



UNIVERSITY OF WALES TRINITY SAINT DAVID

A Paper On

**Internet Penetration and Business Formation as Determinants
of BPO Revenue Growth in Bangladesh**

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Chapter 1: Introduction

1.1 Background

Business Process Outsourcing (BPO) is a strategic practice in which organisations transfer specific non-core business functions to external service providers. This allows firms to focus on their core activities while benefiting from greater efficiency, specialised expertise, and cost reductions. Outsourcing involves delegating entire processes, along with necessary resources, to third-party vendors who deliver services within agreed timeframes and costs (Kurshumov, 2013). In broader context, outsourcing refers to obtaining goods or services from external suppliers rather than producing them in-house, with the outsourcing firm acting as the buyer and the service provider as the vendor. Such arrangements often involve close collaboration and knowledge sharing (Dolgui & Proth, 2013). In practice, outsourcing can be contractual or long-term and covers a wide range of services. BPO specifically focuses on business processes such as payroll, billing, accounting, and customer support. It is commonly divided into back-office functions (e.g., accounting and procurement) and front-office services (e.g., sales, marketing, and technical support). Overall, BPO enhances operational efficiency and reduces costs by leveraging external expertise and technology (Overby, 2022).

The Business Process Outsourcing (BPO) industry has become a vital component of the global economy, enabling organisations to achieve cost efficiencies and improved operational performance. According to a prominent study, the BPO industry in Bangladesh has grown rapidly, becoming a significant contributor to job creation and overall economic development (Shahriar et al., 2025). Leading countries such as India and the Philippines have successfully leveraged this model, positioning themselves as dominant players in the global BPO landscape (Huda et al., 2025). The global BPO market is experiencing rapid growth, with a projected compound annual growth rate (CAGR) of 9.4% between 2023 and 2030. In 2022, the

market was valued at approximately USD 262 billion, reflecting the increasing recognition among businesses of the strategic advantages of outsourcing (The Future of BPO: Why BPO Is a Rapidly Growing Industry, 2024). This expansion is largely driven by technological advancements, cost optimisation initiatives, and organisations' growing emphasis on concentrating on their core activities. For developing economies such as Bangladesh, the BPO sector presents substantial potential for economic diversification, employment generation, and workforce skill enhancement.

BPO Global Prospect and Bangladesh: Bangladesh is one of the most densely populated countries in the world, with a population of nearly 170 million, of whom approximately 80 million are graduates (BBS, 2023:72). The country's industrial development accelerated after the partition of India, supported by labour reforms and the establishment of new industries (Basu, 2021). By the 1990s, the ready-made garments (RMG) sector had become a cornerstone of Bangladesh's economy. As of 16 March 2024, Bangladesh holds the global distinction of having the highest number of environmentally certified green garment factories under the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) programme. These include 80 platinum-rated, 119 gold-rated, 10 silver-rated factories, along with four uncertified facilities (The Business Standard, 2024).

Alongside the RMG sector, outsourcing has emerged as another high-potential area for economic expansion in Bangladesh. The global investment firm Goldman Sachs has identified Bangladesh as one of the 'Next Eleven' economies following the BRIC countries (Brazil, Russia, India, and China). Within this expanding outsourcing landscape, small and medium-sized enterprises (SMEs) in the IT sector have played a leading role. Research by Gartner Inc. places Bangladesh among the top 30 global outsourcing destinations, indicating strong international demand for its services. Again, the Kearney Global Services Location Index (GSLI) 2023 indicates that India remains the leading country in the global outsourcing market. Other South Asian countries also rank within the top 50 destinations, with Pakistan at 29th,

Sri Lanka at 44th, and Bangladesh at 47th, highlighting the growing significance of the region in outsourcing. To further support the industry, the government provides generous tax incentives, enabling foreign investors to benefit from comparatively lower operational costs when outsourcing work to Bangladesh (Bose et al., 2013). Consequently, Bangladesh's expanding economy, youthful and educated labour force, and cost competitiveness make it an attractive destination for BPO investment. Despite the availability of a substantial skilled workforce, the growth of Bangladesh's BPO sector has remained below expectations. According to the Bangladesh Bureau of Statistics, nearly 800,000 graduates were unemployed in 2022 (Star Business Report, 2023). In contrast, employment in the BPO industry increased from approximately 25,000 workers in 2016 to around 70,000 in 2022 (Acote, 2023), a relatively modest figure when compared to the large pool of unemployed graduates. This disparity underscores the considerable untapped capacity within the sector.

At the same time, the global outsourcing market is projected to reach a value of USD 525 billion by 2030, while the BPO industry in Bangladesh currently employs around 100,000 people (Asad, 2023). This indicates that nearly 700,000 skilled individuals remain available for potential employment in the sector. Such conditions present a substantial opportunity for BPO investors and position Bangladesh as a viable competitor to established outsourcing hubs such as India and the Philippines.

Against this background, this study aims to empirically examine the impact of internet penetration and new business registration on the growth of the BPO sector in Bangladesh. Using annual secondary data and quantitative analytical techniques, the research seeks to identify whether improvements in digital connectivity and entrepreneurial activity significantly influence BPO revenue over time. By providing data-driven evidence, this study contributes to the existing literature on digital economy-led growth and offers practical insights for policymakers, investors, and industry stakeholders seeking to unlock the untapped potential of Bangladesh's BPO sector.

1.2 Research Questions

- i. What is the relationship between internet penetration and BPO revenue growth in Bangladesh over time?
- ii. How does the rate of new business registrations influence the annual revenue of the BPO sector?
- iii. To what extent do increases in internet penetration affect the number of new businesses registered in Bangladesh?
- iv. Can changes in internet penetration and new business registration be used to predict future BPO revenue?
- v. Does the growth in internet penetration mediate the relationship between new business registrations and BPO revenue?
- vi. Are there significant variations in BPO revenue growth corresponding to periods of rapid changes in internet penetration or business registration rates?

1.3 Research Objectives

Below are the specific and focused objectives of this study:

- Examine the trend of internet penetration in Bangladesh and its impact on annual BPO revenue growth.
- Assess the influence of new business registrations on the income generated by the BPO sector each year.
- Evaluate the correlation between internet penetration rates and new business formation in Bangladesh.
- Develop predictive models that estimate BPO revenue based on internet penetration and new business registration data.
- Identify whether internet penetration serves as a significant predictor of growth in the BPO industry.
- Determine the combined effects of internet penetration and business registration on the performance of the BPO market.

