Geojournal of Tourism and Geosites
ISSN 2065-0817, E-ISSN 2065-1198

Year XVIII, vol. 59, no. 2, 2025, p.965-977
DOI 10.30892/gtg.59240-1472

HOW TOURISM, GLOBALIZATION, AND EDUCATION DRIVE WOMEN'S EMPLOYMENT IN SERVICE SECTORS? EVIDENCE FROM THE INDO-PACIFIC COUNTRIES

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Citation: Alam, Q., Khan, M.A.K.A., & Rahman, M.H. (2025). How tourism, globalization, and education drive women's employment in service sectors? Evidence from the indo-pacific countries. *Geojournal of Tourism and Geosites*, 59(2), 965–977. https://doi.org/10.30892/gtg.59240-1472

Abstract: The primary aim of this study is to investigate the significance of tourism, globalization, foreign direct investment (FDI), exports, and education on women's employment in the service sectors in selected Indo-Pacific countries. This study uses balanced panel data from 1991 to 2022 in its methodology. To achieve the results, the fixed and random effect models were applied as a baseline model, and the GLS model was used to check for robustness. The findings suggest that enhancing the tourism industry significantly impacts women's employment in service sectors; fostering globalization and increasing FDI can also considerably improve women's employment. Tourism significantly influences women's employment in the service industries of Australia, India, Japan, the Philippines, and Thailand. Globalization has exerted a substantial and beneficial influence in eight countries. Foreign direct investment has a beneficial impact on just three countries: China, Singapore, and Vietnam. Foreign direct investment (FDI) impedes female employment in the service industries of India and Thailand. Exports enhance female employment in Australia, Japan, Thailand, and Vietnam. Education has a positive impact on women's employment in China, Japan, the Philippines, and New Zealand. The quality of education adversely affects women's employment in Thailand. The adverse effect of exports on female employment warrants further investigation to understand underlying causes and develop targeted policies. The study also examined the performance of individual countries, finding that tourism and globalization positively influence women's employment in Australia, Indonesia, India, the Philippines, Thailand, Vietnam, and New Zealand. This research contributes and provides precious insights for policymakers to promote comprehensive economic growth and women's empowerment in the Indo-Pacific region.

Keywords: women's employment, tourism, service sector, Indo-Pacific, globalization, gender equality, economic development

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INTRODUCTION

The diverse economies of the Indo-Pacific region are essential for the global economy. In these regions, tourism, globalization, foreign direct investment (FDI), and export expansion are the dynamic service industries that significantly impact the labor market, particularly for women's employment. As the region integrates more and more into the global economy, the positive impacts of these economic forces on women's employment in the service sectors are becoming important. Due to this expansion, women now have more work options and play a more significant role in tourism, education, and service industries (Alrwajfah et al., 2020). In 2024, LinkedIn data indicated that women's presence in the workforce continues to lag behind that of males in almost all industries and economies, with women comprising 42% of the global workforce and 31.7% of senior leadership positions (World Economic Forum, 2024). The service industry, a significant driver of the global economy, has contributed to boosting Gross Domestic Product (GDP) and employment, particularly in the Indo-Pacific region (Bajo-Rubio & Zhou, 2024). Many countries in this region have experienced rapid growth in services, creating jobs at a rate faster than traditional industries, such as manufacturing and agriculture. Women, who comprise a significant share of the workforce in the service industry, have been essential to this growth, particularly in information technology, tourism, education, and healthcare (Zhang et al., 2022).

Tourism, one of the most dynamic industries in the Indo-Pacific region, significantly boosts employment and economic growth. According to UN Women. (2022), women comprise approximately 54% of the global tourism industry workforce. This percentage is particularly notable in specific countries within the Indo-Pacific region. In Thailand, the participation rate of women in the labor force is 59.86% on average compared to 68% in the tourism sector (WEF, 2024; Ramirez et al., 2023). The industry provides various career options, from tourism and hotel services to the cultural and creative sectors. These alternatives give women more economic power, especially in rural areas with fewer traditional job options. However, regarding women's employment, not all areas benefit equally from tourism. Furthermore, the nature of work in the tourism industry often entails low-paying, informal positions with limited

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opportunities for career progression, which can exacerbate gender inequality rather than alleviate it (Dikilitas et al., 2022; Araújo-Vila et al., 2021). Due to globalization, the Indo-Pacific region's economies are part of global value chains. This has had a significant impact on women's employment. The expansion of service industries, especially in metropolitan areas, has been fueled by the opening of markets and the influx of international goods and services. For example, globalization has enabled the expansion of Information Technology (IT) services, retail, and banking sectors in countries like Malaysia, Thailand, and Vietnam, giving women more work options (Dewi et al., 2023). Globalization does have drawbacks. The increased need for highly trained labor has favored individuals with access to high-quality education and training, which frequently disadvantages women, especially in rural and underprivileged areas. For instance, in Indonesia, women who live in urban areas have more employment options in the service industry. In contrast, women living in rural areas are disadvantaged due to differences in education and training (World Bank, 2021).

Foreign Direct Investment (FDI) is essential to economic growth in the Indo-Pacific region. FDI inflows have generated employment opportunities in the banking, retail, and telecommunications sectors. Developing Asia, comprising China, India, and Singapore, was the leading recipient of over $621 billion in FDI in 2024 (UNCTAD, 2024). Since they now comprise a sizable portion of the workforce in industries such as retail and finance, women have benefited from FDI by creating new job opportunities in these areas.

For example, women comprise 49.2% of Singapore's financial services industry workers, a figure that has been continuously increasing as Foreign Direct Investment (FDI) expands (Singapore Business Review, 2022). The benefits of FDI vary among countries, indicating variations in how states attract and use overseas investments. While some countries have successfully utilised FDI to stimulate innovation, enhance infrastructure, and offer high-quality employment opportunities, others require assistance in attracting desirable investments, resulting in a reliance on low-wage, low-skill jobs. The Asian Development Bank (2022) highlights that variations in regulatory frameworks, political stability, and workforce capabilities across the Indo-Pacific *countries* result in disparate consequences from FDI.

The expansion of export-oriented economic activities in the Indo-Pacific *countries* has significantly impacted on women's employment, particularly in the IT, tourism, and education service industries. Many women are employed in the IT and industrialization outsourcing (BPO) industries, led by the Philippines and India. For instance, in the Philippines, women comprise 70% of the workforce in the BPO industry, which has expanded rapidly due to increased export demand (Oxfam International, 2022). The development of the export sector has also drawn attention to the problems associated with gender segregation in the workforce, despite providing women with new opportunities (Raihan & Tuspekova, 2022). There is a concentration of women in service-related fields, often in lower-paying and less secure jobs. In India, for instance, women are disproportionately represented in the IT services industry. However, they are more likely to be found in entry-level jobs with little room for growth than their male colleagues.

