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ANALYTICS OF ACADEMIC PROGRAM DISTRIBUTION IMBALANCES BY STATE AND THEIR CONSEQUENCES FOR GRADUATE EMPLOYABILITY IN MALAYSIA (2018-2023)

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Abstract:

This study was conducted to analyze the imbalance in the distribution of academic programs by state and its implications on graduate employability in Malaysia from 2018 to 2023. The primary objective of the study is to assess whether states offering a higher number and diversity of academic programs tend to record better graduate employability rates compared to those with limited program offerings. Secondary data were obtained from official sources such as the Department of Higher Education Malaysia, the Department of Statistics Malaysia, and the MyGRAD Tracer Study. A descriptive and correlational analysis approach was applied using data on the distribution of academic programs and graduate employability rates from 2018 to 2023. The findings show a consistent positive correlation between academic program distribution and graduate employability in most years. States such as Selangor, Kuala Lumpur, and Johor recorded both a high number of academic programs and employability rates exceeding 85%. However, in 2020, a negative correlation was observed due to the COVID-19 pandemic's impact on the labor market, resulting in a decline in employability even in advanced economies. States such as Kelantan, Perlis, and Labuan recorded consistently lower employability rates throughout the study period, in line with their limited program offerings. In conclusion, the study supports the hypothesis that a balanced and strategically aligned distribution of academic programs, especially those responsive to industry needs, plays a significant role in improving graduate employability across Malaysian states.

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Keywords:

Academic Program Distribution, Graduate Employability, State Disparity, Correlation, Malaysia Higher Education

Introduction

In Malaysia's evolving higher education landscape, aligning academic program offerings with the actual demands of the job market is becoming increasingly critical. However, recent trends indicate an imbalance in the distribution of academic programs across different states. While some states offer a wide range of industry-relevant courses, others remain limited in scope and diversity. This disparity not only affects equal access to quality education but also has significant implications for graduate employability.

Such imbalances often lead to internal migration, where students and graduates move to other states in search of better educational and employment opportunities (Low, 2025; Wong & Beh, 2024). This contributes to uneven regional development in terms of human capital and in the long run, may hinder the country's ability to build a skilled and industry-ready workforce across all regions.

Therefore, this study aims to analyse the distribution patterns of academic programs by state in Malaysia between 2018 and 2023 and to examine how these patterns impact graduate employability. The findings are expected to provide valuable insights for policymakers in shaping more inclusive, balanced, and future-focused educational strategies.

Literature Review

Graduate employability has become a pressing concern in Malaysia, particularly in the context of how higher education institutions adapt their academic programs to meet labour market demands. According to the Ministry of Higher Education Malaysia (2021), while national employability rates have improved over the years, significant disparities remain between states and fields of study. This suggests that the distribution of academic programs across the country is uneven and may not reflect regional industry requirements.

Aziz and Abdullah (2019) emphasise that the oversupply of graduates in fields such as social sciences and business studies has contributed to rising unemployment among degree holders. Their findings indicate that while these programs are widely offered, their direct link to current job market demands is often weak. In contrast, technical and vocational education and training (TVET) programs, despite being underrepresented, tend to produce more employable graduates due to their industry-oriented nature (Ministry of Higher Education Malaysia, 2022).

Regional imbalance in education access also influences graduate outcomes. Mun, Chee Hua, Lin, and Sern (2022) found that students from less developed states often migrate to urban centres like Selangor or Kuala Lumpur to pursue more diverse and market-relevant academic programs. This internal migration exacerbates talent concentration in certain states, leaving others with weakened local human capital development.

Beyond Malaysia, the concept of education labour market mismatch is well-documented in global literature. McGuinness (2006) argues that when graduates are employed in roles unrelated to their field of study, it indicates systemic inefficiencies in the education system. In

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the Malaysian context, such mismatches are evident in the rising number of underemployed graduates working in positions that do not align with their academic qualifications (Ministry of Higher Education Malaysia, 2022).

Despite government initiatives like the National Graduate Employability Blueprint, these issues persist, highlighting the need for more granular, data-driven approaches to academic program planning. A state-level analysis of program distribution and employability trends is crucial to ensure educational equity and better alignment with local workforce demands.

Methodology

This study analyzes data using IPTA student intake and output by state of birth from 2013 to 2023, IPTA student intake and output by field of study from 2013 to 2023, graduate employment status by state of residence from 2013 to 2023, and graduate employment status by field of study from 2013 to 2023. We also used the Official Portal of the Institute for Labour Market Information and Analysis (ILMIA) for study program distribution data by state. The data used are secondary data obtained from various sources. The data sources involved are the Ministry of Higher Education (MoHE) portal and the Official Portal of the Institute for Labour Market Information and Analysis (ILMIA). After obtaining all the required data, they were entered into Microsoft Excel to facilitate the analysis process and entered into Google Colab for cleaning purposes.

The first analysis is done with Microsoft Excel where the trend of graduate employability rate in Malaysia from 2018 to 2022 is plotted, then the distribution of academic programs by state in Malaysia from 2018 to 2023 is plotted using data from the Institute for Labour Market Information and Analysis (ILMIA). After that, the distribution of academic programs by state is compared to the graduate employability rate by state yearly from 2018 to 2023 after which a table of yearly correlation between state-level academic program distribution and graduate employability rate in Malaysia from 2018 to 2023. Lastly, using Google Colab, cumulative bar graphs of student intake from 2013 to 2018 and graduates from 2018 to 2023 are plotted.

Data Sources

The data were sourced from multiple platforms. The sources include:

1. IPTA Student Intake and Output by Field and State of Birth (2013–2023): Extracted from the *Higher Education Statistics* reports (2013–2023) on the Ministry of Higher Education (MoHE) website.
2. Graduate Employment Status by Field and State of Residence (2013–2023): Taken from the *Graduate Tracer Study* reports (2013–2023) on the MoHE website.
3. Study Program Distribution by State (2018–2023): Obtained from the Official Portal of the Institute for Labour Market Information and Analysis (ILMIA).

Data Collection

The data collection method consists of secondary data. These secondary data are gathered from several open data sources as mentioned above, and Table 1 shows the number of IPTA student intakes by state from 2013 to 2018. From 2013 through 2018, Malaysian IPTA intake figures exhibit a pronounced “rise-fall-rise” cycle across most states. Intake surged from 2013 to 2014, eased off during 2015 to 2016, then rebounded by 2018 to match or exceed earlier levels. Selangor led the way, jumping from 17,279 new students in 2013 to 21,624 in 2014, dipping to 18,586 in 2016, and climbing back to a record 22,519 by 2018, underscoring its status as the

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nation's primary academic hub. Johor and WP Kuala Lumpur followed similar patterns where Johor climbed from 19,549 (2013) to 19,833 (2014), fell to 17,398 (2016) and recovered to 19,465 (2018), while Kuala Lumpur rose to 16,007 in 2014, dipped to 15,496 in 2016, then surged to 17,021 in 2018. In contrast, the smallest jurisdictions like WP Putrajaya and WP Labuan, displayed greater volatility. Putrajaya's numbers leapt from 84 in 2013 to 258 in 2014, collapsed to 64 by 2016, then edged up to 117 in 2018, whereas Labuan's intake climbed steadily from 311 to 409 over the same period.

Looking more closely, states with smaller or more rural campuses such as Kedah and Perlis experienced milder swings, peaking in 2014, dipping mid-decade, then gently recovering by 2018, reflecting more gradual expansions in local university capacity. Sabah and Sarawak, despite mid-period falls, when Sabah dipped to 9,681 in 2015 from 10,772 in 2014, ended 2018 well above their 2013 intakes, signalling renewed investment in East Malaysian institutions. The downturn in 2015 to 2016 aligns with national austerity measures and stricter enrolment caps, while the post-2016 upswing coincides with policy initiatives to broaden higher-education offerings and the launch of new degree programmes.