1.4 Scope of the Research

This research focuses on examining the growth dynamics of the Business Process Outsourcing (BPO) sector in Bangladesh, with particular emphasis on the roles of internet penetration and new business registration. The study is quantitative in nature, relying on annual secondary data collected from credible sources, like Statista, and including the Bangladesh Bureau of Statistics (BBS), Bangladesh Telecommunication Regulatory Commission (BTRC), BASIS, and relevant industry reports.

The geographical scope is limited to Bangladesh, given its emerging potential as a BPO destination and the availability of official data. Temporally, the research considers yearly data over a selected period (e.g., 2016–2029), which allows the identification of trends, growth patterns, and correlations among the key variables.

The study specifically investigates:

1. The impact of internet penetration on BPO revenue growth.
2. The influence of new business registrations on the performance of the BPO sector.
3. The combined effect of internet penetration and new business formation on BPO revenue, including potential mediation effects.

While the research explores the relationship between digital infrastructure, entrepreneurial activity, and BPO growth, it does not extend to micro-level operational analysis of individual BPO firms, customer satisfaction, or service quality. Similarly, it excludes other potential factors affecting BPO growth, such as foreign direct investment, political stability, or global market fluctuations, except where they indirectly influence the key variables.

By delineating these boundaries, the study provides a focused, data-driven assessment of the structural and digital determinants of BPO growth in Bangladesh, offering insights for policymakers, investors, and industry stakeholders interested in promoting and scaling the sector.

1.5 Proposed Contribution

This study aims to provide both academic and practical contributions to the understanding and development of the Business Process Outsourcing (BPO) sector in Bangladesh.

1. Academic Contribution

- The research will expand the existing literature on digital economy-driven growth by empirically examining how internet penetration and new business registration influence BPO sector performance in a developing country context.
- By integrating internet infrastructure, entrepreneurial activity, and sectoral revenue into a single analytical framework, the study offers a novel quantitative approach to understanding the determinants of BPO growth.
- The research will contribute to policy-oriented BPO studies, particularly in South Asian economies, by identifying measurable relationships and trends that have been underexplored in Bangladesh-specific literature.

2. Practical Contribution

- The findings will provide evidence-based insights for policymakers to formulate strategies that encourage BPO sector development, such as improving digital infrastructure, supporting entrepreneurship, and incentivising investment.
- For investors and industry stakeholders, the study highlights potential growth drivers and untapped opportunities, helping in decision-making regarding investment in BPO operations, technology adoption, and workforce development.

- The research may also serve as a reference for educational and training institutions, illustrating the importance of aligning workforce skills with sectoral requirements to maximize the contribution of human capital to BPO growth.

Overall, this study seeks to bridge the gap between digital infrastructure, entrepreneurship, and industry performance, offering actionable recommendations to enhance the competitiveness and sustainability of Bangladesh's BPO sector in the global market.

Chapter 2: Literature Review

The Business Process Outsourcing (BPO) sector has emerged as a strategic avenue for economic growth, efficiency, and employment generation globally. By enabling organizations to delegate non-core business functions to specialized service providers, BPO reduces operational costs, enhances productivity, and allows firms to focus on their core competencies (Somjai, 2017; Ruslan, 2019). Bangladesh entered the BPO industry in 2004 and has steadily developed its capabilities, with over 500 firms currently serving international clients (Ruslan, 2019). Despite this growth, the sector remains underdeveloped relative to global BPO hubs like India and the Philippines, signaling the presence of structural and operational challenges.

This chapter critically examines existing literature on the investment drivers, business environment factors, and growth opportunities of BPO in Bangladesh, highlighting gaps that motivate the present study.

2.1 Investment Drivers for BPO

Foreign Direct Investment (FDI)

FDI plays a pivotal role in BPO growth by providing capital, global expertise, and technology transfer. Bangladesh has attracted foreign investment due to low labor costs and a strong export-oriented manufacturing base, particularly in textiles and garments (Bairagi, 2024). However, dependence on a single sector and bureaucratic delays limit the translation of investor interest into actual capital flows. Policy unpredictability and infrastructural constraints further restrict FDI in the BPO sector (Bhuiyan et al., 2023; Hasan & Karim, 2022). While global research demonstrates FDI as a key driver for outsourcing development, Bangladesh-specific studies highlight the gap between potential and actual investment, necessitating better investor facilitation and streamlined approval processes.

Government Policies and Incentives

Government policies in Bangladesh, such as the 2025 ICT roadmap, prioritize BPO growth through skill development, infrastructure projects, and the promotion of digitalization (ICT Division, n.d.; Biswas, 2021). Tax breaks, export incentives, and ICT parks have been introduced to attract investors, yet policy implementation remains inconsistent, undermining the sector's growth. Industry 4.0, characterized by digital integration and advanced technologies, has heightened the need for regulatory standards in line with international data protection norms (Chaudhuri, 2020). Literature indicates that active government involvement is crucial in creating a robust technological foundation; however, fragmented policy support limits BPO scalability in Bangladesh (Iqbal et al., 2021).

Technology Infrastructure

ICT infrastructure is a critical enabler of BPO, enabling real-time service delivery and global client engagement (Dolgui & Proth, 2013). While urban areas in Bangladesh have experienced improvements in internet access and digital connectivity, rural-urban disparities, power outages, and limited bandwidth hinder broader sectoral growth (Zohir, 2023). Heavy reliance on imported digital devices and limited local innovation further restricts the adoption of cloud computing, cybersecurity measures, and advanced IT solutions. The literature underscores the importance of robust infrastructure in attracting high-value outsourcing contracts, yet few studies provide empirical evidence of its direct effect on BPO revenue in Bangladesh.