Enhancing women's employment prospects in the service sectors of the Indo-Pacific *countries* depends primarily on education. Education significantly impacts women's employment in the service sectors across this region, influencing their ability to benefit from tourism, globalization, FDI, and export activities. Higher levels of educational attainment typically correlate with better job opportunities and higher wages for women (UN Women, 2024). Women with higher education tend to have greater economic freedom, higher incomes, and better career opportunities. Significant female engagement has been observed in service sectors like education, healthcare, and professional services in countries like South Korea and Japan, where women's educational attainment is high (OECD, 2023). In the Philippines, female CEOs are gradually rising; women currently comprise 40% of the executive leadership team (ELT) in publicly Listed Companies (PLCs). Although female CEOs remain underrepresented at only 13%, the proportion of women on boards of directors has continued to rise (PBCWE, 2024). The low percentage of women in management roles in Japan's labor sector limits chances for advancement. A Ministry of Health, Labor and Welfare report indicates that, among industrialized nations, the proportion of women in managerial roles was just 13.2%, one of the lowest (McKinsey & Company, 2025).

Additionally, the service sectors in the Indo-Pacific region are experiencing rapid growth and expansion, making them a key driver of economic development in the area. This research focuses on the service sector in the Indo-Pacific region. Among various drivers, these are essential indicators highly related to service sector jobs.

Previously, various research happened in BRICS (Pandey & Sergeeva, 2022), G7 (Çil & Guzey, 2024), Latin America (Braunstein & Seguino, 2018), and many regions. Indo-Pacific countries are overlooked and underexplored in the research on women's employment in the service sectors.

The objectives of this study are:

i. To examine the specific effects of tourism, globalization, FDI, exports, and education on women's employment in the service sectors across selected Indo-Pacific countries.

ii. To determine the effect of these drivers on women's employment in the service sectors in specific countries.

iii. To suggest some policy recommendations for enhancing tourism, globalization, FDI, exports, and education to support and improve women's employment in the service sectors across the Indo-Pacific zone and specific countries.

Section 2 presents the literature review, and Section 3 of this study represents the theoretical and conceptual framework. The methodology used in this study is discussed in Section 4. Section 5 presents the results and discussion, and Section 6 concludes with the recommendations. Appendix A shows the list of countries, and Appendix B shows abbreviations.

LITERATURE REVIEW

1. Tourism and women's employment

This study critically evaluates the existing body of literature on the impact of tourism on women's employment in the

Indo-Pacific region. Several studies emphasize that tourism has substantial employment prospects for women, especially in hotel administration, tour coordination, and cultural enterprises (Zhang & Zhang, 2020). Although tourism is often praised for its ability to empower women economically, research suggests that it has both long-term benefits and enduring challenges (Zhang & Zhang, 2020). The International Labor Organization (ILO, 2022) has conducted a recent study highlighting how these conditions increase employee turnover rates and hinder career advancement opportunities for women in the tourism industry. The literature also emphasizes how tourism gives women access to entrepreneurial opportunities. Women-owned tourist enterprises have experienced significant growth in this region, enhancing women's financial independence, self-determination, and contributing to the local economy (Pécot et al., 2024). As a result, tourism benefits women's economic empowerment through entrepreneurship and provides jobs (Alrwajfah et al., 2020; Tegegne et al., 2024).

Women in the tourism industry are disproportionately impacted by the unstable conditions of tourism jobs, which frequently involve seasonal employment, and a lack of job stability (Toanoglou, 2018). The COVID-19 pandemic has worsened these issues, with women being more susceptible to job loss and lower working hours compared to men (Zhang et al., 2022). Social and cultural restrictions significantly limit women's participation in the tourism industry, particularly in specific *countries*. Traditional gender roles in numerous Indo-Pacific countries limit women's employment prospects, particularly in professions that require public engagement, which may be considered unsuitable according to societal norms. Based on the literature review, this study developed the first hypothesis that the tourism industry can significantly empower women.

H_1: Women's employment in service sectors, especially in the tourism sector, has increased due to the growth of the tourism and hospitality industry in a few Indo-Pacific regions.

2. Globalization and female employment

The Indo-Pacific region's economy has experienced economic transformation due to globalization, which has expanded markets for products and services and integrated them into global value chains. In the service enterprise, this economic integration has substantially influenced women's employment patterns (Das & Ray, 2020; Rahman et al., 2024). Globalization has a more significant impact on economic rights than social rights in empowering women (Husain et al., 2024). The expansion of service sectors, such as IT, BPO, retail, and finance, is responsible for increasing female participation in the Indo-Pacific region. For example, the rise of these industries is a vital source of employment for women in the Philippines and India because it provides them with generally well-paying jobs and contributes to their economic empowerment. This development has had a positive impact, as the new opportunities approach to reducing gender inequality uses the positive effects of economic globalization to give women more significant employment opportunities and more robust professional networks. Economic globalization also facilitates access to economic opportunities (Akbar et al., 2020). The advancements of regional economies into global markets correlate with the emergence of female entrepreneurship. Women have successfully established enterprises by utilizing international networks and market opportunities, particularly in the retail and e-commerce sectors (Asongu et al., 2020). The emergence of digital platforms has also bolstered entrepreneurship's expansion by reducing obstacles for women and increasing their access to a worldwide consumer base. The second hypothesis was developed based on the literature reviewed.

H_2: Higher levels of globalization are positively related to increased women's employment in service industries in Indo-Pacific countries.

3. FDI and female employment

Foreign Direct Investment (FDI) serves as an essential revenue stream for governments and a vital source of capital for private firms, acting as a powerful engine of economic growth (Fazaalloh, 2024). Driving labor demand and boosting household incomes can influence women to engage in the service sector through various transmission channels (Rahman & Kim, 2023). FDI can lead to the expansion of industrialization and enhance government revenues, which in turn can create more employment opportunities and improve economic conditions, potentially impacting gender dynamics within the workforce. A sizeable portion of FDI is directed toward sectors that employ a female workforce, and, in that case, the demand for female labor will rise more sharply than male labor, reducing the labor participation rate gap (Achmad, 2024). The benefits of FDI are not uniformly distributed. Women often find themselves in lower-skilled and lower-paid positions with limited prospects for career advancement (Mari, 2024). Even with the possible advantages, FDI does not always have a favorable effect on women's employment. Women's access to resources significantly influences the impact of FDI inflows and exacerbates gender disparities in contexts where women have limited access to land, non-land assets, and financial resources. Additionally, the positive effects of FDI on gender equality are diminished in countries where women face more bureaucratic hurdles than men when starting industrialization. While FDI may create numerous jobs, it can also lead to poorly paid occupations, substandard working conditions, and a lack of job security (Kucera & Tejani, 2014). Substantial portions of the female population may not be able to benefit from FDI-driven growth due to this spatial imbalance, which has the potential to exacerbate already existing disparities.