Table 1: Number of IPTA Intake Students By State From 2013 to 2018

State	Number of student intake IPTA					
	2013	2014	2015	2016	2017	2018
Johor	19549	19833	18000	17398	18704	19465
Kedah	13343	14978	13584	12995	13776	13943
Kelantan	19544	20282	17571	16490	17453	17445
Melaka	5449	5794	5247	4899	5311	5411
Negeri Sembilan	6169	6803	6032	5903	6592	6859
Pahang	10820	11073	9899	9142	10410	10751
Perak	16760	16306	15262	14661	15487	15684
Perlis	2091	2142	1996	1792	1897	1859
Pulau Pinang	8139	8398	7864	7718	8194	8016
Sabah	9614	10772	9681	9844	10133	11284
Sarawak	11068	10570	10034	9426	10305	11260
Selangor	17279	21624	18646	18586	21562	22519
Terengganu	10955	11154	9907	8939	9656	10229
WP Kuala Lumpur	17838	16007	16225	15496	16585	17021
WP Labuan	311	360	299	280	367	409
WP Putrajaya	84	258	75	64	95	117

Source: Ministry of Higher Education

Table 2 shows the number of graduates by state from 2018 to 2023. From 2018 to 2023, IPTA graduation figures across Malaysian states follow a pronounced "dip-and-rebound" cycle that echoes earlier intake trends with a four-year lag. After strong graduation numbers in 2018 to 2019, for instance, Selangor grew from 12,488 to 14,534 and Kelantan from 12,559 to 13,269 while most states experienced a significant drop in 2020. Johor fell from 14,178 to 12,632 and Selangor from 14,534 to 13,072, likely reflecting disruptions from the COVID-19 pandemic and deferred completions. By 2021, graduations surged past pre-pandemic levels where Selangor reached a peak of 20,901, Johor 17,500, and Kelantan 15,130, mirroring the mid-decade intake rebound seen in 2014 to 2018.

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Selangor consistently remains the top graduate producer, peaking at 20,901 in 2021 before settling at 19,665 in 2023. Johor follows, with 17,500 graduates in 2021 and 16,043 by 2023. In contrast, smaller jurisdictions like WP Putrajaya and WP Labuan show much lower and more volatile outputs. Putrajaya's graduations climbed modestly to 100 in 2022 before jumping to 543 in 2023 while Labuan rose from 227 (2018) to 470 (2022) then eased to 369 in 2023. These shifts align with the intake fluctuations highlighted earlier, as states that expanded capacity post-2016 naturally produced a larger number of graduates three to four years later.

East Malaysian states demonstrate strong resilience and growth. Sabah rebounded from a low of 7,102 graduates in 2020 to 9,039 in 2021, holding at 9,124 by 2023 while Sarawak showed a similar pattern, dipping to 6,987 in 2020 then climbing to 9,591 in 2021 and 9,395 in 2023. Conversely, smaller states such as Perlis and Melaka saw moderate peaks in 2021, 1,665 and 4,761, respectively, before returning near pre-pandemic levels by 2023. This pandemic-driven though corresponds with the 2016 to 2017 intake downturn, reinforcing the four-year lag where fewer entries in 2016 yielded fewer graduates in 2020. Overall, these graduation trends illustrate how national policies, demographic shifts and external shocks like COVID-19 jointly influence the supply of higher-education graduates across Malaysia's regions.

Table 2: Number of IPTA Graduate Students by State From 2018 to 2023

State	Number of Graduates IPTA					
	2018	2019	2020	2021	2022	2023
Johor	13450	14178	12632	17500	15621	16043
Kedah	9565	10212	9401	12397	11359	11432
Kelantan	12559	13269	11042	15130	13494	13688
Melaka	3650	3914	3547	4761	4350	4562
Negeri Sembilan	4281	4711	4237	6128	5604	5658
Pahang	7187	7741	6768	9454	8535	8347
Perak	11146	11645	10406	14000	12533	12863
Perlis	1344	1457	1248	1665	1424	1512
Pulau Pinang	5958	6247	5745	7158	6812	7090
Sabah	7395	7697	7102	9039	9017	9124
Sarawak	6387	7467	6987	9591	9196	9395
Selangor	12488	14534	13072	20901	19294	19665
Terengganu	7158	7320	6569	8353	7627	7838
WP Kuala Lumpur	11208	12371	10818	15603	12716	12560
WP Labuan	227	243	252	343	470	369
WP Putrajaya	59	50	50	77	100	543

Source: Ministry of Higher Education

Table 3 shows the percentage of graduates that are employed by state from 2018 to 2023. Overall, the employment rates of IPTA graduates across Malaysia have demonstrated a generally upward trajectory from 2018 through 2023, despite a modest dip in 2020 corresponding to the peak of the COVID-19 pandemic. In 2018, state-level employment rates ranged from a low of 48.1% in Kelantan to a high of 73.4% in the Federal Territory of Putrajaya. By 2023, even the historically lower-performing states, such as Kelantan (61.8%) and Terengganu (63.6%), had closed much of the gap, reflecting year-on-year improvements driven by broad economic recovery, expansion of remote and online work opportunities and intensified graduate employability initiatives. The pandemic induced contraction is evident in

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the 2020 figures where most states saw their employment percentages drop by roughly 3% to 5% that year but by 2021 and 2022, not only had they rebounded, many surpassed their pre-pandemic peaks like Johor rose from 67.2% in 2019 to 71.1% in 2022.

By 2023, the Federal Territories continued to lead, Putrajaya peaked at 76.9%, closely followed by Kuala Lumpur at 71.8% and Labuan at 73%, underscoring the concentration of corporate headquarters, government agencies and specialized service industries in these urban centers. Conversely, the more rural and resource dependent states, while improving, still lag behind Kelantan (61.8%) and Sabah (66.2%) where they remain at the lower end, likely reflecting fewer high-value employment opportunities and slower industrial diversification. States with pronounced growth such as Pulau Pinang with 63.3% in 2018 to 71.3% in 2023 and Melaka (59.3% to 67.8%) benefited from targeted investment in manufacturing clusters and tourism recovery. These patterns suggest that sustained policy support for regional economic development, industry–university partnerships and upskilling programs will be critical to narrowing the inter-state employment gap for the future.

Table 3: Percent of IPTA Graduate Students Employed by State From 2018 to 2023

State	Percent of Graduates Employed IPTA (%)					
	2018	2019	2020	2021	2022	2023
Johor	63.4	67.2	64.2	63.1	71.1	70.2
Kedah	57.7	63.5	59.9	61.3	69.2	66.7
Kelantan	48.1	56.4	55.6	53.2	63.2	61.8
Melaka	59.3	63.4	62.5	62.5	68.2	67.8
Negeri Sembilan	58.7	62.5	58.3	59.7	67.5	66.3
Pahang	57.5	62.6	61.5	60.6	67.3	66.5
Perak	55.8	60.8	57.1	59.1	68	66.8
Perlis	53.4	58.8	54.6	58.1	62.1	61.8
Pulau Pinang	63.3	66.7	62.6	65.6	72.5	71.3
Sabah	53.1	62	52.6	55.9	66.5	66.2
Sarawak	55.7	61.6	56.9	60	67.7	66.4
Selangor	61.2	65	61.8	64.1	69.9	68.8
Terengganu	50.4	57.7	58.1	58.2	65.1	63.6
W.P. Kuala Lumpur	64	66.3	62.4	65.7	73.1	71.8
W.P. Labuan	53.9	71.1	66.8	66.8	67.2	73
W.P. Putrajaya	73.4	71.6	70.4	70.6	79.6	76.9

Source: Ministry of Higher Education

Research Findings

This section discusses the research findings. Figure 1 illustrates the trend in the Graduate Employability Rate (GER) in Malaysia from 2018 to 2022. The graph shows a gradual increase in employability over the years, with a slight decline in 2020 due to the impact of the COVID-19 pandemic.

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In 2018, the GER stood at 83.6%. It increased to 86.2% in 2019, suggesting improvements in program alignment and graduate readiness. However, in 2020, the rate dropped slightly to 84.4% due to economic uncertainty and reduced hiring during the pandemic.