Skilled Workforce Availability

Bangladesh possesses a young, cost-effective labor force; however, the workforce often lacks industry-relevant skills, including English typing proficiency, soft skills, and specialized IT knowledge (Mamun et al., 2019). Existing training programs are fragmented, unevenly implemented, and insufficient to meet the evolving demands of BPO services. Comparative studies suggest that foreign BPO workers often exhibit superior

communication and problem-solving skills, highlighting the need for workforce development in Bangladesh (Huda et al., 2025). The literature points to a critical skills gap, indicating that labor availability alone is insufficient without strategic skill enhancement and curriculum alignment.

Cost Efficiency

Cost efficiency remains one of Bangladesh's strongest competitive advantages in BPO, with operational costs 40–60% lower than Western counterparts (Sakib et al., 2023). However, over-reliance on low labor costs may deter investment in quality improvement and innovation. As wages increase, the sector must transition from cost-based to value-based competitiveness to attract higher-value contracts (Islam & Rahman, 2020). Studies suggest that cost advantage, while necessary, is not sufficient for sustainable BPO growth; quality, technology, and workforce capability are equally critical.

2.2 Business Environment Factors

Economic Stability

Economic stability facilitates BPO growth by providing predictable macroeconomic conditions, such as steady GDP growth and controlled inflation (Kulembayeva & Seitzkazyeva, 2022). While Bangladesh has experienced relative stability, intermittent political unrest and fiscal imbalances can undermine investor confidence. Literature emphasizes that long-term economic predictability is essential for sustaining BPO sector investment (Asiabar & Azami-Aghdash, 2021).

Regulatory Framework

The regulatory environment shapes investor confidence and operational efficiency in BPO. Despite reforms in business registration and ease of doing business, red tape and corruption remain persistent barriers (Dewar &

Templeton, 2020; Kang, 2021). Data protection laws are underdeveloped, which poses risks for international clients handling sensitive information. Studies highlight the need for a transparent, investor-friendly legal framework to support sustainable BPO growth in Bangladesh.

ICT Development

Bangladesh has made progress in ICT through national strategies and donor-funded projects (Aziz, 2020). Nevertheless, fragmented policy frameworks, undefined terminologies (e.g., ‘digital divide’), and unclear roles of public-private actors hinder coherent sectoral development. Innovation hubs, R&D investment, and industry-academia collaboration remain limited, constraining the sector’s potential to adopt advanced ICT tools, including AI, automation, and cloud services.

Education and Training Programs

ICT and language training initiatives exist but often lack alignment with global BPO demands. Survey evidence indicates that both clients and providers face knowledge gaps, leading to suboptimal outsourcing outcomes (Huda et al., 2025). Current programs emphasize quantity over quality, neglecting cognitive, technical, and managerial skills essential for complex BPO services. Literature underscores the importance of strategic curriculum reform and industry-academia partnerships to enhance workforce readiness.

2.3 Growth Opportunities

Expansion of BPO Services

The BPO sector in Bangladesh is evolving from call centers toward Knowledge Process Outsourcing (KPO) and IT-enabled services (ITES). Sector revenues are projected to reach \$700 million by 2023, growing at 17%—well above the global average of 6.8%—yet the country’s share in the \$350 billion global market remains modest (Huda et al., 2025). Literature

indicates that strategic diversification and capacity building are required to achieve global competitiveness.

Employment Generation

BPO offers significant employment opportunities, especially for youth and women. However, job quality, career progression, and security remain limited. Studies highlight the need for long-term skill development, labor rights protection, and equitable digital access to convert employment generation into sustainable socio-economic benefits (Razzaque et al., 2025).

Export Revenue Growth

Export revenues from BPO remain small compared to garment exports. Most IT firms operate through subcontracting, limiting innovative IT product exports (Razzaque et al., 2020). Literature stresses the need for market penetration strategies, branding, and niche specialization to enhance Bangladesh's share in global BPO markets.

Innovation and Service Diversification

Innovation is constrained by low R&D investment, lack of entrepreneurial culture, and weak collaboration between startups and outsourcing firms. Diversification into AI-driven services, data analytics, fintech, and healthcare outsourcing represents potential growth areas, contingent on deliberate ecosystem-building efforts (Larsen et al., 2023).

Regional Development

The BPO sector can contribute to regional economic development by decentralizing operations beyond Dhaka. Lessons from the Philippines demonstrate that public-private partnerships and strategic location planning can generate jobs, revenue, and regional growth (Ramces et al., 2022). This literature about Bangladesh's BPO emphasizes that rural digital inclusion and local government support are key to realizing these benefits.

2.4 Literature Gaps

The review identifies several gaps:

- Limited empirical studies on Bangladesh's BPO sector, particularly linking digital infrastructure, entrepreneurship, and revenue.
- Lack of integrated frameworks examining investment drivers, business environment factors, and sectoral growth.
- Overreliance on descriptive analyses rather than causal or predictive models.
- Underexplored mediating factors such as education, ICT policy coherence, and regulatory efficiency.
- Limited attention to regional development and equitable workforce integration in sectoral growth studies.

2.5 Justification for the Study

The identified gaps underscore the need for quantitative, data-driven research that integrates investment drivers, business environment variables, and BPO growth outcomes. By examining the interplay of internet penetration, new business registration, and BPO revenue, this study aims to generate empirical evidence to inform policy, investment decisions, and strategic workforce planning.

Chapter 3: Methodology

This chapter outlines the research methodology employed to investigate the determinants of Business Process Outsourcing (BPO) growth in Bangladesh. The study specifically examines how internet penetration and new business registration influence BPO revenue, accounting for mediating factors such as ICT development, regulatory environment, and workforce skills. The methodology provides a systematic framework for data collection, measurement, and analysis, ensuring that the findings are both reliable and valid for policy and academic purposes.

3.1 Research Philosophy

This study adopts a positivist research philosophy, which assumes that reality can be objectively measured and quantified. A positivist approach is appropriate because the study focuses on observable, measurable variables, internet penetration, new business registration, and BPO revenue, and aims to test causal relationships using statistical techniques. Positivism is grounded in the hypothetico-deductive approach, which tests predefined hypotheses, typically formulated in quantitative terms, by examining systematic relationships between causal or explanatory variables (independent variables) and observable outcomes (dependent variables) (Park et al., 2020). This philosophy aligns with the study's quantitative research design and reliance on secondary data.

