey 2017-2025*. Retrieved from <https://www.dsec.gov.mo/en-US/Statistic?id=301>
 70. Statistics and Census Service of Macao. (2026). *Tourism statistics 2025*. Retrieved from <https://www.dsec.gov.mo/en-US/Statistic?id=401>
 71. Talent Development Committee of Macao. (n.d.a). *Introduction and legislation of the talent recruitment system by the Macao Special Administrative Region*. Retrieved from <https://www.cdqq.gov.mo/en/talent-recruitment-system/>
 72. Talent Development Committee of Macao. (n.d.b). *Talent training and certification incentive plan*. Retrieved from <https://www.cdqq.gov.mo/en/talent-development/>
 73. The State Council of the PRC. (2010). *The national medium- and long-term talent development plan (2010-2020)*. Retrieved from http://www.moe.gov.cn/jyb_xwfb/s6052/moe_838/201006/t20100607_88754.html
 74. Tipayalai, K. (2020). Impact of international labor migration on regional economic growth in Thailand. *Journal of Economic Structures*, 9(1), 15. <https://doi.org/10.1186/s40008-020-00192-7>
 75. Valero, A., & Van Reenen, J. (2023). Embedding green industrial policy in a growth strategy for the UK. *IPPR Progressive Review*, 30(3), 175-183. <https://doi.org/10.1111/newe.12370>
 76. Vinnicombe, T., & Sou, J. P. U. (2014). Diversifying the Macao economy: Insights from profiling mainland Chinese visitors. *Journal of China Tourism Research*, 10(3), 347-362. <https://doi.org/10.1080/19388160.2013.865573>
 77. Wright, C. F., & Clibborn, S. (2019). Migrant labour and low-quality work: A persistent relationship. *Journal of Industrial Relations*, 61(2), 157-175. <https://doi.org/10.1177/0022185618824137>
 78. Yu, E. W. Y., & Tam, N. I. L. (2016). The puzzle of Macao's talent development. *Asian Education and Development Studies*, 5(4), 423-437. <https://doi.org/10.1108/AEDS-11-2015-0060>
 79. Zhang, Y., & Kwan, F. (2009). Macao's gaming-led prosperity and prospects for economic diversification. *China: An International Journal*, 07(02), 288-319. <https://doi.org/10.1142/S0219747209000363>

APPENDIX A

Table A1. Core terms from selected policy addresses

Source: Macao Special Administrative Region Government (2000, 2002, 2012, 2018, 2022).

Year	Governance-related core terms (freq.)	Labor-related core terms (freq.)	Talent-related core terms (freq.)	Industry-related core terms (freq.)
2000	public security / 治安(8) Basic Law / 基本法(8) Macao people governing Macao / 澳門治澳(5) integrity / 廉政、廉潔(5)	human resources / 人力資源(2) labor relations / 勞資關係(1) importing labor / 輸入外勞(1)	education / 教育、高等教育(11) training / 培訓、職業培訓(6) nurture / 培育、培養(3)	diversify / 多元、多元化(5) tourism / 旅遊、旅遊業(10) gaming / 博彩業(2)
2003	Basic Law / 基本法(6) Macao people governing Macao / 澳門治澳(2) integrity / 廉政(2) autonomy / 自治(2)	employment / 就業(16) professional / 專業(12) unemployment / 失業(7) human resources / 人力資源(5) labor force / 勞動力(3) employment opportunities / 就業機會(3)	education / 教育、高等教育(24) training / 培訓、職業培訓(15) talent / 人材(4) nurture / 培育、培養(4) teenager / 青少年(4)	SMEs / 中小企業、中小企(17) tourism / 旅遊(13) industrial structure / 產業結構(5) diversify / 多元、多元化(5) gaming / 博彩業(4) service industry / 服務業(3)
2013	well-being / 福祉、福利(26) Basic Law / 基本法(8) Integrity / 廉政、廉潔(5) Macao people governing Macao / 澳門治澳(2)	human resources / 人力資源(7) employment / 就業(4)	education / 教育、高等教育(40) youth / 青年、青少年(10) talent / 人才(6) nurture / 培育、培養(8) training / 培訓(3) skill / 技能、技術(6)	tourism / 旅遊(15) appropriate economic diversification / 多元、經濟適度多元(9) gaming / 博彩業、博彩(5)
2019	Basic Law / 基本法(5) integrity / 廉政(3) Macao people governing Macao / 澳門治澳(2)	employment / 就業(8) professional / 專業(5) human resources / 人力資源(5)	education / 教育、高等教育(27) youth / 青年(16) talent / 人才(14) nurture / 培養、培育、人才培養(14) training / 培訓(10)	Technology / 科技(19) tourism / 旅遊(12) SMEs / 中小企業(9) appropriate economic diversification / 多元、經濟適度多元(11) gaming / 博彩、博彩業(8) integrate / 融入、融合(8)
2023	integrity / 廉政、廉潔(6) well-being / 福利、福祉(6) e-governance / 電子政務(4)	employment / 就業(20) human resources / 人力資源(5) professional / 專業(8) employment priority / 優先就業(2) non-resident workers / 外地僱員(2) upward and horizontal mobility / 向上及橫向流動(2)	education / 教育、高等教育(27) youth / 青年、青少年(18) nurture / 培養、培育(14) talent / 人才(13) training / 培訓(10) talent recruitment / 人才引進(3)	tourism / 旅遊、旅遊業(47) pandemic / 疫情(38) finance / 金融(28) industrial development / 產業發展(16) gaming / 博彩、博彩業(14) appropriate economic diversification / 多元、產業多元、適度多元、經濟適度多元(28) SMEs / 中小企、中小企業(8) Non-gaming / 非博彩(9)