H_3: Increased FDI inflows resulted in a notable rise in women's employment in the Indo-Pacific regions.

4. Export and women's employment

In the Indo-Pacific area, the growth of export-oriented industrialization has given women significant job prospects, particularly in labor-intensive industries like textiles, apparel, electronics, and agriculture (ADB, 2022). In Bangladesh, Vietnam, and Cambodia, women comprise a large part of the labor force in the export-oriented manufacturing industry

(Karim et al., 2024). These positions have contributed to the economy's growth, providing women with income and financial independence. Export-led growth has also increased women's engagement in non-traditional industries, such as BPO and IT services. Compared to traditional industrial professions, export industries typically offer better job security and provide opportunities for skill improvement in the emerging job market. One of the primary issues is the prevalence of women in low-skill, low-wage positions within the export industry (World Bank, 2020). Although women now have more employment in exports, these occupations frequently come with low pay, lengthy hours, and unfavorable working conditions. Women are disproportionately employed in low-paying, unstable occupations with limited prospects for advancement in numerous export-oriented industries, such as electronics and textiles. Women's employment has increased significantly in some countries and industries but not in others. Export-driven job possibilities are less likely to benefit women in rural areas or with lower education and skills, exacerbating existing disparities (Ghosh & Ghosal, 2020).

H_4: In Indo-Pacific countries, there is a positive relationship between exports and increasing women's employment.

5. Education and women's employment

Education is universally acknowledged as a fundamental instrument that helps women enter the job market and supports women's empowerment, strengthening their society and autonomy. The Indo-Pacific region's diverse economic, environmental, and cultural variations make the relationship between education and women's employment vital. In the workplace, education is essential because it influences women's job positions, salary levels, and career advancement (Garibaldi, 2014). The increase in tertiary education has typically reduced disparities in the workplace due to increased enrollment and attainment of educational degrees (Pasek & Ratkowski, 2021). The literature on the impact of education on women's employment in the Indo-Pacific region has been thoroughly reviewed, focusing on key trends, challenges, and knowledge gaps. Increased labor force participation, better employment chances, higher earnings, and greater economic empowerment for women are highly connected with higher educational attainment (Kabeer, 2018). Countries like Australia, New Zealand, and Singapore in the Indo-Pacific region have demonstrated how investing in education can lead to improved job outcomes for women. In Australia, for instance, women who have completed their higher education are more likely to hold high-paying, high-skilled positions, particularly in service industries such as banking, healthcare, and education (Riaz & Pervaiz, 2018). Based on the literature review, Hypothesis 5 was developed.

H_5: In the Indo-Pacific countries, women's higher educational attainment has a positive relation with increasing employment in the service sector.

Although numerous studies examine the influence of these variables on economic development and total women's employment, research on how they specifically affect women's employment in the service sector is limited. The lack of targeted studies in this sector creates a gap in understanding the gender-specific implications of these economic drivers. Most existing literature concentrates on developed Western countries or other global regions, overlooking the Indo-Pacific countries. Because of the tourist hub, a highly globalized area with some export centers, and FDI-led economic activities, it is essential to focus on the Indo-Pacific countries. More research is needed to explore the impact of tourism, globalization, FDI, exports, and education on women's employment within these diverse and rapidly rising countries.

Various research studies have been conducted on the total employment of women, but they do not specify the subsectors of employment. Among the three sectors (agriculture, industry, and service sector), the service sector is increasingly recognized for its importance in providing employment opportunities for women. There needs to be more analysis on how the impact on women's employment in the service sectors is expanding, specifically in the Indo-Pacific. Many studies examine the combined effect of selected variables on regions like BRICS, G7, SAARC, and ASEAN, but ignore the impact of specific countries. This study utilizes several theories such as feminization of tourism employment theory, human capital theory, and the capability approach, to contribute to the academic field. Overall, this research aims to fill existing literature gaps by focusing on the Indo-Pacific countries and conducting country-specific analyses, examining a unique combination of variables and their specific impact on women's employment in the service sector.

THEORETICAL BACKGROUND AND CONCEPTUAL FRAMEWORK

1. Theoretical background

The tourism industry is a labor-abundant industry that has become a significant economic driver in the Indo-Pacific countries. As per the "feminization of tourism employment theory (FTET)," women are destined to be utilized in the tourism industry related help jobs, like accommodation, housekeeping, retail, and social services, because of their orientation to providing care and administrative support services. The feminization of the tourism industry business hypothesis holds enormous pertinence for understanding orientation elements in the working market, especially regarding creating and rising economies (Srivastava et al., 2024). It highlights the tourism industry as a key driver of women's economic empowerment, extending to positions in ventures typically associated with hospitality, caregiving, and customer service. This hypothesis offers a framework for examining how cultural norms and economic development influence women's employment in the tourism industry.

From a developmental perspective, the feminization of the tourism industry business shows that the area's capability to advance orientation fairness for women is strengthening. By opening doors, the tourism industry empowers women to achieve economic freedom. The hypothesis results in social and economic changes commenced by the tourism industry, especially in male-centric social orders where the women's labor force has generally been limited. Nonetheless, the feminization of the tourism industry in business additionally uncovers difficulties, for example, gender wage gaps,

work-related isolation, and restricted professional success. It investigates how customary orientation standards might bind or limit women to low-wage and low-expertise jobs, propagating an imbalance even as women enter the labor force. Economic theories, including human capital theory, labor market segmentation theory, and the capability approach, explain the labor market dynamics and gender differences in employment. These theories analyze the impact of globalization, education, and public policy on gender disparities and explore the reasons behind women's potentially distinct experiences in the job market compared to men. Amartya Sen's capability approach also focuses on improving an individual's capabilities to attain the desired outcome. By focusing on the freedom and opportunities available for women in the labor market, these theories can also be used to analyze gender disparity.

Sen (1999) emphasized the importance of women's capabilities, including education, health, and training, in achieving gender equity in the job market. The framework of the study is presented in Figure 1.