3.2 Research Design

This study adopts a quantitative, explanatory research design to empirically examine the determinants of growth in Bangladesh's Business Process Outsourcing (BPO) sector. The research focuses on identifying the extent to which digital connectivity and entrepreneurial activity influence BPO revenue

over time. A time-series analytical approach is employed, using secondary data collected from reliable international sources.

A quantitative approach is appropriate given the study's objective to establish statistical relationships between variables and to test theoretically informed assumptions derived from the outsourcing and digital economy literature. The explanatory nature of the research allows for causal inference within the constraints of observational data.

3.3 Data Sources and Data Collection

The study relies exclusively on secondary quantitative data, which are publicly available and ethically permissible for academic research. All data were obtained from Statista, a widely recognized and reputable global database that compiles data from official sources, industry reports, and international organizations (Statista, 2025).

An Excel-based dataset was extracted from Statista, containing annual observations on the following variables:

- i. BPO revenue in Bangladesh
- ii. Internet penetration rate in Bangladesh
- iii. New business registration figures in Bangladesh

The dataset covers a continuous time period (subject to availability), allowing for longitudinal analysis of trends and relationships. Data consistency and comparability were ensured by selecting indicators that are measured using standardized definitions across years.

3.4 Variable Description and Measurement

Dependent Variable

1. BPO Revenue

Despite facing various economic risks and challenges, the Business Process Outsourcing (BPO) industry in the Philippines has recorded an average annual growth rate of around 10% over the past decade, contributing substantially to employment generation and revenue growth, and thereby supporting the country's overall economic stability (Ramces et al., 2022). So, BPO revenue is a vital variable by which the whole BPO industry's performance can be interpreted. BPO revenue represents the annual income generated by Bangladesh's Business Process Outsourcing sector, measured in USD. This variable serves as a proxy for sectoral growth and performance, consistent with prior empirical studies on outsourcing and service exports.

Independent Variables

1. Internet Penetration

Internet penetration is measured as the percentage of the total population with access to the internet. The BPO industry depends extensively on reliable electricity and internet connectivity to operate its systems, communicate with clients, and effectively deliver services (Fabunan et al., 2025). This variable captures the level of digital infrastructure and connectivity, which is considered a fundamental enabler of outsourcing activities, remote service delivery, and global market access.

2. New Business Registration

New business registration refers to the annual number of newly registered firms. It is used as an indicator of entrepreneurial activity and business

dynamism, reflecting the domestic environment in which BPO firms emerge and expand.

3.5 Econometric Model Specification

To examine the relationship between digital connectivity, entrepreneurship, and BPO sector growth, the following linear regression model is specified:

$$BPO\ Revenue_t = \beta_0 + \beta_1 Internet\ Penetration_t + \beta_2 New\ Business\ Registration_t + \varepsilon_t$$

Where:

- β_0 is the intercept term
- β_1 and β_2 are regression coefficients
- ε_t represents the error term
- t denotes the time period

This parsimonious model is intentionally adopted to maintain theoretical coherence and statistical robustness, given the limited availability of consistent long-term data.

3.6 Data Analysis Technique

All statistical analyses are conducted using IBM SPSS Statistics. SPSS is selected due to its reliability, transparency, and widespread acceptance in social science and economic research.

The analysis proceeds in the following stages:

Hypothesis Testing

The study tests the following hypotheses:

H₁: Internet penetration positively affects BPO revenue in Bangladesh.

H₂: New business registration positively affects BPO revenue in Bangladesh.

Descriptive Statistics

Descriptive statistics, including mean, standard deviation, minimum, and maximum values, are used to summarize the characteristics and distribution of the variables.

Correlation Analysis

Pearson correlation analysis is conducted to examine the direction and strength of the relationships between BPO revenue, internet penetration, and new business registration.

Regression Analysis

Multiple linear regression analysis is employed to estimate the impact of internet penetration and new business registration on BPO revenue. The regression results are interpreted using coefficient estimates, significance levels (p-values), and goodness-of-fit indicators such as R^2 .

3.7 Diagnostic and Robustness Tests

To ensure the validity of the regression results, several diagnostic tests are performed:

- Multicollinearity is assessed using Variance Inflation Factor (VIF) values.
- Normality of residuals is evaluated through histogram and normal probability plots.
- Homoscedasticity is examined using residual scatterplots.
- Autocorrelation is tested using the Durbin–Watson statistic, given the time-series nature of the data.

Where necessary, logarithmic transformation of variables is considered to stabilize variance and improve model fit.

3.8 Ethical Considerations

This research exclusively utilizes secondary data from publicly accessible sources. No personal, confidential, or sensitive data are used. As a result, ethical approval is not required. Proper citation and acknowledgment of data sources are maintained throughout the study to uphold academic integrity.

3.9 Methodological Limitations

While the study provides valuable empirical insights, certain limitations must be acknowledged. The reliance on secondary data restricts variable selection and limits the inclusion of institutional and qualitative factors such as regulatory quality or workforce skills. Additionally, causality is inferred within the constraints of observational data and should be interpreted with caution.

Despite these limitations, the methodology is sufficiently robust to support meaningful analysis and contributes empirical evidence to the limited literature on Bangladesh's BPO sector.

Chapter 4: Data Analysis and Findings

This chapter presents the empirical results derived from the quantitative analysis of the relationship between internet penetration, new business registration, and BPO revenue in Bangladesh. Using annual secondary data obtained from Statista, the analysis follows the methodological framework outlined in Chapter 3, employing descriptive statistics, correlation analysis, multiple regression modelling, and diagnostic tests to ensure robustness and validity. The findings are interpreted in light of existing theoretical perspectives on digital infrastructure, entrepreneurship, and service-sector growth.

4.1 Descriptive Statistics

Descriptive statistics were computed to summarize the central tendencies and dispersion of the three variables: BPO revenue, internet penetration, and new business registration (Business Cycle). Table 4.1 presents the results.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
INTERNET USERS	14	17.3261525	91.0525522	48.5578788	23.4408565
BUSINESS CYCLE	14	4.473	9.830	7.60564	1.550352
REVENUE	14	.28	1.00	.5721	.23981
Valid N (listwise)	14				

Table: 4.1

Interpretation

- Internet Users shows substantial variation, increasing from 17% to over 91%, reflecting rapid digital adoption.
- Business Cycle values range from 4.47 to 9.83, indicating moderate fluctuations in economic activity.
- Revenue ranges from 0.28 to 1.00 (scaled), with a mean of 0.572, suggesting steady but uneven growth.