Note: The target terms were identified in Chinese. The English terms in Appendix A are translations. Each reported term was manually checked against the original Chinese policy address to verify the count and review the textual context. Relevant policy-address passages corresponding to these terms are summarized in Appendix B.

The benchmark years refer to the policy years of the selected policy addresses and the corresponding documents were published in 2000, 2002, 2012, 2018, and 2022, respectively.

APPENDIX B

Table B1. Selected passages from the policy addresses

Source: Macao Special Administrative Region Government (2000, 2002, 2012, 2018, 2022).

Area	Year	Content from the policy address
Talent	2000	"We also hope that citizens will make a greater effort in their respective sectors, and contribute to the constant raising of standards within society at large by pursuing education, training and practice" "The government should support training for its young people by allocating enough resources so as to ensure a better future for Macao"
	2003	"The government will provide sufficient resources to the education system" "We increased the financial resources allocated to vocational training to provide job seekers with training courses" "The government will work with the community to improve the training of existing and potential employees" "We must do our best to train local professionals"
	2013	"The government has continued to increase resource investment in the education industry" "The government adheres to the administrative principle of <i>letting Macao thrive through education</i>" "Nurturing local talent is the focus of the government's education policy" "The government attaches great importance to building up a talent database"
	2019	"The government will optimize the education system and invest more resources to nurture talented local people" "The government is concerned about the long-term development of young people and their real needs" "The government will optimize a long-term mechanism of talent cultivation"
	2023	"We will expedite the cultivation of local talented people, and proactively promote the return of local talents who are currently abroad" "The government will ensure that resources for education, healthcare, livelihoods and social welfare will not be reduced" "The government will speed up talent cultivation to assist the development of the MSAR"
	2000	"The government will fine tune the policy for importing labour"
Labour	2003	"Increasing Macao's employment rate continues to be a priority in the government's agenda" "Importing an adequate number of professionals is a way to satisfy the development needs of society" "We will prevent any abuses in the use of professionals that may adversely affect the employment of local people"
	2013	"The government is committed to the protection of local residents' employment rights"
	2019	"The government always prioritizes the protection of local employees' rights, sticks to the principle of importing foreign workers only to make up for inadequacies in local labour" "We will explore a mechanism to import high-calibre talented people and experts"
	2023	"MSAR government will take concrete and effective measures to respond to residents' demands; actively solve problems with employment" "The government will help young people and students to pursue employment" "The government will seek to recruit talented people with open and pragmatic attitudes, and strive to import talented people who can help facilitate adequate economic diversification in Macao" "The government also controlled the number of non-resident workers to ensure employment priority for local employees" "The government will flexibly adjust the number of non-resident workers according to the circumstances of the job market, enhance local people's competitiveness in employment...to help Macao residents with strengthening their upward or horizontal mobility in the workplace"
	2003	"Under our planned industrial structure, tourism and the gaming industry remain our development priorities" "The guiding principle of Macao's industrial structural reforms will be to highlight the strong sectors of the economy, while valuing diversity"
	2013	"The MSAR government will fully promote adequate economic diversification" "We will accelerate the pace of appropriate economic diversification...create opportunities for the better future of Macao people"
Industry	2019	"Small- and medium-sized enterprises (SMEs) are vital components for promoting adequate diversification of Macao's economy" "We will strive to attract quality business operators in the Greater Bay Area to establish bases in Macao to enhance industrial and employment diversification"
	2023	"The government made it a priority to expedite adequate economic diversification" "The two major and most pressing tasks for the economy are expediting economic recovery and promoting adequate economic diversification" "The MSAR government will adhere to the "1+4" adequate economic diversification strategy, to optimize the industrial structure" "We shall make good use of the Central People's Government's supportive policies and measures...ensure economic recovery...expedite adequate economic diversification, pragmatically facilitate the construction of the Guangdong Macao Intensive Cooperation Zone in Hengqin"