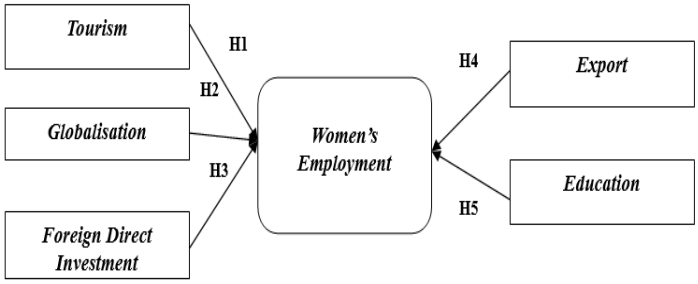

Figure 1. Conceptual framework based on different drivers of women's employment in service sectors

2. Conceptual Framework

Women are involved in hospitality, healthcare, education, retail, customer service, and administrative sectors. Women are also engaged in the service sector because of their interpersonal, communication, and cognitive skills, which make them emotionally intelligent and help build their connections with others. The restructuring of the economy reinforces the comparative advantage and reverses the labor demand curve for services (Kratochwill & Teixeira, 2024). In several service industries, such as nursing, childcare, and teaching, women comprise most workers. In other service sectors, women are equally well-represented in high-paying positions and leadership responsibilities (Ahmad et al., 2024).

When assessing economic growth, it is crucial to consider women's employment in the service industries, as it is a significant factor. It guarantees gender parity by fostering economic growth. According to the UN Women (2024) report, economic growth and higher productivity can be stimulated through women's employment in the service sector. Employment opportunities for women in the service sector foster the development of new entrepreneurs, creating a more innovative and job-oriented environment. Additionally, Mari et al. (2024) underscored the significance of female entrepreneurs in market development. They demonstrated that greater gender diversity in leadership positions leads to increased productivity and enhanced employment opportunities. The increased participation of women in the service sector reinforces gender equity. Women with specialized skills and education are predominantly employed in the tourism industry, constituting a significant portion of the service sector. According to Rahman et al. (2024); Dikilitas et al. (2022), tourism favors women's employment in the service sector, namely in the hospitality and service industries. Globalization typically fosters the growth of IT industries, which rely on a skilled workforce. Globalization has led to a boom in work prospects for educated women and has also played a role in reducing gender disparities by creating additional possibilities for women. Fazaalloh (2024) explains that FDI has a favorable effect on both economic growth and the development of human capital in developing countries. Utouh and Kitole (2024) argued that education has improved work prospects for women, particularly in the service sector, as education is essential for acquiring the necessary skills and knowledge. Almutairi (2024) has found substantial returns on investment in education. Their research emphasizes that education is a significant factor in women's employment, especially in the service industry.

METHODOLOGY

1. Data and Variables

Table 1 provides an overview of the variables used in this study, detailing their names, short names, descriptions, and sources. The dependent variable, the female labor force in service, is the percentage of female employment in services, modelled by ILO estimates. Independent variables include tourism, globalization, FDI, export, and education. The four variables, tourism, female service in the labor force, FDI, export, and education data, were collected from World Development Indicators (WDI). Globalization data was collected from the KOF Swiss Economic Institute. In this paper, all variables were transformed using the natural logarithm (ln) transformation to normalize the data. The natural log transformation helps address potential non-linearity and heteroskedasticity in the data, stabilizes the time series variance, and makes the relationships between variables more linear. Figure 2 outlines the research process in a step-by-step manner. It starts with the introduction and literature review, progressing through the research aim and framework, study zone, and variable selection. The theoretical background and empirical framework are presented below. It then proceeds to robustness checks and specific country findings, including discussion, conclusion, and policy recommendations. This diagram provides a clear, step-by-step roadmap of the entire research process.

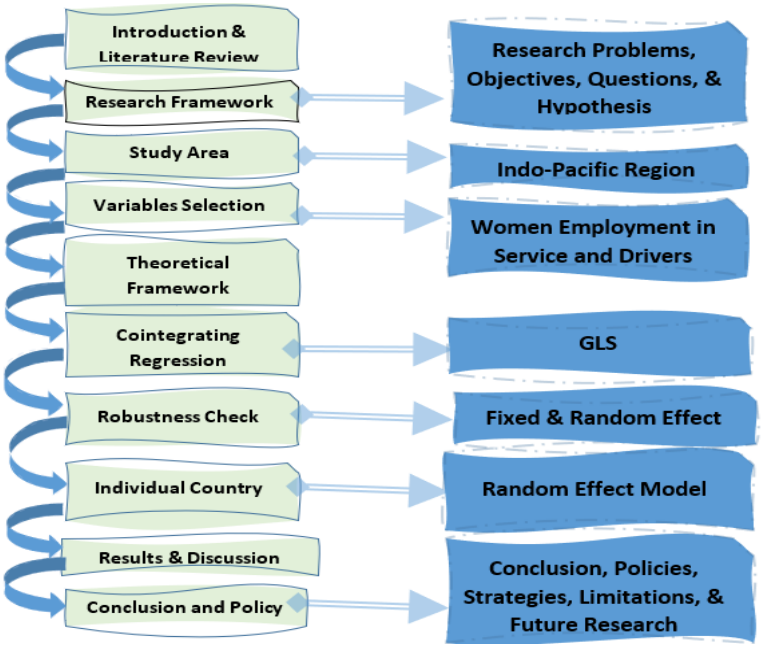

Figure 2. Methodology and Workflow Diagram

In the context of this study, the research utilizes a combination of interpolation and extrapolation techniques to manage missing data. Particularly, the research employed linear interpolation to estimate missing values within the data range, ensuring continuity in the dataset without introducing bias or shock. Extrapolation was used cautiously for data points outside the observed range to extend known patterns while minimizing potential errors. These methods confirmed that our data set remained robust and consistent, and provided a complete basis for further research.

The study examines empirical evidence explicitly about the factors that influence women's employment in the service sector in the Indo-Pacific countries. The model of the relationship between the dependent variable (women's employment in service) and the independent variables (Tourism, Globalization, FDI, Export, and Education) is shown in the following Equation (Voumik et al., 2023):

$$FemServ = f(TOUR, GLOB, FDI, EXP, EDU) \quad (1)$$

Here the variables are denoted by *GLOB, TOUR, FDI, EXP*, and *EDU* that means globalization, tourism, foreign direct investment, exports, and education, respectively. The measurement unit of those selected variables are presented in Table 1.