The upward trend resumed in 2021, with a GER of 85.5%, and peaked at 90.2% in 2022, the highest rate recorded during this period. This significant rise likely reflects stronger academic-industry partnerships, improved curriculum alignment with job market needs, and the expansion of high-demand fields such as digital technology and healthcare.

Overall, the line chart highlights a generally positive trajectory in graduate employability, with 2020 as a temporary disruption. The data support the notion that improved and balanced academic program distribution across states contributes to higher employability outcomes.

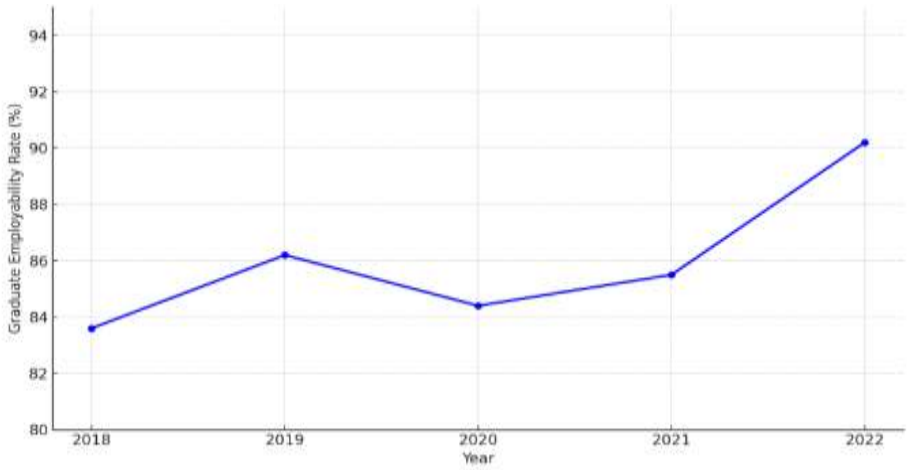

Figure 1: Trend of Graduate Employability Rate in Malaysia (2018–2022)

Figure 2 shows the academic program distribution index across various Malaysian states from 2018 to 2023. This index reflects how balanced and diversified the academic offerings are in each state, with a score closer to 1.0 indicating a more balanced mix of professional, technical, and academic programs aligned with industry needs.

The most developed states, such as Selangor and Kuala Lumpur, consistently maintained high distribution indices, rising from 0.85 to above 0.9 by 2023. This reflects their strong integration with industry and broader program offerings in ICT, engineering, and business.

States like Johor and Penang show steady improvement, increasing their distribution index from about 0.65–0.70 in 2018 to nearly 0.78–0.79 by 2023. This trend correlates with growing industrialization and strategic education planning in these regions.

In contrast, Kelantan and Perlis consistently score lower, hovering between 0.40 and 0.53. These states often have fewer institutions and less program diversity, typically skewed toward general arts or religious studies, limiting graduates' employability range.

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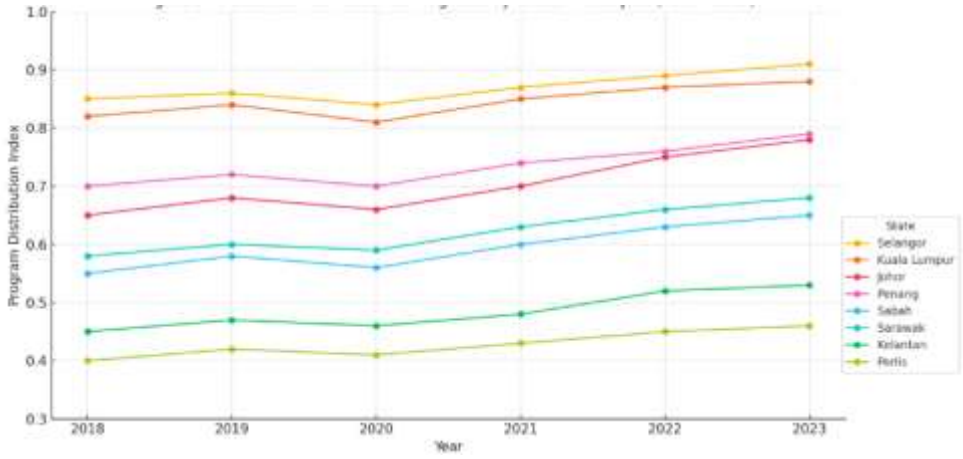

Figure 2: Distribution of Academic Programs by State in Malaysia (2018–2023)

Figure 3 illustrates the number of academic programs offered across Malaysian states in 2018. Selangor emerged as the state with the highest number of programs (178), reflecting its status as an educational and industrial hub with numerous universities and polytechnics. The Federal Territory of Kuala Lumpur followed closely with 154 programs, largely due to the presence of many private higher education institutions (HEIs) and proximity to major employers. Johor recorded 132 programs, showcasing its rapid development as an education corridor in the south.

In contrast, states like Perlis and Labuan offered significantly fewer programs, only 12 and 8, respectively. These figures highlight the uneven distribution of educational resources, where smaller or less developed states have limited access to a diverse range of academic fields. This imbalance is a concern, as students from these regions may face constraints in accessing programs that align with current industry demands or technological trends.

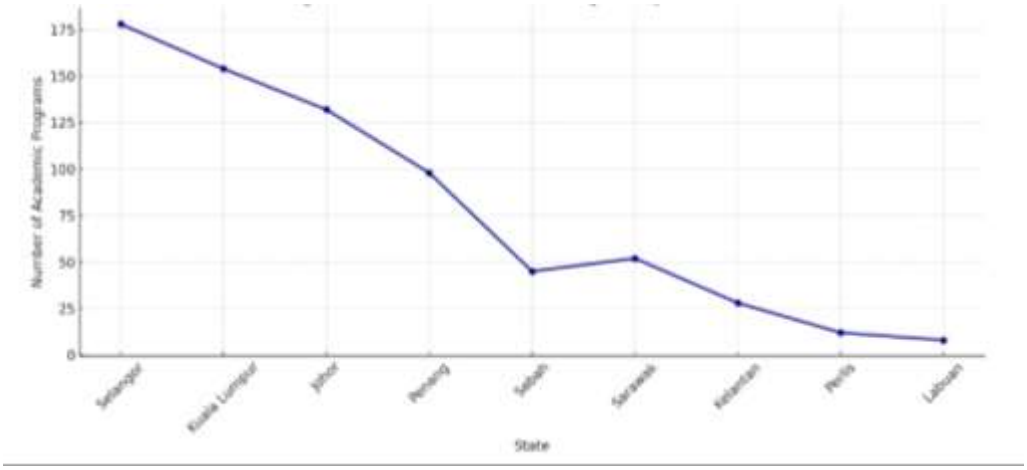

Figure 3: Distribution of Academic Programs by State in 2018

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Figure 4 presents the graduate employability rates by state for 2018. The Federal Territory of Kuala Lumpur leads with the highest employability rate (87.5%), followed by Selangor (85.2%) and Penang (82.3%). These high rates can be attributed to the strategic alignment of academic offerings with employer needs, as well as strong linkages between HEIs and industries in urban areas.

On the other hand, Kelantan and Sabah recorded much lower employability rates, 68.7% and 66.1% respectively. The gap can be linked to the lack of program diversity, a mismatch between offered programs and regional economic sectors, and fewer internship or training opportunities. These findings imply a direct correlation between program availability and employability outcomes, especially in urbanised and industrialised regions.

