

Graduate Enrollment in Bahrain's Higher Education: A Descriptive Analysis of Gender and Program-Level Trends

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Abstract

This study examines graduate enrollment trends in Bahrain's higher education sector, situating them within global and Gulf Cooperation Council (GCC) contexts. Using official data from the Higher Education Council (HEC) via the Government of Bahrain's Open Data Portal, the analysis covers academic years 2018/2019 to 2022/2023 across diploma, bachelor's, master's, and doctoral programs, disaggregated by gender and institutional sector. A descriptive quantitative design was applied, incorporating data aggregation, growth rate calculations, and gender ratio analysis. Descriptive statistics, trend analysis, and a Chi-Square Test of Independence were used to identify patterns and associations.

The results indicate overall enrollment stability across the five-year period but with notable structural shifts. Diploma enrollments declined (CAGR = -1.8%), bachelor's programs showed steady growth (CAGR = 6.0%), and postgraduate education expanded rapidly, with master's (CAGR = 20.6%) and doctoral programs (CAGR = 28.5%) recording the strongest growth. Female students consistently outnumbered males at all levels, with disparities most pronounced at the master's level (female-to-male ratio > 2:1). A Chi-Square Test confirmed a significant association between gender and program-level enrollment, $\chi^2 (3, N = 62,345) = 12.80, p = .005$.

These findings position Bahrain within broader international and regional trends, including the global shift toward advanced qualifications, employability-focused curricula, and digital transformation. Bahrain's exceptionally high female participation distinguishes it from many OECD systems.

Keywords: Higher Education, Graduate Enrollment Trends, Bahrain.

1. Introduction

Higher education enrollment trends have attracted growing scholarly and policy attention worldwide, as governments seek to promote equitable access, ensure gender balance, and align academic programs with national development objectives. Globally, higher education systems are being reshaped by the twin imperatives of expanding participation and enhancing relevance to labor market needs. These pressures are particularly pronounced in the Gulf Cooperation Council (GCC) region, where higher education has expanded rapidly over the past two decades in response to economic diversification agendas and human capital development strategies.

In the Kingdom of Bahrain, higher education provision spans diploma, bachelor's, master's, and doctoral programs across both public and private sectors. While national statistics are available, scholarly analyses of graduate enrollment trends remain sparse, particularly those disaggregated by program level, institutional sector, and gender. Historical evidence suggests that women have long played a leading role in Bahrain's higher education system. As early as 1996, female-to-male enrollment ratios reached 1.87:1, surpassing comparable figures in neighboring Saudi Arabia and Kuwait (Ridge, 1996). More recent UNESCO data confirm this trend, showing that women represent over 80% of graduates in health and welfare disciplines among the highest in the Arab region (UNESCO Institute for Statistics, 2022).

Despite these encouraging indicators of participation, critical gaps remain. Specifically, there has been limited longitudinal, sector-specific analysis of graduate enrollment in Bahrain. This constrains policymakers' ability to evaluate progress toward gender equity, assess the respective contributions of public and private institutions, and forecast capacity needs in alignment with national development goals. Globally, Higher education is increasingly shaped by shifting labor market demands, the digital transformation of learning, and policy imperatives to ensure stronger alignment between academic programs and economic requirements (Sulistiawan, 2025). Within the GCC, these forces intersect with national strategies such as Bahrain's Economic Vision 2030, which emphasizes an education system capable of producing graduates equipped for a competitive, diversified economy.

This study also builds on previous research by Alshaer, Zeki, and Al-Zayed (2025), which examined patterns and predictive factors influencing university admission outcomes. While that earlier study focused on access and selection mechanisms at the entry phase of higher education, the present research extends this inquiry to the post-admission stage by analyzing longitudinal enrollment dynamics across diploma, bachelor's, master's, and doctoral programs.