The theoretical framework representing the relationship is written as follows in Equation (Voumik et al., 2023):

$$FemServ_{it} = \alpha_0 + \alpha_1 TOUR_{it} + \alpha_2 GLOB_{it} + \alpha_3 FDI_{it} + \alpha_4 EXP_{it} + \alpha_5 EDU_{it} + \mu_{it} \quad (2)$$

FemServ indicates female employment in the service sector; *GLOB, TOUR, FDI, EXP*, and *EDU* denote globalization, tourism, foreign direct investment, exports, and education, respectively. Furthermore, α_0 is the constant term, α_{1-5} are coefficients, i illustrates the cross-section units; t is the time dimension, and μ_{it} is the error term.

Table 1. List of variables and sources

Variables Name	Short Name	Measurement Unit Details	Sources
Female Labor Force in Service	FemServ	Employment in services, female (% of female employment) (modelled ILO estimate)	World Development Indicators (WDI)
Tourism	TOUR	International tourism, number of arrivals	WDI
Globalisation	GLOB	KOF Globalisation Index	KOF Swiss Economic Institute
Foreign Direct Investment	FDI	Foreign direct investment, net inflows (BoP, current US$)	WDI
Export	EXP	Exports of goods and services (% of GDP)	WDI
Education	EDU	Government expenditure on education, total (% of GDP)	WDI

Table 2. Summary statistics of the variables

	FemServ	GLOB	TOUR	FDI	EXP	EDU
count	384	384	384	384	384	384
mean	3.958	4.157	15.808	21.946	3.578	1.311
std	0.519	0.204	1.067	4.677	0.764	0.32
median	4.164	4.17	15.614	22.821	3.395	1.282
skewness	-0.984	-1.271	0.876	-4.003	0.604	-0.703
kurtosis	0.013	1.848	0.699	16.314	-0.185	1.952

Table 2 presents the summary statistics for the variables used in this study. The sample consists of 384 observations for each variable. The mean value for the female labor force in service is 3.958, with a standard deviation of 0.519, while

globalization has a mean of 4.157 and a standard deviation of 0.204. Tourism has a mean of 15.808 with a higher variability, indicated by a standard deviation of 1.067. Notably, FDI shows significant variation with a mean of 21.946 and a standard deviation of 4.677. FDI and its distribution are highly skewed, as indicated by the skewness and kurtosis values. All variables show significant p-values for the Jarque-Bera test, indicating non-normal distributions.

2. Econometric framework

Before applying any regression analysis, it is crucial to use a unit root test, as this prevents erroneous conclusions. Unit roots guarantee that all variables are stationary. This study will employ the Augmented Dickey-Fuller (Dickey & Fuller, 1981) and Phillips-Perron test (Phillips & Perron, 1988). According to Dickey & Fuller (1981), the ADF test is more robust and applicable to complex models. Both the ADF test and PP test handle serial correlation. ADF test is formulated in the following Equation (Dickey & Fuller, 1981):

$\Delta Y_{it}=\alpha i + \gamma i Y_{it-1} + \sum_{K=1}^{P} \beta ik\, \Delta\, Y_{it-k}+\varepsilon it$ (3)

Here, t denotes the time series and I denotes cross-section units, ΔY_{it} presents the first difference of the variable, αi is the intercept term, Y_{it-1} is the lag value of the variable, γi is the coefficient of the lag variable, K is arbitrary constant, P is the number of lag, βik is the coefficient of the lag differences and εit is the error term.

The PP equation is constructed in the following Equation (Dickey & Fuller, 1981):

$\Delta Y_{it}=\alpha i + \gamma i Y_{it-1}+\varepsilon it$ (4)

The PP test does not include lagged differences in the dependent variable. Here, t denotes the time series and i denote cross-section units, ΔY_{it} presents the first difference of the variable, αi is the intercept term, Y_{it-1} is the lag value of the variable, γi is the coefficient of the lag variable. After analyzing the unit root test, the research will examine the Johansen Cointegration test to examine the cointegrating relationship among the time series.

After examining the diagnostic tests for unit roots and cointegration, the paper will proceed with the long-run regression analysis. To determine how tourism, globalization, FDI, exports, and education impact women's employment in the service sector, the paper employs GLS regression. GLS is more appropriate because this method deviates from the traditional assumption of homoscedasticity. GLS is a more robust and unbiased estimator because it does not imply either homoscedasticity or autocorrelation (Wooldridge, 2010). The GLS alters the estimation method to account for heteroscedasticity or autocorrelation by transforming the original data or employing weights to the observations. Even if the error terms show heteroscedasticity or serial correlation, then the GLS transformation and adjustment also guarantee unbiased and efficient estimates and ensure the validity of the estimation (Gujarati & Porter, 2009). The GLS regression is explained in the following Equation (Voumik et al., 2023):

$FemServ_{it} = \alpha_0 + \alpha_1 GLOB_{it} + \alpha_2 TOUR_{it} + \alpha_3 FDI_{it} + \alpha_4 EXP_{it} + \alpha_5 EDU_{it} + \mu_{it}$ (5)

FemServ indicates female employment in the service sector, GLOB shows globalisation, TOUR reflects tourism, FDI demonstrates foreign direct investment, EXP indicates exports, and EDU indicates education. Moreover, $\alpha_0$is the constant term, α_{1-5} are coefficients, i illustrates the cross-section units; t is the time dimension, and μ_{it} is the error term. The logarithmic transformation of the variables is demonstrated in the following Equation (Voumik et al., 2023):

$lnFemServ_{it} = \alpha_0 + \alpha_1 lnGLOB_{it} + \alpha_2 lnTOUR_{it} + \alpha_3 lnFDI_{it} + \alpha_4 lnEXP_{it} + \alpha_5 lnEDU_{it} + \mu_{it}$ (6)

According to Majeed and Ozturk (2020) and Siddique and Kiani (2020), the log transformation is a tool for interpreting the coefficients of the variables because it can manage skewed data and nonlinear relationships, making the regression interpretation more efficient and robust. Consequently, panel data econometric models (fixed effect and random effect) are implemented to account for unobserved effects, including country-specific effects. In contrast, a fixed effects model permits a correlation between explanatory factors and the unobserved effect μi for a cross-section and does not make this assumption. Another reason for applying the fixed effect and random effect models exists. The fixed-effects and random-effects frameworks are beneficial for analysing missing data because they allow for linking the missing data to any of the other variables in the model. Wooldridge (2010) uses random and fixed effect models to resolve the potential problem of missing variables in panel data analysis.

Equation by (Wooldridge, 2010) can be used to express the fixed-effects model.