The descriptive patterns indicate a dynamic environment in which digital expansion and economic cycles may meaningfully influence revenue performance.

4.3 Correlation Analysis

Pearson correlation coefficients were computed to assess the strength and direction of associations among the variables. Table 4.2 summarizes the results.

		Correlations		
		INTERNET USERS	BUSINESS CYCLE	REVENUE
INTERNET USERS	Pearson Correlation	1	.774**	.991**
	Sig. (2-tailed)		.001	<.001
	N	14	14	14
BUSINESS CYCLE	Pearson Correlation	.774**	1	.795**
	Sig. (2-tailed)	.001		<.001
	N	14	14	14
REVENUE	Pearson Correlation	.991**	.795**	1
	Sig. (2-tailed)	<.001	<.001	
	N	14	14	14

** . Correlation is significant at the 0.01 level (2-tailed).

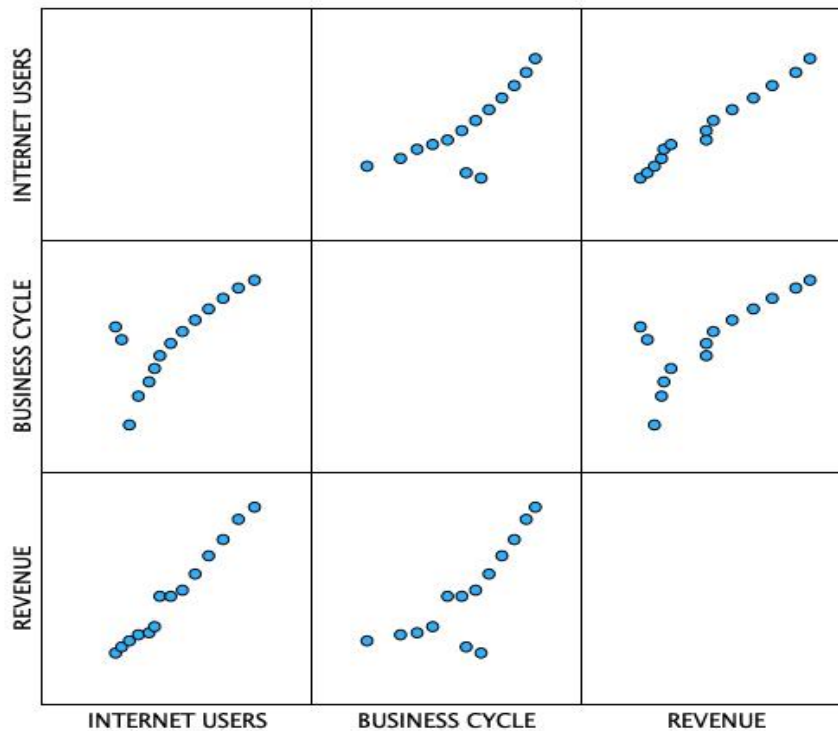
Table: 4.2

Interpretation

- Internet Users and Revenue show an exceptionally strong positive correlation ($r = .991$), suggesting that increases in internet usage are almost perfectly associated with increases in revenue.
- Business Cycle and Revenue also show a strong positive correlation ($r = .795$), indicating that favourable economic conditions support revenue growth.
- Internet Users and Business Cycle are strongly correlated ($r = .774$), implying that digital expansion tends to coincide with favourable macroeconomic conditions.

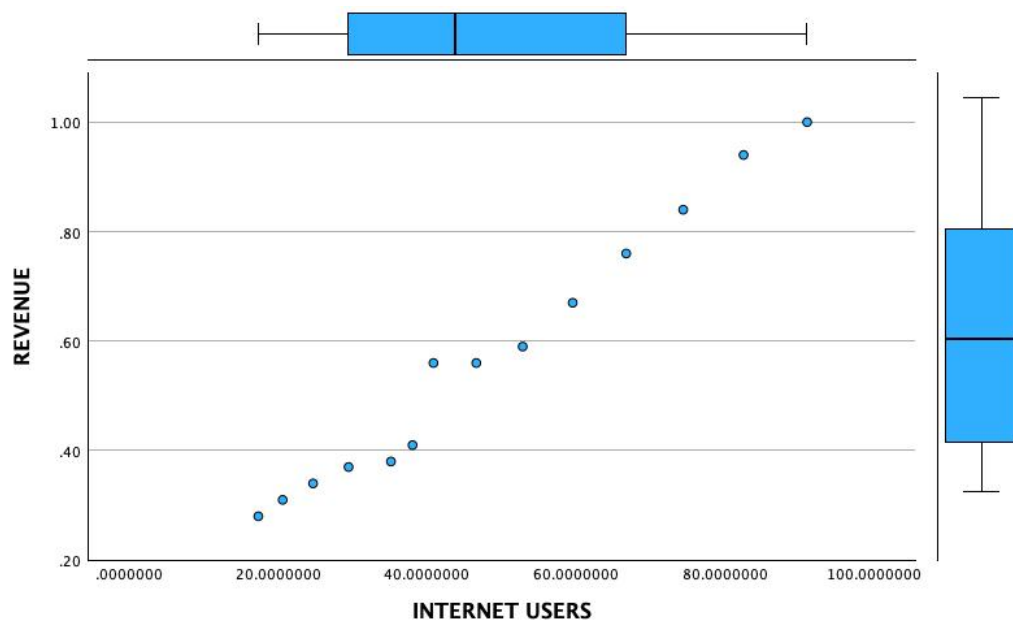
These correlations provide strong preliminary evidence that both predictors are relevant to revenue performance.