This study responds to these gaps by offering a descriptive, data-driven analysis of graduate enrollment trends in Bahrain between 2018 and 2023. Drawing on official higher education statistics published by the Higher Education Council (HEC) via Bahrain's national open data portal (Government of Bahrain, 2023), the study examines patterns of enrollment across academic levels, gender, and institutional sectors (public and private). By addressing an underexplored dimension of Bahrain's higher education landscape, the research contributes to both academic scholarship and academic policy discourse, providing empirical insights to support evidence-based planning and to advance discussions on gender equity and sectoral development in the Bahraini context.

2. Problem Definition

Bahrain has made substantial investments in higher education infrastructure and policy reform, with the aim of expanding access and strengthening Higher education-level training in line with national development priorities. While enrollment statistics are publicly available, most remain aggregated and have not been subjected to systematic academic analysis. In particular, trends disaggregated by academic level, institutional sector, and gender are underexplored in the scholarly literature.

The HEC publishes official enrollment data by program level and institutional type, yet these datasets have rarely been analyzed in a longitudinal and comparative manner. This gap limits stakeholders' ability to evaluate demand for specific program levels, monitor gender disparities, and assess how graduate education aligns with evolving labor market requirements.

The absence of such analysis is especially significant in Bahrain, where Higher education is central to workforce development, economic diversification, and digital transformation strategies. Without a clear understanding of enrollment dynamics across program levels, sectors, and gender groups, policymakers risk adopting strategies that inadequately address equity, capacity, and labor market relevance.

Accordingly, there is a pressing need for a structured, descriptive study that leverages reliable government data to: (1) identify temporal changes in graduate enrollment across academic levels and institutional sectors, (2) examine gender-based differentials within and across program types, and (3) provide an empirical foundation for evaluating the effectiveness of higher education policy in Bahrain.

3. Objectives

This study pursues the following objectives:

1. To describe enrollment trends in Bahrain's higher education system across diploma, bachelor's, master's, and doctoral programs between 2018 and 2023.

2. To analyze gender-based differentials in enrollment across academic levels and institutional sectors.
3. To evaluate longitudinal patterns and growth rates in enrollment, highlighting structural shifts within the higher education pipeline.

4. Literature Review

Higher education enrollment is shaped by intersecting socioeconomic, institutional, and policy factors that operate across global, regional, and national contexts. Understanding these dynamics is essential for positioning Bahrain's trajectory within both international and GCC perspectives.

4.1 Global Trends in Higher Education Enrollment:

Globally, demand for higher education has expanded markedly over the past two decades, driven by the transition to knowledge-based economies, globalization of labor markets, and the digitalization of work and learning (UNESCO, 2022; Altbach, Reisberg, & Rumbley, 2019). This growth spans diploma, bachelor's, and graduate programs, each playing a distinct role in the education-to-employment pipeline.

Diploma programs often serve as flexible entry points into tertiary education, enabling students either to enter the workforce quickly or to transition into bachelor's programs. Recent studies highlight how digital learning technologies have widened access. Batool et al. (2025), in their bibliometric mapping of tertiary digital learning (2001–2024), emphasize the surge in online and blended diploma/bachelor programs during the COVID-19 pandemic, which expanded participation among non-traditional learners. Similarly, Faiz and Yusoff (2025) demonstrate that inclusive access across all levels of tertiary education is central to achieving SDG 4 targets on equity and lifelong learning.

Sulistiawan (2025) shows that postgraduate education is increasingly valued for building “graduate capital” which is a blend of advanced skills, adaptability, and professional networks rather than as a direct path to employment. Institutional strategies also play a decisive role as universities that align curricula with labor market needs, diversify recruitment, and maintain program quality are more successful in attracting and retaining graduate students (Baban, 2025; Hou & Wang, 2024).

Social background continues to influence graduate participation. Bryer (2025) finds that parental education strongly predicts graduate enrollment, especially at the doctoral level, highlighting the role of social and cultural capital in shaping aspirations. Bloem (2025) adds that delayed undergraduate completion reduces the likelihood of immediate entry into graduate study, underscoring the importance of timely educational progression.

Beyond academic outcomes, enrollment itself can act as a stabilizing force. Nice and Joseph (2025) show that higher education participation during the COVID-19 pandemic was linked to greater psychosocial resilience among students, reinforcing the broader societal value of tertiary enrollment.