$y_{it} = \alpha_i + \lambda_t + \beta'_{xit} + \mu_{it}$, i= 1, 2……N; t= 1, 2……..T (7)

Where it denotes the time series and cross-section units; y_{it} represents the dependent variable (women employment in the service sector); xit denotes the explanatory variables; the vector of coefficients is denoted by β '; αi represents the individual-specific concept; λt is the period-specific intercept; and $\mu_{it} \sim N(0, \sigma_u^2)$.

The following Equation ((Wooldridge, 2010) expresses the random-effects model:

$y_{it} = \alpha_i + \lambda_t + \beta'_{xit} + \mu_i + \varepsilon_{it}$ i= 1, 2……N; t= 1, 2……..T (8)

Where the measurement unit explain that, individual-specific error component is indicated by μi and $\mu_i \sim N(0, \sigma_u^2)$; the period-specific error component is narrated by λt and $\lambda_t \sim N(0, \sigma_\lambda^2)$; the idiosyncratic error component is illustrated by εit and $\varepsilon_{it} \sim N(0, \sigma_\varepsilon^2)$.

RESULTS ANALYSIS AND DISCUSSIONS

Figure 3 shows the correlation matrix of the variables. The female labor force in service strongly correlates positively with globalization, and the value is 0.79. Export and education also positively correlate with female in service. The correlation value of the female labor force and education is 0.29. Tourism and FDI show negative correlations with female employment, suggesting an inverse relationship. Table 3 presents all independent variables' Variance Inflation Factor (VIF) values. All VIF values are below the common threshold of 10, indicating no severe

multicollinearity in our variables. The highest VIF is observed for globalization at 1.400, while FDI has the lowest at 1.090. The overall VIF and 1/VIF tests suggest low collinearity among the independent variables.

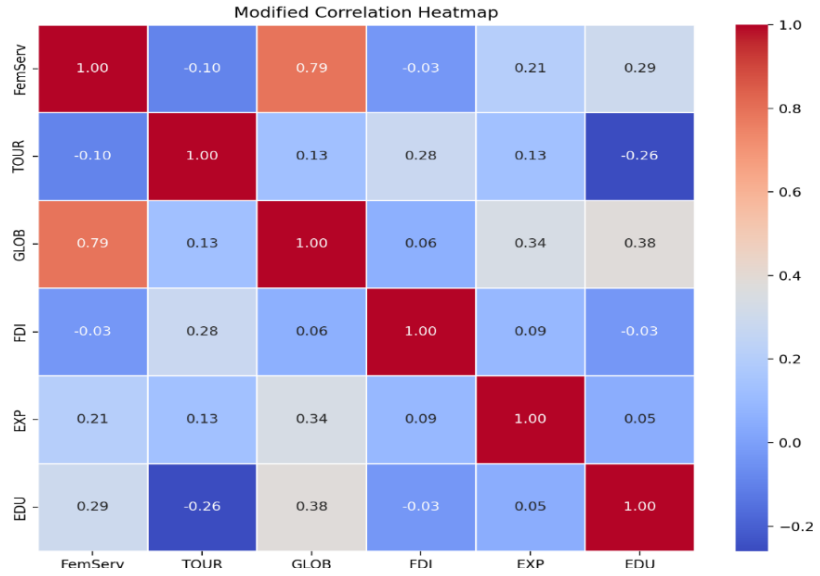

Figure 3. Correlation heatmap of female service employment and economic indicators

Table 3. Multicollinearity tests

Variable	VIF	1/VIF
const	581.368	0.002
TOUR	1.241	0.806
GLOB	1.400	0.714
FDI	1.090	0.917
EXP	1.150	0.870
EDU	1.329	0.752

Table 4. Unit root test (ADF & PP)

Variable	Test	ADF Statistic	ADF p-value	PP Statistic	PP p-value	Critical value (1%)	Critical value (5%)	Critical value (10%)
FemServ	Level	-2.9158	0.0435	0.2848	0.1	-3.4475	-2.8691	-2.5708
	1st Difference	-19.6822	0.001	0.0579	0.1	-3.4476	-2.8691	-2.5708
TOUR	Level	-3.2645	0.0165	0.3845	0.0838	-3.4475	-2.8691	-2.5708
	1st Difference	-18.8417	0.001	0.0516	0.1	-3.4476	-2.8691	-2.5708
GLOB	Level	-4.5851	0.0001	0.1659	0.1	-3.4477	-2.8692	-2.5708
	1st Difference	-9.9798	0.001	0.0174	0.1	-3.4477	-2.8692	-2.5708
FDI	Level	-4.6218	0.0001	0.2926	0.1	-3.448	-2.8693	-2.5709
	1st Difference	-8.0903	0.001	0.0459	0.1	-3.4482	-2.8694	-2.571
EXP	Level	-2.6581	0.0816	1.4796	0.01	-3.4475	-2.8691	-2.5708
	1st Difference	-20.3565	0.001	0.0616	0.1	-3.4476	-2.8691	-2.5708
EDU	Level	-4.2871	0.0005	0.3248	0.1	-3.4476	-2.8692	-2.5708
	1st Difference	-17.9986	0.001	0.0352	0.1	-3.4476	-2.8691	-2.5708

Table 4 presents the results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests, respectively. Both tests indicate that all variables, except for exports (EXP), are stationary at the 5% significance level, as their p-values are below 0.05 and their test statistics exceed the critical values. These results suggest that most of the series do not contain a unit root problem and are suitable for regression analysis.

Table 5. Johansen cointegration tests

Variables	Eigenvalues	Trace Statistic	Critical Values (90%)	Critical Values (95%)	Critical Values (99%)
FemServ	0.204586	170.8377	91.109	95.7542	104.9637
TOUR	0.098093	83.40083	65.8202	69.8189	77.8202
GLOB	0.042987	43.9615	44.4929	47.8545	54.6815
FDI	0.038096	27.17704	27.0669	29.7961	35.4628
EXP	0.020179	12.33997	13.4294	15.4943	19.9349
EDU	0.011847	4.552576	2.7055	3.8415	6.6349

The Johansen cointegration test in Table 5 identifies the presence and number of cointegrating relationships among multiple time series. If the trace statistic exceeds the critical values at given significance levels (90%, 95%, 99%), it

indicates the presence of cointegration. It uses eigenvalues and trace statistics to evaluate the null hypothesis of no cointegration against the alternative of at least one cointegrating relationship.