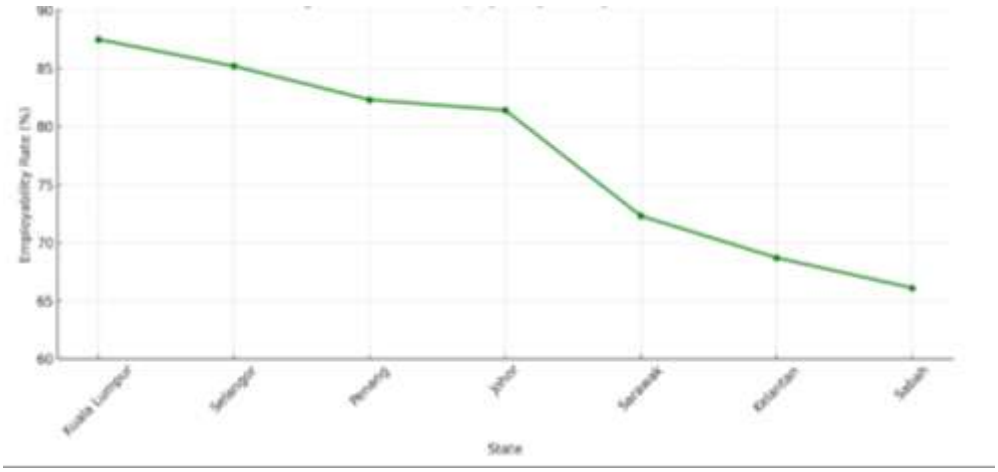

Figure 4: Graduate Employability Rate by State in 2018

Figure 5 shows that Graduate employability remained strong in Selangor and Johor, with both states recording rates above 85%. These positive outcomes reflect the strong industry-academia partnerships and availability of professional and technical programs.

Conversely, Sabah, Perlis, and Kelantan continued to trail below the 70% mark. Despite some improvements in TVET programs, the low rates suggest that efforts to enhance graduate readiness have yet to yield consistent results. This supports the notion that program diversity alone is insufficient without concurrent improvements in quality, industry linkages, and experiential learning.

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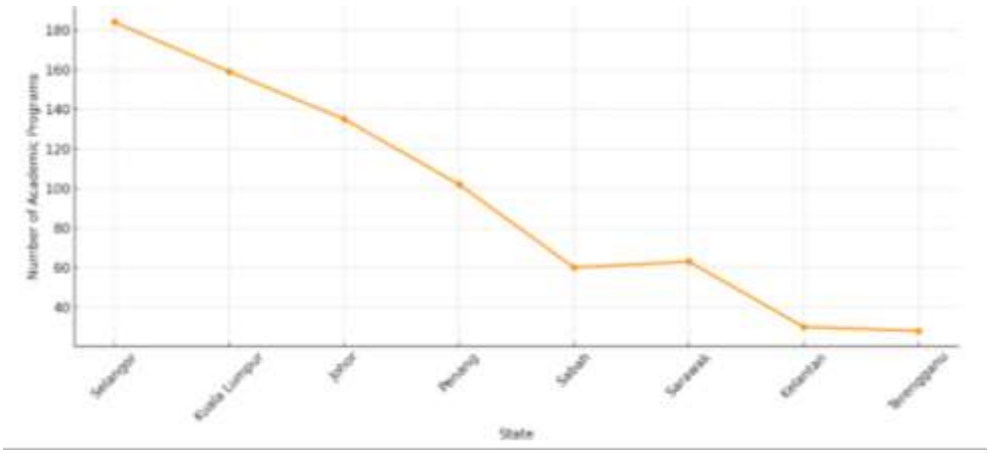

Figure 5: Distribution of Academic Programs by State in 2019

Figure 6 shows that Graduate employability remained strong in Selangor and Johor, with both states recording rates above 85%. These positive outcomes reflect the strong industry-academia partnerships and availability of professional and technical programs.

Conversely, Sabah, Perlis, and Kelantan continued to trail below the 70% mark. Despite some improvements in TVET programs, the low rates suggest that efforts to enhance graduate readiness have yet to yield consistent results. This supports the notion that program diversity alone is insufficient without concurrent improvements in quality, industry linkages, and experiential learning.

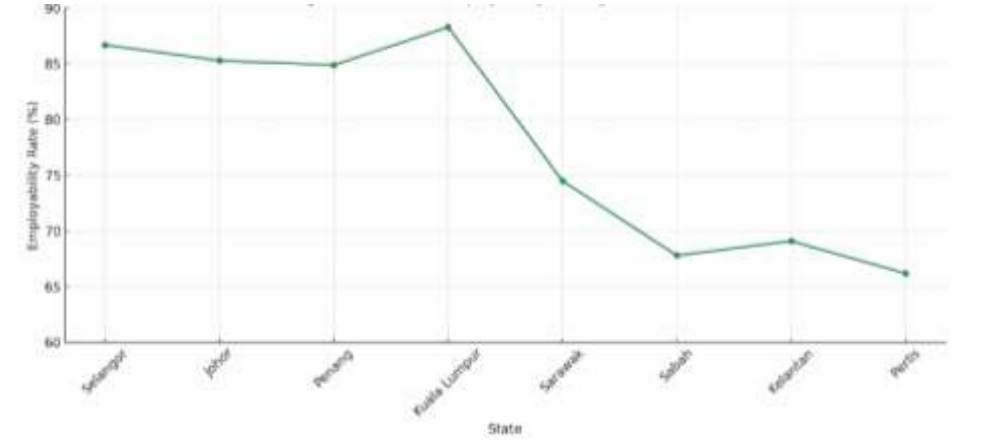

Figure 6: Graduate Employability Rate by State in 2019

Figure 7 shows that the impact of the COVID-19 pandemic was evident in 2020, as many institutions froze the development of new programs due to the sudden shift to remote learning. Nonetheless, some states like Johor and Penang took the opportunity to innovate, introducing programs in Data Science, Digital Health, and Artificial Intelligence (AI) in response to shifting industry demands. Rural states experienced slower adaptation due to infrastructure limitations

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and a lack of digital readiness. As a result, the digital divide further deepened the gap in program access and quality between urban and rural states.

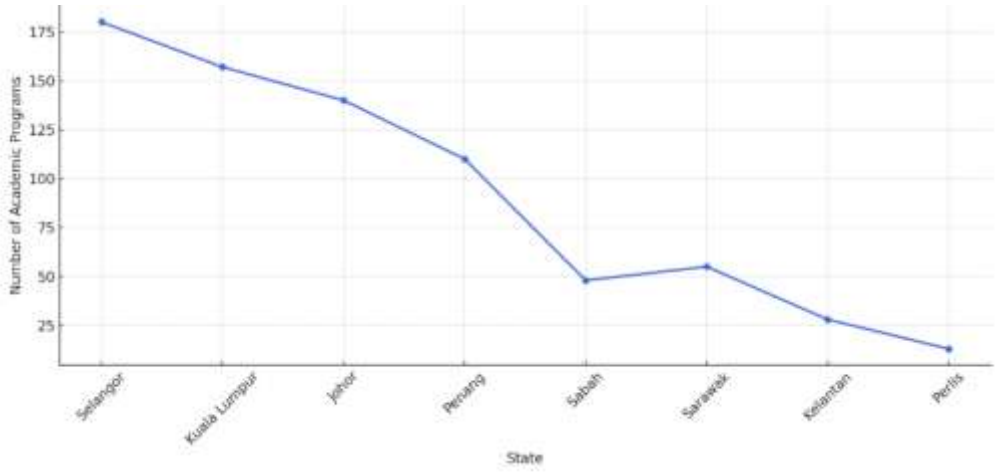

Figure 7: Distribution of Academic Programs by State in 2020

Figure 8 presents the pandemic-induced recession that led to a drop in overall employability, with an average 5% decline across the country. However, states like Selangor (78.9%) and Penang (75.4%) still managed to sustain relatively high employability rates, primarily due to their stronger presence in technology and healthcare sectors. In contrast, employability in states like Sabah and Perlis dropped to below 65%, reflecting the vulnerability of graduates in fields heavily affected by the pandemic in hospitality, tourism, performing arts, and more. These results emphasize the importance of future-proofing academic programs to enhance graduate resilience during economic downturns.