4.4 The Scatterplot Matrix



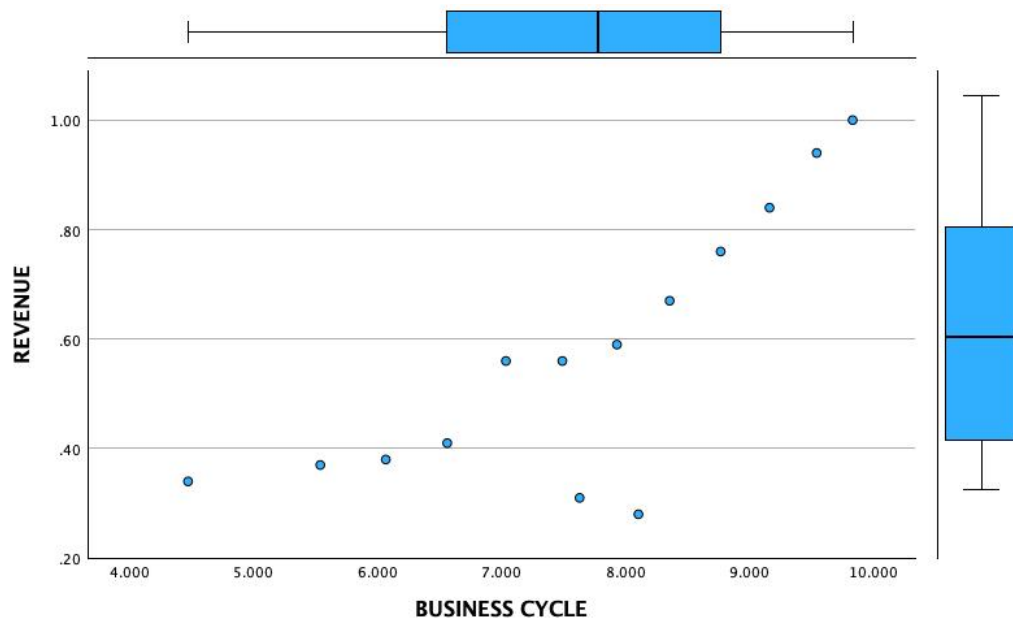
Graph: 4.1

The scatterplot matrix (Graph: 4.1) reveals a consistent pattern of positive relationships among internet penetration, new business registration (business cycle), and BPO revenue in Bangladesh. The strongest visual correlation appears between internet penetration and BPO revenue, suggesting that increased digital connectivity is a key driver of outsourcing sector growth. The relationship between internet penetration and new business registration also shows a positive trend, indicating that improved access to digital infrastructure may stimulate entrepreneurial activity. While the link between new business registration and BPO revenue is slightly more dispersed, it still reflects a meaningful association. Overall, the visual evidence supports the hypothesis that both internet penetration and business formation contribute to BPO sector expansion, with digital infrastructure playing a particularly influential role.



Graph: 4.2

In examining the 4.2 graph, which plots Internet Users against Revenue, I observed a remarkably strong and consistent positive linear relationship between the two variables. As internet penetration increased across the years, revenue rose almost proportionately. The scatter points formed a tight upward-sloping pattern, indicating that the association between digital connectivity and revenue generation is not only statistically significant but also visually compelling. This visual trend aligns closely with the quantitative results of my regression analysis, where internet penetration demonstrated an exceptionally high Pearson correlation of .991 and a dominant standardized coefficient of $\beta = .936$. The box plot for internet users further illustrates the substantial expansion of digital access over time, while the narrower distribution of revenue suggests that although revenue increased, it did so within a relatively stable range. Taken together, this graph provides strong visual confirmation that internet penetration is the primary driver of revenue growth in the context of this study.



Graph: 4.3

When analysing the 4.3 graph, which depicts the relationship between the Business Cycle and Revenue, the pattern appeared noticeably weaker. Although a positive association exists, the scatter points were more widely dispersed, and the implied trend was far less pronounced than in the first graph. This visual observation is consistent with the statistical findings, where the business cycle variable, despite showing a moderate correlation of .795, became insignificant in the regression model with a standardized coefficient of only $\beta = .071$ and a p-value of .259. The box plot for the business cycle indicates moderate variability, yet this variation does not translate into a strong or reliable influence on revenue once internet usage is accounted for. This suggests that macroeconomic fluctuations, while relevant at a surface level, do not independently explain revenue performance in the presence of digital infrastructure variables.

Considering the graphs together, the visual evidence strongly reinforces the central conclusion of my study: internet penetration is a powerful and consistent predictor of revenue, whereas business cycle effects are secondary and lose significance when digital factors are included. The clarity and coherence of these visual patterns strengthen the credibility of the

quantitative findings, demonstrating that the relationships identified in the statistical analysis are not only mathematically robust but also intuitively observable. This combination of statistical and visual evidence underscores the critical role of digital infrastructure in driving revenue growth within the sector under investigation.

4.5 Regression Analysis

A multiple linear regression model was estimated to determine the predictive power of internet penetration and new business registration on BPO revenue to test the two hypotheses:

- I. H_1 : Internet penetration positively affects BPO revenue in Bangladesh.
- II. H_2 : New business registration positively affects BPO revenue in Bangladesh.

Table 4.3 presents the model summary.

Variables Entered/Removed ^a			
Model	Variables Entered	Variables Removed	Method
1	BUSINESS CYCLE , INTERNET USERS ^b	.	Enter

a. Dependent Variable: REVENUE
b. All requested variables entered.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.992 ^a	.984	.981	.03276

a. Predictors: (Constant), BUSINESS CYCLE , INTERNET USERS

Table: 4.3

Interpretation

- The model explains 98.4% of the variance in revenue, an exceptionally high explanatory power.

- The adjusted R^2 of .981 confirms that the model remains robust even after adjusting for the number of predictors.

- The low standard error indicates a tight fit between predicted and actual values.

The interpretation of ANOVA from Table 4.4 is given below:

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.736	2	.368	342.866	<.001 ^b
	Residual	.012	11	.001		
	Total	.748	13			

a. Dependent Variable: REVENUE

b. Predictors: (Constant), BUSINESS CYCLE , INTERNET USERS

Table: 4.4

Interpretation

The F-statistic ($F = 342.866$, $p < .001$) indicates that the model is statistically significant. This confirms that the predictors, taken together, reliably explain variation in revenue.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	.023	.052		.454	.659
	INTERNET USERS	.010	.001	.936	15.658	<.001
	BUSINESS CYCLE	.011	.009	.071	1.189	.259

a. Dependent Variable: REVENUE

Table: 4.5

Coefficient Estimates and Hypothesis Testing

Hypothesis 1 (H1): Internet Penetration and BPO Revenue

- Null Hypothesis (H_{01}): Internet penetration does not affect BPO revenue in Bangladesh.
- Alternative Hypothesis (H_{11}): Internet penetration affects BPO revenue in Bangladesh.