Table 6 demonstrates the fixed and random effect findings to check the robustness. In the fixed and random effects model, tourism, globalization, education, and FDI are significant and positive determinants of female employment in the service sector, with considerable p-values, respectively. A positive coefficient value for variable tourism indicates a positive relationship between women's employment and tourism in the chosen panel group. The coefficient values are 0.037 and 0.340, suggesting that a one per cent rise in tourism leads to a 0.037 and 0.034 per cent increase in women's employment in the service industry. The findings are similar to those of Bolukoglu & Gozukucuk (2024). The tourism industry in Indo-Pacific countries is related to the hospitality, retail, transportation, food, and entertainment sub-sectors, generating more job demand in these sub-sectors. Tourism offers more flexible jobs in these countries, such as part-time and seasonal jobs. Part-time and seasonal jobs are flexible for women in every country.

Furthermore, the coefficient value of variable globalization is positive, indicating a positive relationship between employment and globalization. The coefficients are 0.992 and 1.009, indicating that a one per cent rise in globalization leads to a 0.992 and 1.009 per cent increase in women's employment in the service industry. The results of Hossain et al. (2022), and Ayenagbo (2022) also concluded that globalization enhanced women's employment in different regions. Globalization has increased labor demand across several sub-industries, such as hospitality, information technology, export-import-related sectors, and finance. These sectors provide part-time job options and flexible working circumstances, particularly attracting women. The coefficients of FDI are positive and statistically significant, indicating a positive correlation between women's employment and FDI. An increase in FDI contributes to the rise in women's employment. The research of Nica et al. (2023) and Kucera & Tejani (2014) also highlighted that FDI enhanced women's employment in the service sector, however, as FDI is related to building new industrializations, many job opportunities can be generated.

The positive coefficient value of education indicates a positive correlation between women's employment and education in the chosen panel group. The coefficient values are 0.0476 and 0.0472, indicating that a one per cent increase in schooling contributes to a 0.0476 and 0.0472 per cent rise in women's employment in the service industry. Education is critical to advancing women's abilities and capabilities and acquiring essential information and mastery in service. The education level of women in the Indo-Pacific region is increasing, and their participation in the labor market is increasing (Koch & Kuckertz, 2024). Khan et al. (2024) support that education helps increase women's employment and living standards. Only exports show negative coefficients, meaning that as exports rise, the decrease in women's employment due to lack of skill and expertise that is required by the export-oriented firms and industry.

The null hypothesis of the Hausman test shows that the Random Effects model is appropriate, while the alternative hypothesis suggests that the Fixed Effects model is more suitable. The test statistics are negative (-13.0653), which is unusual and can occur due to small sample sizes or model misspecification. In practice, we typically interpret the absolute value of the test statistics. Based on these results, we fail to reject the null hypothesis. This means that the Random Effects model is preferred over the Fixed Effects model for our data. According to the Hausman test results, the random effect model is preferable. The Random Effects model assumes that the individual-specific effects are uncorrelated with the independent variables, which appears to be the case in our data.

Table 6. Fixed and random effect (Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1)

Variables	**FE**	**RE**
TOUR	0.0373***(0.00969)	0.0340***(0.00977)
GLOB	0.992***(0.0549)	1.009***(0.0550)
FDI	0.00325***(0.00113)	0.00319***(0.00115)
EXP	-0.0515*(0.0271)	-0.0513*(0.0267)
EDU	0.0476*(0.0262)	0.0472*(0.0265)
Constant	-0.706***(0.158)	-0.724***(0.179)
Observations	384	384
R-square	0.721	
Hausman Test		
Test Statistic	Degrees of Freedom	Probability
-13.0653	6	p>0.10

Table 7 demonstrates the long-run estimation findings of the GLS regression. GLS is used to check the robustness of the results. The GLS results match the baseline regression FE and RE findings.

Table 7. GLS regression

	Coefficients	**Std. Error**	**T-Statistic**	**P-Value**
const	-0.724	0.179	-4.052	0.001
TOUR	0.034	0.01	3.479	0.001
GLOB	1.009	0.055	18.337	0.001
FDI	0.003	0.001	2.769	0.006
EXP	-0.051	0.027	-1.919	0.056
EDU	0.047	0.027	1.78	0.076

Table 8. Impacts on individual country (*** p<0.01, ** p<0.05, * p<0.1)

	const	TOUR	GLOB	FDI	EXP	EDU
Australia	3.694***	0.014*	0.009	-0.000	0.141***	0.067
China	-1.042	-0.084**	1.094***	0.091**	-0.250***	0.203*
India	-2.308***	0.370***	0.529**	-0.117***	0.106	-0.156
Indonesia	1.797*	0.005	0.780***	0.001	-0.380***	-0.014
Japan	1.923***	-0.003	0.388***	0.000	0.185***	0.275***
Korea, Rep.	0.712***	-0.009	0.741***	0.016	0.034	0.074
Malaysia	0.258	-0.003	1.045***	0.005	-0.107	-0.108
Philippines	-0.105	0.033*	0.933***	0.007	-0.095**	0.129**
Singapore	1.497***	-0.001	0.341***	0.051***	0.061	-0.123
Thailand	-2.046***	0.258***	-0.052	-0.005*	0.518***	-0.262***
Viet Nam	-0.699***	0.008	0.414**	0.054**	0.272***	0.015
New Zealand	4.078***	0.049***	0.083	-0.001	-0.271***	0.114***

Table 8 illustrates the coefficients of different variables and represents how these variables impact women's employment in the service sector across the Indo-Pacific regions. In Australia, tourism slightly impacts female employment in the service sector, while exports have a more significant positive effect. Globalization, FDI, and education do not significantly impact FemServ statistically. The positive coefficient value of the variable tourism indicates a positive relationship between women's employment and tourism in Australia. The coefficient value is 0.014, suggesting that a one per cent increase in tourism contributes to a 0.014 per cent rise in women's employment in the service industry. The coefficient value of globalization is 0.009, indicating that a one per cent increase in globalization raises 0.009 per cent of women's employment in the service industry. On the other hand, the coefficient value of exports is 0.141, indicating that a one per cent increase in exports raises 0.141 per cent of women's employment in the service industry in Australia.

Conversely, in China, FDI and globalization exhibit notable positive impacts on FemServ, whereas tourism has a slight negative effect. In addition, the coefficient of FDI is 0.091, significant at the 5% level, and the coefficient of education is 0.203, which is important at a 10% level. Export impacts are negative, albeit not statistically significant, and education shows a neutral effect. Indonesia experiences positive impacts from globalization and FDI on FemServ, with significant effects noted for tourism as well. Meanwhile, Japan shows positive impacts from FDI and globalization, with tourism also exerting a positive but minimal influence. South Korea has revealed positive impacts from globalization and FDI, with tourism, exports, and education showing slight positive effects. The coefficient values in South Korea are 0.741, 0.016, -0.009, 0.034, and 0.074, respectively.