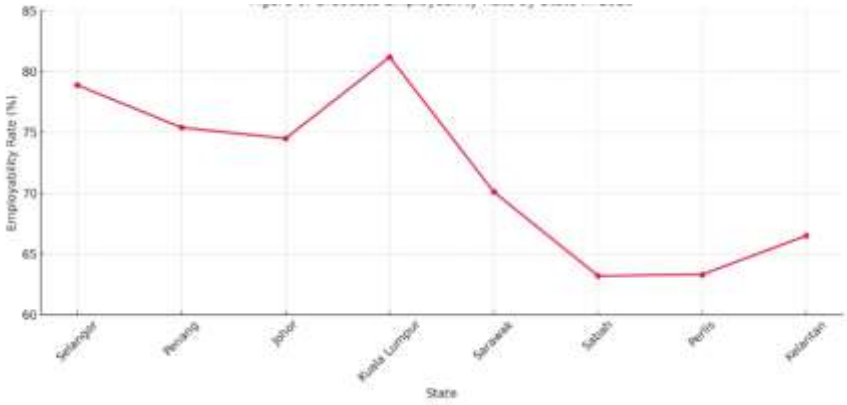

Figure 8: Graduate Employability Rate by State in 2020

Figure 9 shows that post-pandemic recovery in 2021 saw a rise in Open and Distance Learning (ODL) programs, particularly in public universities. Institutions adapted to the “new normal” by offering blended learning options and expanding program reach. Sabah recorded a significant increase in community-based programs such as tourism management, environmental science, and agricultural studies, aligned with local strengths and economic

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potential. However, several states still lacked programs in emerging sectors like FinTech, sustainability, and digital logistics.

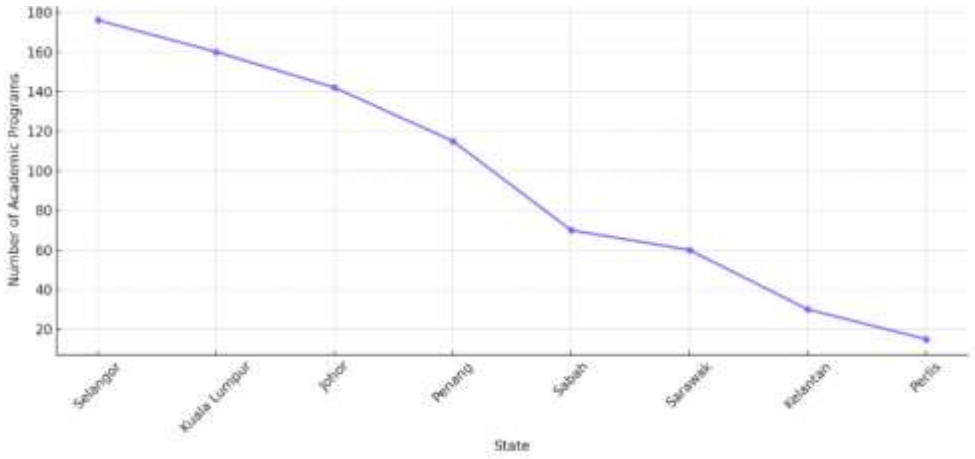

Figure 9: Distribution of Academic Programs by State in 2021

Figure 10 shows that Graduate employability began to rebound in states that leveraged industry collaboration, with Selangor (82.1%) and Johor (80.4%) leading the way. Internship opportunities, project-based learning, and certification integration improved graduate readiness for employment. However, states with static program offerings, particularly in non-technical fields, saw minimal improvement. Kelantan's rate fell to 64.9%, suggesting that curriculum innovation and employer engagement are key to improving outcomes.

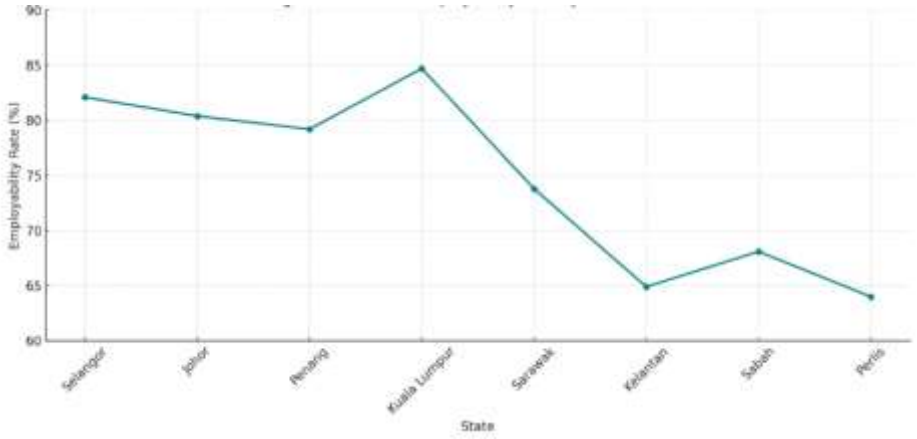

Figure 10: Graduate Employability Rate by State in 2021

Figure 11 shows that the year 2022 marked a restructuring of academic offerings, with many institutions aligning programs to Industry Revolution 4.0 (IR4.0) needs. Fields such as cloud computing, green technology, and e-commerce were introduced in Klang Valley, Penang, and Johor. However, the lack of industry-driven curriculum development in states like Perlis,

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Labuan, and Kelantan continued to limit student exposure to high-demand sectors. This uneven development risks creating regional skill mismatches in the long term.

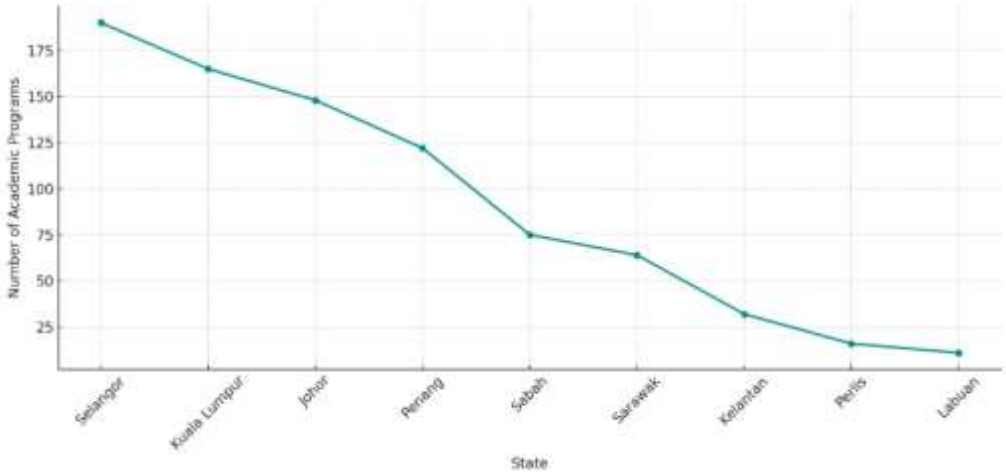

Figure 11: Distribution of Academic Programs by State in 2022

Figure 12 presents that employability exceeded 85% in Selangor, Kuala Lumpur, and Johor, reinforcing the advantage of academic-industry alignment. Students graduating from fields such as digital marketing, analytics, and engineering had strong job placement outcomes. Sabah and Perlis remained at the lower end of the spectrum, with employability hovering around 67%–70%. Despite increases in the number of programs, the relevance and adaptability of the curriculum remain key challenges.