4.2 Trends in Higher Education Enrollment in the GCC:

Higher education systems in the GCC comprising Bahrain, Saudi Arabia, Oman, Qatar, Kuwait, and the UAE have expanded rapidly over the past two decades, closely linked to economic diversification strategies and national visions such as Saudi Arabia’s Vision 2030 and Bahrain’s Vision 2030. Recent scholarship highlights how these initiatives prioritize not only the expansion of graduate programs but also the development of diploma and bachelor’s pathways that sustain postgraduate participation (Batool et al., 2025; Faiz & Yusoff, 2025).

At the undergraduate level, bachelor’s programs have experienced mass expansion, while diploma programs continue to function as important bridging tracks,

especially for vocational learners and those seeking employability-oriented qualifications (Faiz & Yusoff, 2025). Policy reforms increasingly emphasize flexible entry and exit points to accommodate lifelong learning and adult learners, reflecting international trends in higher education accessibility.

Post graduate education is also undergoing significant shifts. Awashreh and Al Ghunaimi (2025) report that master's graduates in the GCC are increasingly motivated to pursue doctoral study, often to secure advancement in public-sector careers. Yet, employers continue to emphasize applied skills, professional experience, and industry readiness over formal qualifications, underscoring a growing skills-qualifications gap. This resonates with global calls to embed experiential learning, industry collaboration, and professional networking within graduate curricula (Hou & Wang, 2024).

The COVID-19 pandemic further accelerated the digital transformation of GCC universities, particularly in Saudi Arabia and the UAE. Tian and Ye (2025) document how blended and online delivery models have become central to higher education in the region, expanding access to both undergraduate and postgraduate programs. This shift has increased participation among non-traditional learners and aligned the GCC with global digitalization trends in tertiary education.

4.3 Trends in Higher Education Enrollment in Bahrain:

Bahrain's higher education system reflects many GCC-wide trends while maintaining distinctive characteristics. It comprises diploma, bachelor's, and graduate programs across public institutions such as the University of Bahrain and the Arabian Gulf University and a dynamic private sector (Ministry of Education Bahrain, 2023).

In 2023, Bahrain's gross tertiary enrollment ratio was 72%, with female participation (87.0%) significantly outpacing male participation (57.8%) (World Bank, 2023; UNESCO Institute for Statistics, 2022). This gender disparity in favor

of women has been a long-standing feature of the Bahraini system, extending across undergraduate and graduate levels.

Bachelor's programs remain the principal entry route to postgraduate study, while diploma programs continue to play a strategic role in widening participation, supporting vocational pathways, and enabling transitions into bachelor's and master's study. Recent global research also highlights the role of enrollment in promoting resilience: Bahraini students' continued engagement in higher education during the COVID-19 pandemic reflects findings that enrollment acts as a protective factor in times of disruption, sustaining psychosocial development (Nice & Joseph, 2025).

Digitalization has further reshaped Bahrain's higher education landscape. Like other GCC states, Bahrain adopted blended and online delivery models to sustain participation during the pandemic, in line with global shifts toward digitally mediated higher education (Batoool et al., 2025). These reforms expanded access for non-traditional learners and strengthened the flexibility of program delivery.

Positioning Bahrain within global and GCC contexts reveals several insights. First, diploma and bachelor's enrollments form the backbone of higher education, shaping postgraduate participation. Second, the system is increasingly adopting employability-focused and digitally enhanced curricula, consistent with regional and global best practices.

5. Methodology

5.1 Research Design:

This study adopts a descriptive quantitative research design to examine enrollment trends in Bahrain's higher education sector across diploma, bachelor's, master's, and doctoral programs. The design provides a comprehensive analysis of

longitudinal patterns disaggregated by gender and program level, enabling the identification of structural dynamics within Bahrain's higher education pipeline.