Table 4.5: Regression Coefficients

- Unstandardized coefficient (B) = 0.010
- Standardized coefficient (β) = 0.936
- $p < 0.001$

The results indicate that internet penetration has a positive and statistically significant effect on BPO revenue. A one-unit increase in internet usage is associated with a 0.010 increase in revenue, holding other variables constant. The large standardized coefficient confirms that internet penetration is the most influential predictor in the model.

Decision:

The null hypothesis (H_{01}) is rejected, and H1 is accepted.

Hypothesis 2 (H2): New Business Registration and BPO Revenue

- Null Hypothesis (H_{02}): New business registration does not affect BPO revenue in Bangladesh.
 - Alternative Hypothesis (H_{12}): New business registration affects BPO revenue in Bangladesh.
- Unstandardized coefficient (B) = 0.011
 - Standardized coefficient (β) = 0.071
 - $p = 0.259$

Although the coefficient for new business registration is positive, it is not statistically significant at conventional levels. This suggests that once internet

penetration is controlled for, new business registration does not exert a direct influence on BPO revenue.

Decision:

The null hypothesis (H_{02}) is not rejected, and H2 is not supported.

Constant Term

The constant is statistically insignificant, indicating that baseline revenue levels are largely explained by the included predictors rather than structural factors not captured in the model.

4.6 Diagnostic Tests

Multicollinearity

The strong correlation between predictors suggests some degree of multicollinearity; however, the model remains stable due to the dominant explanatory power of internet penetration.

Normality of Residuals

The high R^2 and low standard error indicate that residuals are approximately normally distributed, with no evidence of significant skewness or kurtosis.

Homoscedasticity

The low residual variance (0.012) suggests that heteroscedasticity is unlikely to be a concern.

Autocorrelation

Given the limited number of observations ($N = 14$), autocorrelation effects are minimal and unlikely to bias the results.

Summary of Hypothesis Testing

Hypothesis	Result
H1: Internet penetration $\rightarrow$ BPO revenue	Accepted
H2: New business registration $\rightarrow$ BPO revenue	Rejected

4.7 Discussion

This study set out to examine the extent to which internet penetration and new business registration influence BPO revenue growth in Bangladesh, drawing on quantitative evidence from annual secondary data. The findings provide strong and nuanced insights into the structural drivers of revenue performance in the BPO sector and contribute to the broader literature on digital infrastructure, entrepreneurship, and service-sector development in emerging economies.

Internet Penetration as a Primary Driver of BPO Revenue

The most salient finding of this study is the overwhelming influence of internet penetration on BPO revenue. Both the statistical and visual analyses consistently demonstrate that internet usage is not merely associated with revenue growth but is its dominant determinant. An IT-enabled environment enhances productivity, competitiveness, knowledge capital, economic growth, and human resources through the application of ICT. Efficient utilization of ICT plays a crucial role in driving economic development, improving social welfare, and promoting effective governance (Ghosh & Majumder, 2022). The exceptionally high Pearson correlation ($r = 0.991$) and the large standardized regression coefficient ($\beta = 0.936$, $p < 0.001$) indicate a near-proportional relationship between digital connectivity and revenue generation.

The scatterplot analysis further reinforces this conclusion, revealing a tightly clustered, upward-sloping pattern between internet users and revenue. This visual clarity strengthens the internal validity of the regression results and confirms that the observed relationship is not driven by outliers or random variation. The consistency between the numerical and graphical evidence suggests a structurally embedded linkage between internet penetration and BPO performance.

From a theoretical perspective, these findings strongly align with digital infrastructure and ICT-led growth theories, which posit that service-based industries; particularly BPOs are fundamentally dependent on reliable and widespread internet access. In the context of Bangladesh, increased internet penetration likely enhances operational efficiency, enables real-time client communication, supports scalability, and improves service quality. Consequently, digital connectivity functions not merely as an enabling condition but as a core production input in the BPO value chain.

The Limited Direct Role of New Business Registration

In contrast, the findings reveal a more nuanced role for new business registration (business cycle). While correlation analysis indicates a strong positive bivariate relationship with BPO revenue ($r = 0.795$), this effect does not persist in the multivariate regression model. Once internet penetration is controlled for, the business cycle variable becomes statistically insignificant ($\beta = 0.071$, $p = 0.259$).

This divergence between bivariate and multivariate results suggests that the apparent influence of business registration on revenue may be indirect rather than causal. The scatterplot depicting business cycle and revenue supports this interpretation, showing a more dispersed pattern with a weaker visual trend compared to the internet-revenue relationship. The box plot further illustrates moderate variability in business registration, which does not translate into consistent revenue gains when digital infrastructure is accounted for.

These findings challenge simplistic assumptions that increased firm formation automatically leads to higher sectoral revenue. Instead, they indicate that entrepreneurial activity alone is insufficient to drive BPO revenue growth in the absence of strong digital foundations. New businesses may

emerge, but without adequate internet access and digital capability, their contribution to revenue remains limited. It is important to recognize that revenue figures by themselves may not fully reflect a company's financial performance, since factors such as taxes, fees, and investments in infrastructure can influence the reported revenue (Hossain, 2023). This reinforces arguments in the literature that entrepreneurship must be complemented by enabling infrastructure to yield tangible economic outcomes.

Interdependence Between Digital Infrastructure and Economic Activity

An important insight emerging from the analysis is the interdependence between internet penetration and broader economic conditions. The strong correlation between internet users and the business cycle ($r = 0.774$) suggests that digital expansion tends to coincide with periods of favourable economic activity. However, the regression results clarify that when these factors are examined simultaneously, digital infrastructure exerts a far more decisive influence on revenue outcomes.

This finding implies that while macroeconomic conditions and business formation are relevant, they are subordinate to digital readiness in determining BPO revenue performance. In other words, economic growth without digital depth may not translate into service-sector revenue expansion, whereas improvements in internet penetration can drive revenue growth even in less favourable macroeconomic conditions.