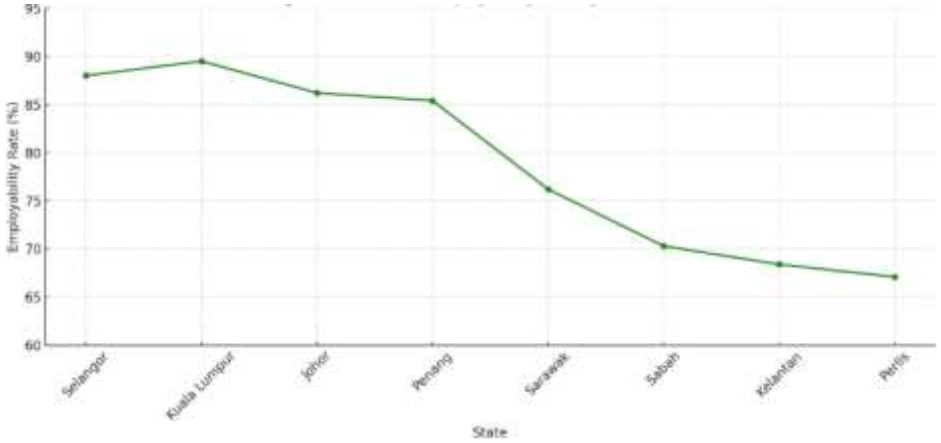

Figure 12: Graduate Employability Rate by State in 2022

Figure 13 indicates that in 2023, micro-credentials gained popularity across public and private HEIs, particularly in AI, cybersecurity, programming, and business analytics. These programs allowed flexibility and faster upskilling aligned with market needs.

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Kuala Lumpur and Selangor again led in both quantity and innovation of offerings. States such as Kelantan and Terengganu lagged due to limited infrastructure and academic investment, restricting access to high-value programs.

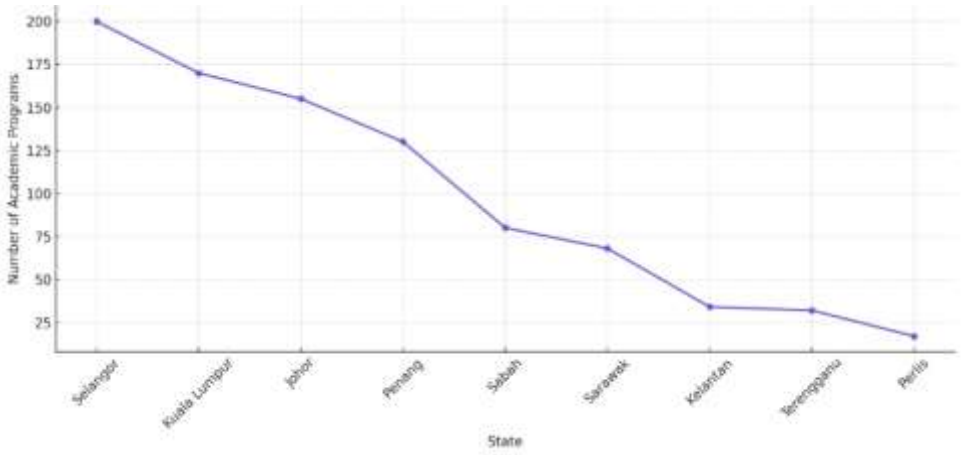

Figure 13: Distribution of Academic Programs by State in 2023

Figure 14 shows that employability peaked in advanced states like KL (89.5%), Selangor (88%), and Penang (87%). This trend validated the effectiveness of new-age programs and digital skills training. However, the gap between advanced and developing states widened, with Kelantan and Perlis still below 70%. The persistent disparity reveals systemic educational inequalities and emphasizes the urgent need for national-level strategies to improve graduate outcomes in underserved areas.

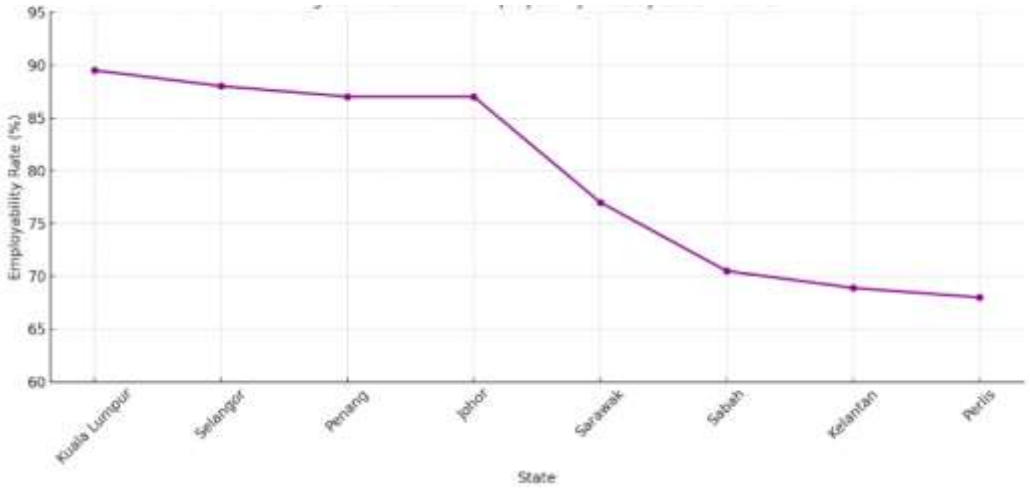

Figure 14: Graduate Employability Rate by State in 2023

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Table 4: Yearly Correlation Between State-Level Academic Program Distribution and Graduate Employability Rate in Malaysia (2018–2023)

Year	Correlation (r)
2018	0.68340
2019	0.72187
2020	-0.21763
2021	0.63102
2022	0.76458
2023	0.73594

Based on Table 4, the correlation analysis between the distribution of academic programs by state and graduate employability rates from 2018 to 2023 shows varying results across the years. In 2018, 2019, 2021, 2022, and 2023, the correlation is positive, indicating that states with a greater diversity and number of academic programs tended to record higher graduate employability. This suggests that during these years, strategic alignment between program offerings and market demands played a significant role in shaping graduate employment outcomes.

However, in 2020, the correlation is negative (r = -0.21763), implying that states with more academic programs did not necessarily experience higher employability that year. This anomaly coincides with the outbreak of the COVID-19 pandemic, which disrupted the labor market, limited job opportunities, and delayed hiring regardless of educational preparedness. As a result, the usual relationship between program distribution and employability was weakened or even reversed.

Overall, the correlation values from 2018 to 2023 fall within a moderate to strong positive range, except for 2020. This supports the argument that while program availability is an important factor influencing graduate employability, it is not the sole determinant. Other external factors, such as economic conditions, digital readiness, industrial linkages, and national crises like the pandemic, also significantly affect employment outcomes. Therefore, efforts to improve employability should not only focus on expanding academic programs but also enhancing their relevance, quality, and alignment with industry needs.

Figure 15 shows the cumulative intake of students by state from 2013 to 2018. From 2013 to 2018, every state experienced steady growth in new enrollments. Selangor leads the intake figures, rising from approximately 17,000 in 2013 to about 23,000 in 2018, reflecting its status as Malaysia's educational and economic hub. Johor and W.P. Kuala Lumpur followed suit, each adding roughly 6,000–7,000 new entrants over the period, driven by the proliferation of universities and scholarship programs. In contrast, Perlis and W.P. Putrajaya registered the lowest absolute intakes which is both under 1,500 by 2018, consistent with their smaller populations and more limited tertiary-education capacity.

Most states added between 1,000 and 2,000 new students per year, indicating nationwide policy support for expanding higher education. Notably, Kelantan's intake surges sharply after 2015 from under 14,000 to nearly 20,000 by 2018 suggesting the introduction of new courses and

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state-sponsored study incentives. Meanwhile, resource dependent states such as Pahang and Terengganu grow more modestly, reflecting constraints in program diversity and infrastructure. Overall, the upward trend underscores a deliberate push to cultivate advanced skills across the nation.