5.2 Data Source:

Data were obtained from the Government of Bahrain's Open Data Portal, specifically the official enrollment statistics published by the Higher Education Council (HEC) (Government of Bahrain, 2023). The dataset covers the academic years 2018/2019 to 2022/2023, including both government and private institutions, and is disaggregated into four program levels:

- Short-cycle higher education (Diploma)
- Bachelor's or equivalent level
- Master's or equivalent level
- Doctoral programs

5.3 Data Preparation:

The dataset was cleaned, aggregated, and reorganized for analysis. Key preparation steps included:

1. Aggregating enrollment counts by year, program level, and gender.
2. Calculating annual totals for each academic level.
3. Deriving gender ratios, including female-to-male participation.
4. Computing longitudinal indicators such as year-on-year percentage changes and Compound Annual Growth Rates (CAGR) to capture growth dynamics.

5.4 Analytical Techniques:

The analysis combined descriptive, comparative, and inferential methods:

- Descriptive Statistics: Frequencies, totals, percentages, and gender ratios were calculated to establish baseline trends.

- Trend Analysis: Year-on-year comparisons and CAGR values measured overall growth and decline across programs.
- Comparative Analysis: Cross-tabulations examined enrollment distributions across gender and academic levels.
- Inferential Statistics: A Chi-Square Test of Independence assessed whether gender distribution differed significantly across academic programs, with results interpreted at $p < 0.05$.

5.5 Ethical Considerations:

The study relied exclusively on secondary, aggregated, and publicly available data provided by the Government of Bahrain. No individual-level records were accessed, ensuring confidentiality and compliance with ethical standards for social science research.

5.6 Reliability and Validity:

Reliability was strengthened by the use of official government-published statistics, which apply standardized definitions and consistent reporting practices across academic years. Validity was supported by the application of multiple analytical techniques which are descriptive, trend-based, and inferential that together provide a triangulated understanding of enrollment dynamics.

5.7 Limitations:

This study relied on aggregated, publicly available enrollment data provided by the Higher Education Council (HEC) through the Government of Bahrain's Open Data Portal. While these data are reliable and standardized, they do not include detailed breakdowns by discipline, socioeconomic background, or individual institutions. As a result, the analysis is limited to system-wide patterns across program levels and gender. Furthermore, the lack of longitudinal individual-level data prevents the

study from assessing transitions, persistence, or progression pathways. Despite these limitations, the use of official national data ensures validity at the system level and provides a robust basis for identifying structural enrollment trends and informing policy.

6. Results

6.1 Overall Enrollment Trends:

Total higher education enrollment in Bahrain remained stable between 2018/2019 and 2022/2023, with only slight overall growth. This stability reflects the system's resilience despite external pressures such as economic fluctuations and the COVID-19 pandemic as shown in Figure 1.

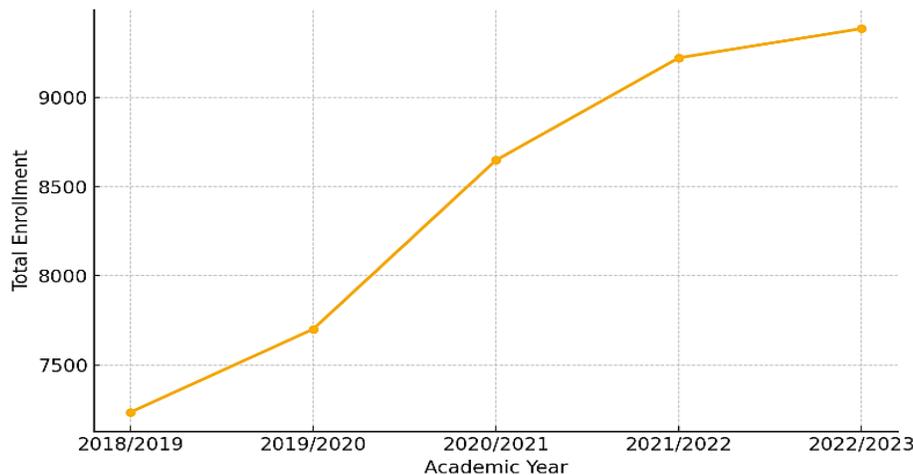


Figure (1): Total Higher Education Enrollment in Bahrain (2018–2023)

6.2 Program-Level Enrollment:

Program-level analysis reveals significant structural shifts as illustrated in Figure 2:

- Bachelor's programs dominate overall participation and continued to grow steadily, with a Compound Annual Growth Rate (CAGR) of 6.0%.
- Diploma programs experienced a decline (CAGR = -1.8%), indicating reduced

demand for short-cycle qualifications.