The Philippines exhibits significant positive impacts from globalization and tourism on FemServ, with mixed effects from other variables. Singapore experiences positive impacts from FDI and globalization, while tourism and education show minor positive effects. Thailand, Vietnam, and New Zealand each display distinct patterns of impact from these variables on FemServ, reflecting varying economic contexts and policy environments influencing female employment in their service sectors. The positive coefficient value of the variable tourism indicates a positive relationship between women's employment and tourism in Australia. The coefficient value is 0.049, suggesting that a one per cent increase in tourism contributes to a 0.049 per cent rise in women's employment in the service industry. The coefficient value of globalization is 0.083, indicating that a one per cent increase in globalization raises 0.083 per cent of women's employment in the service industry. On the other hand, the coefficient value of education is 0.114, indicating that a one per cent increase in education raises 0.114% cent of women's employment in the service industry in Australia.

CONCLUSION AND RECOMMENDATIONS

Tourism is essential in increasing women's employment in the service sector worldwide, particularly in the Indo-Pacific countries, as tourism plays a crucial role in employment opportunities in the service sector. The main objective of this research is to focus on how tourism, globalization, FDI, exports, and education impact women's employment in the service sector in the selected Indo-Pacific countries. The listed countries are Australia, New Zealand, India, China, Vietnam, Thailand, Malaysia, Indonesia, South Korea, the Philippines, Singapore, and Japan.

By analyzing the data from 1991 to 2022, the research concluded how various social and economic indicators impact women's participation rate in the service sector. For the baseline regression, the researchers used the GLS approach. According to the GLS regression, tourism, globalization, FDI, and education positively impact women's participation in service sectors. As tourism grows, women's job opportunities in the service sector widen.

This research area, making a significant contribution to enhancing employment opportunities for women. The research also employed fixed and random effects models to assess robustness. The robust findings of FE and RE proved the validity of the GLS regression. The study also applied random effects to check a specific country's performance. Tourism has a positive and significant impact on women's employment in the service sectors of Australia, India, Japan, the Philippines, and Thailand. Globalization has had a significant and positive impact on nine countries such as, India, China, Vietnam, Thailand, Malaysia, South Korea, the Philippines, Singapore, and Japan.

At the same time, FDI has a positive effect only on three countries (China, Singapore, and Vietnam). Foreign direct investment (FDI) hinders female employment in the service sector in India and Thailand. Exports increase female employment in Australia, Japan, Thailand, and Vietnam. Education has a positive and significant impact on women's employment in China, Japan, the Philippines, and New Zealand.

Policy Recommendations

The tourism industry has a significant impact on women's employment in the Indo-Pacific countries, making it essential for public authorities to promote women-driven tourism businesses. This can be achieved by granting licenses to organizations encouraging women to take leadership roles and offering incentives such as low-interest credit to women starting businesses in tourism-related sectors. To ensure women participate fully, it is crucial to create safe workplaces, provide dependable transportation, and establish protective measures against workplace harassment. Additionally, globalization positively affects women's employment, and policymakers should foster platforms for women entrepreneurs in international markets. It is important to enforce fair trade regulations that guarantee equal pay for women and ensure that multinational companies adhere to gender equality principles.

FDI plays a crucial role in boosting women's employment, especially in retail, healthcare, and hospitality industries. Governments should offer tax incentives to attract FDI into these sectors while ensuring that women's rights are protected through strict labor laws. Similarly, while exports have shown a minimal positive impact on women's employment in the service sector, policies should promote women's participation in export-led industries, particularly textiles and education services. Education is key to expanding opportunities for women, especially in science, technology, engineering, and mathematics (STEM), where countries like Japan and Singapore have already made significant progress. Public authorities must prioritize STEM education and improve literacy rates for women to enhance their involvement in the service sector.

Limitations and Future Research

This study needs more data for specific countries and years. Future data should address the data limitations by filling in the gaps in missing data. Additionally, the research is based on secondary data, which may limit the depth of understanding of local demographic, cultural, social, and policy influences on women's employment. This study considered significant factors such as tourism, globalization, FDI, exports, and education to measure the impact on women's employment in the service sector of Indo-Pacific countries.

Further study may consider other factors, such as technological innovation, urbanization, and uncertainty, such as political, economic and natural disasters. The research focused on the Indo-Pacific region, but there is an opportunity to research other panel groups such as N-11, D-8, G-7, and others. Future researchers will also examine how similar variables affect women's employment in different continents, such as Latin America, Europe, and Africa.

Appendix A. List of Countries

Australia, New Zealand, India, China, Vietnam, Thailand, Malaysia, Indonesia, South Korea, Philippines, Singapore, and Japan

Appendix B. List of Abbreviations

Abbreviations	Details
ADB	Asian Development Bank
ADF	Augmented Dickey-Fuller
ASEAN	Association of Southeast Asian Nations
BRICS	Brazil, Russia, India, China, and South Africa
BPO	Business process outsourcing
FDI	Foreign Direct Investment
G 7	Group Seven
GLS	*Generalised Least Squares*
GDP	Gross Domestic Product
IT	Information Technology
ILO	International Labour Organisation
PP	Phillips-Perron
N-11	*Next Eleven Countries*
OECD	*Organisation for Economic Co-operation and Development*
SAARC	*South Asian Association for Regional Cooperation*
UNCTAD	United Nations Conference on Trade and Development
UN	United Nations
VIF	Variance Inflation Factor
WDI	World Development Indicators

Author Contributions: Conceptualization, Q.A. and M.H.R.; methodology, M.A.K. and M.H.R.; software, Q.A and M.H.R.; validation, Q.A. and M.A.K. and M.H.R.; formal analysis, M.H.R. and M.A.K. and Q.A; investigation, Q.A. and M.A.K.; data curation, M.A.K and M.H.R; writing - original draft preparation, M.H.R. and M.A.K.; writing - review and editing, Q.A. and M.A.K.; visualization, Q.A. and M.A.K.; supervision, Q.A.; project administration, Q.A. and M.A.K. All authors have read and agreed to the published version of the manuscript.

Funding: Not applicable.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study may be obtained on request from the corresponding author.

Acknowledgements: The research undertaken was made possible by the equal scientific involvement of all the authors concerned.

Conflicts of Interest: The authors declare no conflict of interest.

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Article history: Received: 01.01.2025 Revised: 22.04.2025 Accepted: 19.05.2025 Available online: 25.06.2025