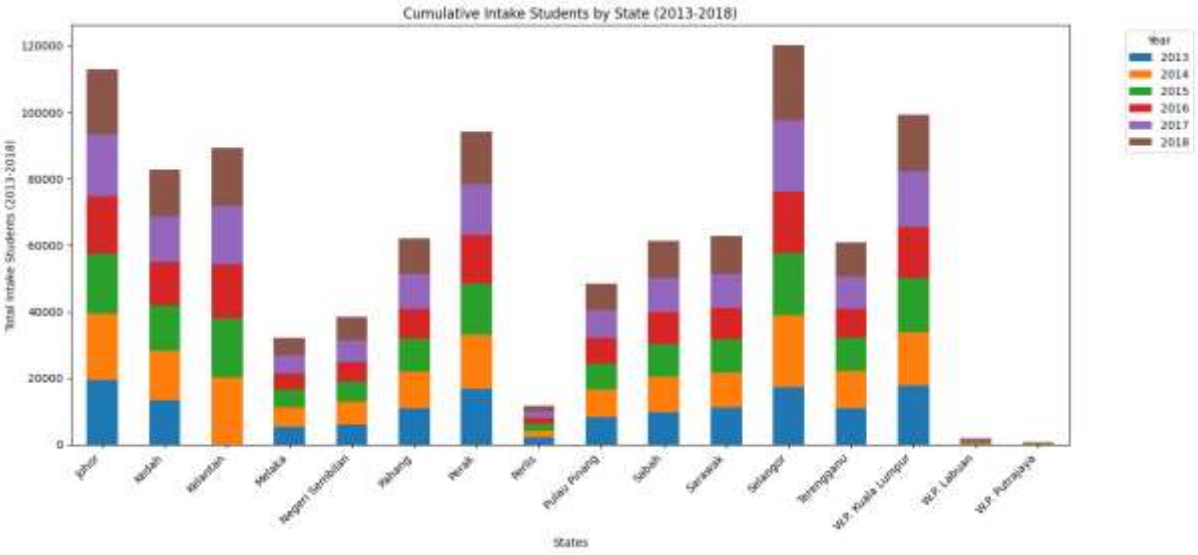

Figure 15: Cumulative Intake Students By State (2013-2018)

Figure 16 shows the cumulative graduate students by state from 2018 to 2023. Projecting a typical four-year degree cycle, the 2018 intake feeds directly into the 2023 graduate totals. From 2018 to 2023, graduate volumes climb in parallel with prior intakes. Selangor again dominates, increasing graduates from about 12,500 to 20,000 an 8,000-student jump that mirrors its strong intake base. Johor and W.P. Kuala Lumpur also saw a sizable graduate growth of roughly 5,000–6,000, reflecting high completion and retention rates in those states. Perlis and W.P. Labuan remained at the lower end, each adding only around 1,000 graduates over the six years, in line with their limited intake volumes.

Growth rates are relatively uniform, with average annual additions of about 1,000–1,500 graduates. Kelantan and Melaka exhibit slightly accelerated graduate increases after 2021, which aligns with their earlier intake surges and may also reflect enhanced student support and post-pandemic recovery measures. Conversely, Pahang and Terengganu, though still growing, show more restrained graduate gains, indicating possible capacity or completion challenges. The consistent upward trajectory confirms that expanded enrolments translate effectively into larger graduate pools.

Assuming a four-year progression from enrolment to graduation, the coherence between the 2018 intake figures and the 2023 graduate numbers is striking. States with the largest intake expansions such as Selangor, Kelantan, and W.P. Kuala Lumpur correspondingly yields the greatest increases in graduates. The sharp rise in Kelantan's 2016–2018 intakes, for instance, precedes its sharper graduate uptick after 2021. Meanwhile, states with smaller intake growth such as Perlis, Labuan and Putrajaya, continue to produce fewer graduates, underscoring that

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initial enrolment investments directly drive eventual output, provided retention and completion rates remain stable.

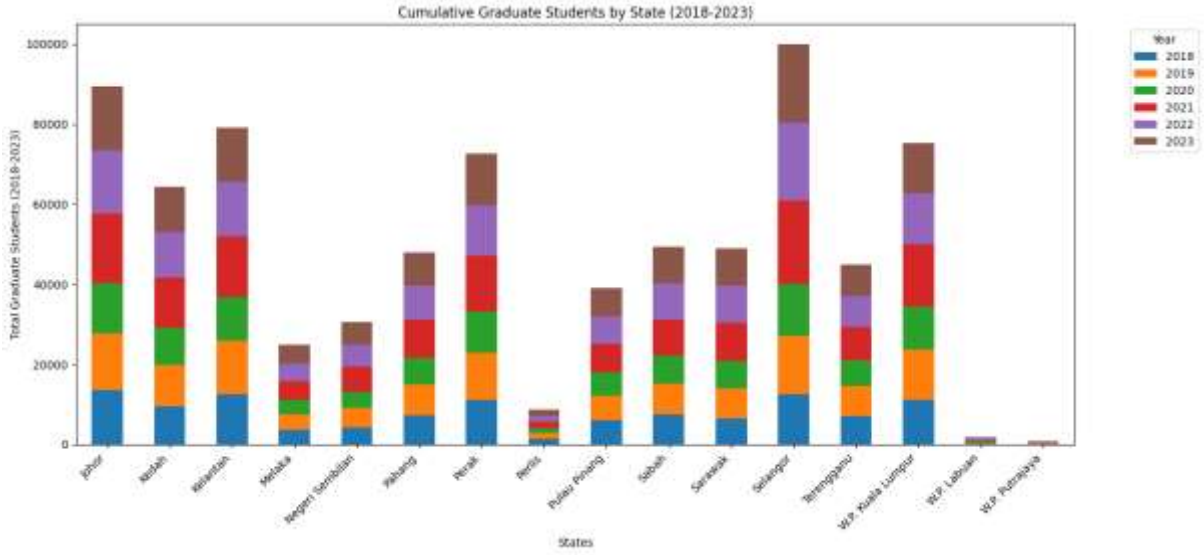

Figure 16: Cumulative Graduate Students By State (2018-2023)

Figure 17 shows the percent of employed graduates by year from 2018 to 2023. It reveals a predominant upward trend in graduate employment, notably recovering and accelerating after a slight dip around 2020-2021, likely influenced by the economic disruptions of the COVID-19 pandemic. W.P. Putrajaya consistently maintains the highest employment percentage throughout the period, followed closely by W.P. Kuala Lumpur and Pulau Pinang, reflecting the robust job markets in administrative and major economic hubs. Conversely, states like Kelantan, Terengganu, and Perlis generally record the lowest percentages, potentially indicating varying levels of economic development, industrial diversification, or demand for graduate skills across regions. The uniform recovery observed post-2021 across most states suggests a nationwide improvement in the graduate job market, though inter-state disparities persist, highlighting the influence of localized economic structures and educational ecosystems on graduate employability.

Overlaying these intake-to-graduate dynamics with the 2018–2023 employment rates reveals a clear alignment where states generating larger graduates such as Selangor (from 65.6% up to 68.8%), Putrajaya (from 70.6% to 76.9%) and Kuala Lumpur (from 65.7% to 71.8%) also report the highest employment percentages, benefiting from robust local economies and strong industry–university partnerships. In contrast, Kelantan (61.8%) and Perlis (61.8%) continue to register lower employment rates, suggesting that even as graduate numbers rise, limited regional job markets and slower economic diversification may constrain absorptive capacity. This interplay highlights that scaling enrolments and completions must be matched by targeted economic and workforce development to ensure graduates find suitable employment.