- Master's programs expanded strongly, recording a CAGR of 20.6%, highlighting increasing demand for advanced qualifications.
- Doctoral programs, while small in absolute numbers, exhibited the fastest relative growth (CAGR = 28.5%), signaling gradual capacity -building at the highest academic level.

These trends indicate a clear shift in Bahrain's higher education system toward postgraduate education, with diplomas losing ground to higher-level qualifications.

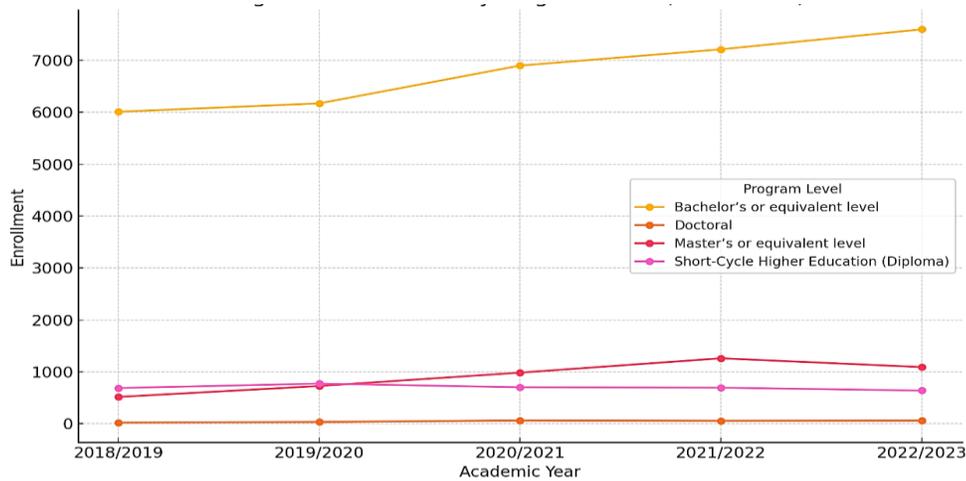


Figure (2): Enrollment by Program Level (2018–2023)

These findings are reinforced in Table 1, which summarizes the compound annual growth rates (CAGR) for each program.

Table (1): Compound Annual Growth Rates (CAGR) by Program Level, 2018–2023

Program Level	CAGR (%)
Diploma	-1.8
Bachelor's	+6.0
Master's	+20.6
Doctoral	+28.5

6.3 Gender Distribution:

Female students outnumbered males across all program levels throughout the five-year period. Gender disparities were most pronounced at the master's level, where the female-to-male ratio exceeded 2:1. Even at the doctoral level, female enrollment slightly surpassed male participation, underscoring Bahrain's strong and consistent female dominance in higher education as illustrated in Figure 3.

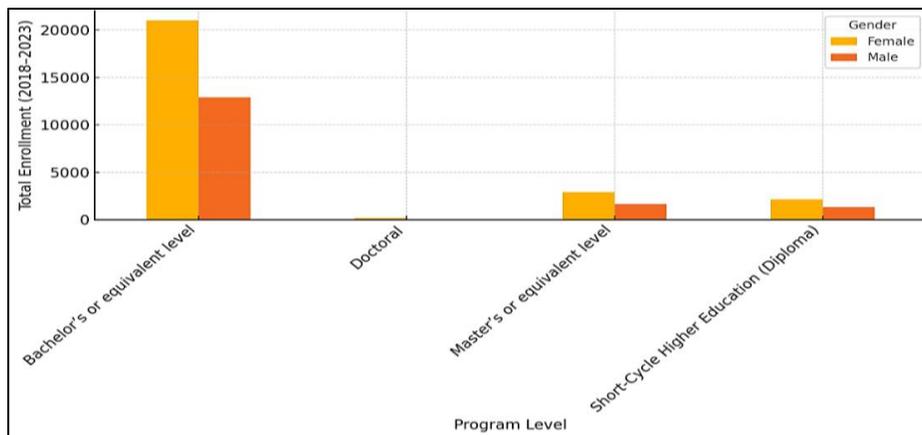


Figure (3): Gender Distribution by Program Level (Aggregate 2018–2023)

6.4 Statistical Testing:

A Chi-Square Test of Independence confirmed a statistically significant association between gender and program-level enrollment ($\chi^2 = 12.80$, $p = 0.005$). This indicates that gender distribution differs systematically across program types, with female participation disproportionately higher at postgraduate levels.

6.5 Summary of Findings:

The analysis yields five key insights:

1. System stability: Overall enrollment remained steady across the study period.
2. Structural shifts: Growth was concentrated in postgraduate education, while diploma programs declined.

3. Dominance of bachelor's: Bachelor's programs continue to form the core of Bahrain's higher education system.
4. Female advantage: Women consistently outnumber men, particularly in master's and doctoral programs.
5. Significant association: Gender and program level are strongly associated, reflecting differentiated participation patterns.

7. Discussion

7.1 Shifts in Enrollment Patterns:

The findings reveal a clear structural transition in Bahrain's higher education sector. While diploma programs declined, bachelor's enrollments grew steadily, and postgraduate programs particularly at the master's and doctoral levels expanded rapidly. This reflects a global trend in which short-cycle qualifications are increasingly de-emphasized as systems mature, and advanced degrees become more central to labor market competitiveness (Faiz & Yusoff, 2025; UNESCO, 2022). Within the GCC, similar dynamics have been documented, with diploma pathways being repositioned as vocational or bridging tracks rather than long-term educational destinations (Awashreh & Al Ghunaimi, 2025). The rising demand for graduate education in Bahrain is thus consistent with regional strategies, particularly Bahrain's Economic Vision 2030, which emphasizes human capital development and alignment with a knowledge-based economy.

7.2 Gender Dynamics:

The results reaffirm Bahrain's long-standing distinction of female-dominated higher education participation as presented in Figure 4. Women consistently outnumber men across all program levels, with disparities most pronounced at the master's level, where the female-to-male ratio exceeds 2:1. This pattern exceeds global averages and positions Bahrain among the leaders in gender equity in higher

education participation (World Bank, 2023; UIS, 2022).

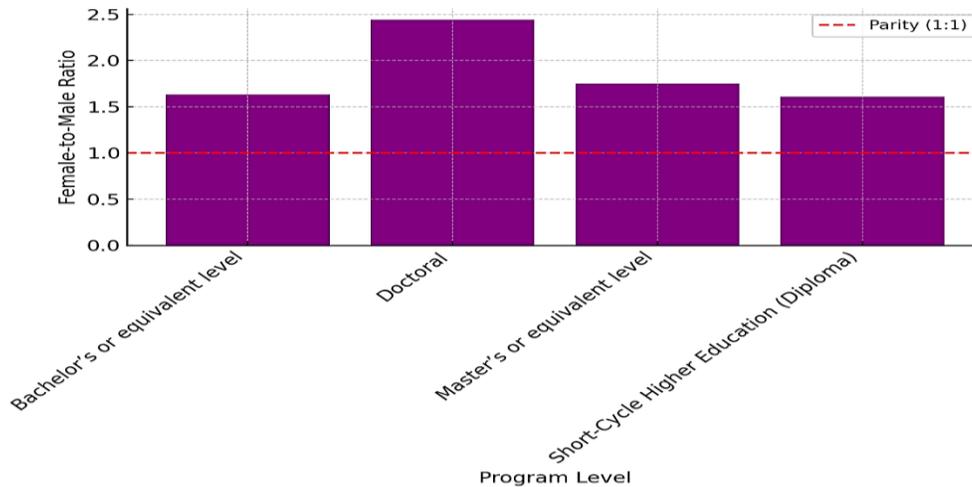


Figure (4): Female-to-Male Enrollment Ratios by Program Level (2018–2023 Aggregate)