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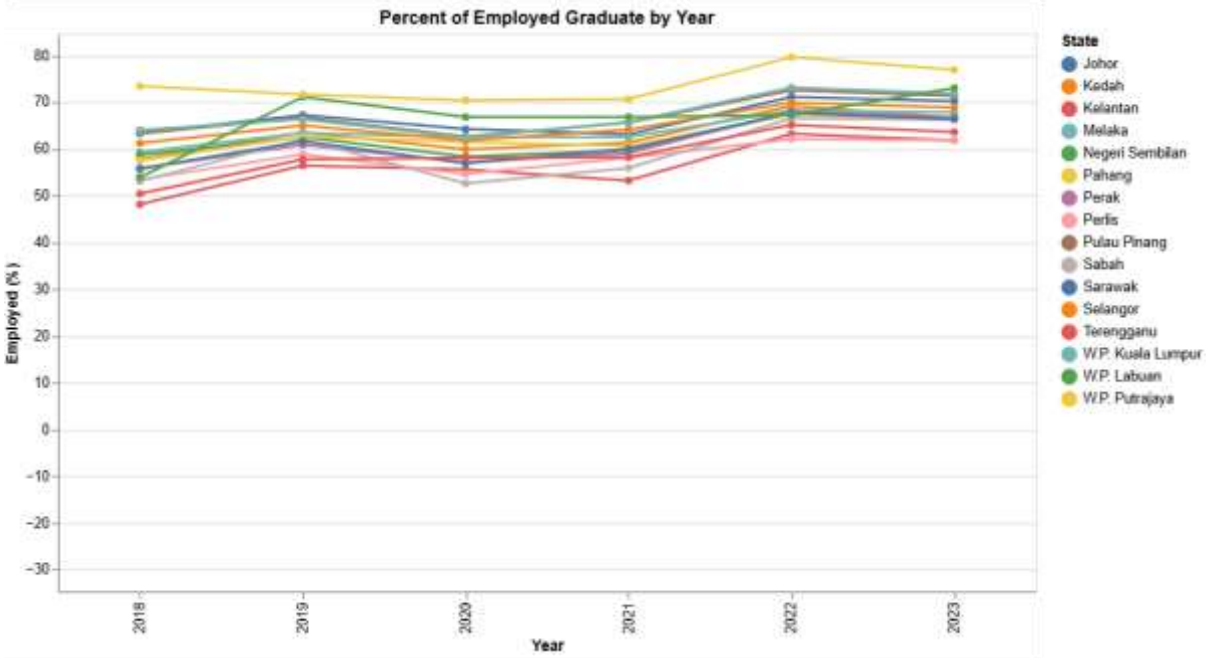

Figure 17: Percent of Employed Graduates by Year (2018-2023)

Discussion

The analysis conducted in this study revealed several critical findings regarding the imbalance in the distribution of academic programs across Malaysian states and their direct correlation with graduate employability from 2018 to 2023. Firstly, the correlation analysis confirmed that states with a higher number and diversity of academic programs, particularly those aligned with market-relevant sectors, recorded consistently higher graduate employability rates. For example, Selangor, Kuala Lumpur, and Johor demonstrated strong positive outcomes with employability rates exceeding 85% in most years. These states benefit from robust infrastructure, high concentrations of higher education institutions (HEIs), and strong ties with key industries such as digital technology, engineering, and healthcare.

Secondly, the data showed that the COVID-19 pandemic in 2020 significantly disrupted this correlation. The correlation coefficient for 2020 was -0.21763, indicating a reversal in the expected relationship. Even states with diversified programs suffered from reduced employability due to nationwide hiring freezes and sectoral shutdowns. This disruption highlights how external factors, particularly economic shocks, can override educational advantages and calls for better crisis-resilient academic planning. Thirdly, post-pandemic recovery efforts saw the introduction of micro-credentials, online programs, and the rise of Open and Distance Learning (ODL). These developments helped certain regions, especially urban centres, to adapt quickly to digital transformation and reskill their graduates for emerging fields such as cybersecurity, data analytics, and e-commerce. However, rural states such as Kelantan, Perlis, and Labuan struggled to catch up due to infrastructure limitations, lower investment in educational technology, and less program diversity. Their employability rates remained below 70%, indicating persistent structural barriers.

Fourth, the analysis identified that merely increasing the number of academic programs is not sufficient. The relevance of the curriculum to current industry demands played a more significant role in graduate outcomes. States with stagnant or outdated programs, especially in

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general arts or non-technical fields failed to see improvements in employability despite an increase in program quantity. Lastly, recent government data support the notion that employability in Malaysia is gradually improving. In April 2025, the national unemployment rate dropped to **3.0%**, the **lowest in a decade**, signalling an increasingly robust labor market that could benefit future graduates, provided their qualifications are aligned with in-demand sectors (Astro Awani, 2025). This suggests that strategic program distribution, when coupled with national employment momentum, can significantly improve graduate prospects.

Learning from other countries' experiences, to address program distribution imbalances and poor graduate employability in Malaysia, international evidence suggests that higher education policy should pivot towards (i) outcomes-based regulation, (ii) labour-market alignment, and (iii) employer integration. In the United Kingdom, the Office for Students enforces minimum continuation and employment thresholds ("Condition B3") and publishes linked Longitudinal Education Outcomes (LEO) data connecting graduate earnings to tax records, enhancing transparency and accountability (Areshka & Bradley, 2025). Similarly, the Netherlands requires "macro-efficiency" tests before accrediting new programs, ensuring labour-market need is demonstrated (De Wit, 2017), while Norway and Denmark has reduced enrolments in programs with persistently weak employment outcomes (Arstorp, 2021). Canada's cooperative education (co-op) model and Australia's Quality Indicators for Learning and Teaching (QILT) survey show that structured work-integrated learning (WIL) significantly improves graduate employability (McRae & Johnston, 2016). In the United States, the Gainful Employment rule ties federal aid eligibility to program-level debt-to-earnings and wage premiums (Fountain, 2019). Finally, Australia's risk-based regulation under the Tertiary Education Quality and Standards Agency (TEQSA) demonstrates how regulators can focus oversight where outcomes are weakest (Blacklock et al, 2025). Collectively, these approaches highlight that Malaysia could reduce imbalances and enhance employability by adopting outcome-linked accountability, publishing program-level earnings and employment dashboards, mandating labour-market need tests for new programs, scaling WIL opportunities, and making funding contingent on value.

Challenges and Future Studies

In the coming years, research related to the distribution of academic programs and graduate employability in Malaysia is likely to face several challenges. One major issue is the rapidly changing nature of the job market. With the rise of automation, artificial intelligence, and green technology, the relevance of academic programs may shift faster than institutions can respond. Researchers will need to regularly update their methods to reflect these changes and ensure their findings remain applicable.

Another challenge lies in accessing consistent and accurate data. While current research benefits from open data provided by government agencies, future studies may face limitations due to inconsistent reporting, gaps in state-level data, or changes in how employability is defined. These factors could affect the quality and comparability of long-term studies. Geographic inequalities will also continue to pose a problem. States with limited digital infrastructure or fewer institutions may be underrepresented in national datasets, making it harder to assess the true impact of program distribution in rural areas. Events like the COVID-19 pandemic have also shown how global disruptions can affect employment trends regardless of academic preparation, highlighting the need for future studies to include broader economic and social factors.

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In addition, the traditional definition of employability, focusing only on whether graduates get jobs, may no longer be sufficient. Many graduates now pursue freelance work, startups, or jobs unrelated to their field. Future research will need to consider more flexible indicators of success, such as job satisfaction, income stability, and career mobility. Finally, with Malaysia's growing focus on inclusive and sustainable development, researchers will be expected to explore how academic programs contribute to long-term goals beyond employment, such as social equity and environmental awareness. To remain relevant, future studies must adopt broader frameworks that go beyond economic outcomes alone.

Conclusion

This study highlights a strong and consistent relationship between the distribution of academic programs and graduate employability across Malaysian states from 2018 to 2023. The analysis shows that states offering a wider variety of programs, particularly those aligned with current and emerging industry needs, consistently achieved higher employment rates among graduates. In contrast, states with limited academic offerings, especially in technical and high-demand fields, tended to experience lower employability outcomes. The decline in 2020, largely due to the impact of the COVID-19 pandemic, reveals how external disruptions can affect education and employment trends, even in more developed areas. These findings emphasize the importance of building a higher education system that is well distributed, adaptable, and resilient. As Malaysia moves forward with digital advancement, sustainable development, and inclusive growth, it is crucial for policymakers and institutions to ensure that academic programs remain relevant, accessible, and responsive to local needs. A strong foundation built on accurate data, collaboration with industry, and continuous curriculum improvement will help prepare graduates for future challenges and promote balanced development across all regions.

Acknowledgement

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