7.3 Economic and Digital Drivers:

The decline in diploma enrollments reflects labor market preferences for higher qualifications, while the strong growth of master's and doctoral enrollments signals a recalibration of academic pathways to align with professional advancement and national development needs. Bahrain's stability in overall enrollment during the COVID-19 pandemic further highlights the system's adaptability. Recent global research shows that higher education enrollment acts as a protective factor during crises, supporting psychosocial resilience and continuity in skill development (Nice & Joseph, 2025). Bahrain's adoption of blended and online learning models mirrors broader GCC and global transformations (Batool et al., 2025; Tian & Ye, 2025), positioning the country to sustain participation despite disruption.

7.4 Comparative Positioning:

Taken together, Bahrain's trends reflect both global and GCC trajectories. Like global systems, Bahrain is moving toward advanced qualifications and

employability-driven reforms. Bahrain stands out for its exceptionally strong female participation, exceeding that of most OECD countries. This dual positioning highlights Bahrain's success in promoting gender equity, while also underscoring the need to align educational outcomes with sustainable labor market and national development goals.

8. Conclusion

This study analyzed graduate enrollment trends in Bahrain's higher education sector between 2018/2019 and 2022/2023, situating them within global and GCC contexts. The results reveal a stable system with important structural shifts: diploma enrollments declined, bachelor's programs grew steadily, and postgraduate education particularly at the master's and doctoral levels expanded rapidly. A defining feature of Bahrain's higher education landscape is the sustained dominance of female participation, which exceeds global and OECD benchmarks and is most pronounced at the postgraduate level. A Chi-Square Test confirmed a significant association between gender and program-level enrollment, further underscoring differentiated participation patterns.

These findings position Bahrain as both aligned with global and regional trends and distinctive in its achievements. Like other knowledge-based economies, Bahrain is experiencing a shift toward advanced qualifications, employability-driven curricula, and digital transformation. At the same time, its remarkable progress in gender equity places it ahead of many international peers.

Overall, Bahrain's higher education system demonstrates resilience and progress. By capitalizing on its achievements and addressing evolving enrollment dynamics, it is well positioned to advance national development goals and contribute to regional competitiveness in the years ahead.

9. Recommendations

Bahrain's higher education system has demonstrated stability and resilience, with notable progress in postgraduate expansion and gender equity. To sustain this trajectory and maximize the impact of recent trends, several evidence-based recommendations are proposed.

First, the decline in diploma enrollments suggests a need to redefine the role of diploma programs. These programs should be repositioned as flexible, vocational, or bridging qualifications that meet labor market needs and provide alternative entry points for students who may later progress to bachelor's or postgraduate levels. This approach would maintain their relevance while ensuring they complement, rather than compete with, higher-level programs.

Second, the rapid growth in master's and doctoral enrollments highlights an opportunity to invest in advanced graduate education and research capacity. Expanding doctoral programs in priority areas, offering scholarships and research grants, and strengthening international collaborations would help Bahrain build a robust knowledge economy aligned with its Economic Vision 2030.

Third, the consistent female dominance across all program levels, particularly at the postgraduate stage, underscores Bahrain's success in gender equity. To build on this achievement, targeted initiatives could be introduced to ensure women's transition from higher education into leadership roles and high-demand sectors, including STEM fields. This would help translate Bahrain's educational advantage into broader economic and social gains.

Fourth, steady bachelor's enrollment reinforces its role as the backbone of the higher education system. To maximize its impact, bachelor's programs should continue to be aligned with labor market requirements through curriculum modernization, industry partnerships, and the integration of digital and transferable skills.

Finally, the overall system stability points to an opportunity to future-proof higher education through diversification and digital innovation. Expanding micro-credentials, blended and online learning models, and lifelong learning opportunities will ensure accessibility for non-traditional learners and support continuous upskilling in a rapidly evolving labor market.

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