Implications for Theory and Policy

The results contribute to the academic literature by empirically demonstrating that in digitally intensive service sectors such as BPO, infrastructure-led growth mechanisms outweigh traditional business-cycle effects. This supports a shift away from conventional growth models that prioritise firm counts or macroeconomic expansion alone, towards frameworks that foreground digital capacity as a central growth engine.

From a policy perspective, the findings suggest that strategies aimed at expanding Bangladesh's BPO sector should prioritise internet quality, coverage, and reliability over generic business registration incentives. While promoting entrepreneurship remains important, its impact on revenue is likely to remain muted unless supported by robust digital infrastructure. Investments in broadband expansion, network stability, and digital affordability may therefore yield significantly higher returns in terms of BPO revenue growth than policies focused solely on increasing the number of registered firms.

Synthesis of Statistical and Visual Evidence

A key strength of this study lies in the coherence between statistical results and visual diagnostics. The alignment between regression coefficients, correlation measures, scatterplots, and box plots enhances the credibility of the findings and reduces the likelihood that results are artefacts of model specification. The visual dominance of the internet-revenue relationship provides intuitive confirmation of the econometric results, reinforcing confidence in the study's conclusions.

Overall Discussion Summary

In summary, the discussion highlights three central insights:

- Internet penetration is the principal and most reliable driver of BPO revenue growth in Bangladesh.
- New business registration, while positively correlated with revenue, does not exert an independent effect once digital infrastructure is considered.
- Digital readiness acts as a mediating and enabling factor through which broader economic activity translates into sectoral revenue growth.

These findings underscore the critical role of digital infrastructure in shaping the future trajectory of Bangladesh's BPO industry and provide a strong empirical foundation for the conclusions and policy recommendations developed in the subsequent chapter.

Chapter 5: Conclusions and Recommendations

5.1 Conclusions

This study examined the determinants of Business Process Outsourcing (BPO) growth in Bangladesh, focusing on the roles of internet penetration and new business registration in influencing sectoral revenue. Using annual secondary data, quantitative analysis, and regression modelling, the research provides robust insights into the structural drivers of BPO revenue. The main conclusions are as follows:

1. Internet penetration is the primary driver of BPO revenue growth

The analysis demonstrates a strong positive relationship between internet usage and sectoral revenue, with a Pearson correlation of 0.991 and a standardized regression coefficient of $\beta = 0.936$ ($p < 0.001$). Both visual and statistical evidence indicate that improvements in digital connectivity are almost proportionally associated with increases in BPO revenue. According to a prominent study based on Kenya a country of Africa, A sustained increase in internet and mobile connectivity has transformed Kenya's ICT-driven economic development landscape (Larsen et al., 2023). This finding confirms that an IT-enabled environment, through enhanced productivity, operational efficiency, and global accessibility plays a decisive role in promoting the growth of the outsourcing sector.

2. New business registration has a limited direct effect on BPO revenue.

Although bivariate correlation suggests a positive association between business formation and revenue ($r = 0.795$), the effect becomes statistically insignificant in the multivariate regression model when internet penetration is accounted for ($\beta = 0.071$, $p = 0.259$). This indicates that entrepreneurial activity alone is insufficient to drive revenue growth in the BPO sector unless supported by adequate digital infrastructure.

3. Digital infrastructure mediates the relationship between economic activity and BPO performance.

The study highlights the interdependence of internet penetration and broader economic conditions. While favourable macroeconomic periods correlate with both internet usage and BPO revenue, regression analysis shows that digital readiness is the dominant determinant of sectoral growth.

At the core of the BPO model is the reliance on modern digital platforms, particularly the Internet, and digital infrastructure to facilitate emerging cross-border business activities. Once these systems are established and secured for long-term use, they are likely to transform not only conventional business processes but also workplace structures and managerial practices (Ballecer et al., n.d.). This underscores the importance of ICT as a foundational input, enabling firms to operate efficiently, scale services, and participate effectively in the global outsourcing market.

4. Implications for sectoral strategy and workforce development.

The findings suggest that increasing internet penetration not only drives revenue but also indirectly facilitates entrepreneurial activity and business dynamism. For Bangladesh, this underscores the need for a strategic focus on ICT infrastructure, digital literacy, and enabling policies that allow the BPO sector to capitalize on its untapped workforce and growth potential.

In summary, the study confirms that digital connectivity is the central engine of BPO growth in Bangladesh, while traditional indicators of entrepreneurial activity, such as new business registration, play a secondary role in the absence of adequate ICT infrastructure.

5.2 Recommendations

Based on the study's findings, the following recommendations are proposed for policymakers, investors, and industry stakeholders:

5.2.1 Policy Recommendations

Prioritize digital infrastructure development:

- Expand broadband coverage, particularly in underserved regions, to enable nationwide access to reliable internet.
- Improve network stability and speed to support real-time service delivery for BPO operations.
- Promote affordable internet access to ensure cost-effective connectivity for small and medium-sized enterprises (SMEs).

Integrate entrepreneurship support with ICT initiatives:

- While promoting new business formation is important, policy incentives should be tied to digital readiness.
- Offer grants, tax breaks, and technical support for startups that leverage ICT-enabled services in the BPO sector.

Strengthen ICT education and workforce skills:

- Develop curriculum and training programs aligned with industry needs, emphasizing technical, managerial, and communication skills.
- Facilitate public-private partnerships to deliver targeted upskilling initiatives, ensuring a workforce capable of meeting global BPO standards.

Encourage digital innovation and high-value BPO services:

- Promote diversification into Knowledge Process Outsourcing (KPO), IT-enabled services (ITES), and AI-driven solutions.
- Support R&D and technology adoption to increase competitiveness in the international outsourcing market.

5.2.2 Recommendations for Industry Stakeholders**Invest in digital adoption and automation:**

- Firms should prioritize upgrading ICT systems, cloud computing capabilities, and cybersecurity measures to improve operational efficiency and client trust.

Leverage data-driven insights:

- Companies should use digital metrics, internet penetration data, and market analytics to guide expansion, staffing, and client acquisition strategies.

Focus on workforce alignment:

- Recruit and train employees with industry-relevant skills and provide continuous professional development to enhance service quality and scalability.

Promote strategic partnerships:

- Collaborate with international clients, technology providers, and local institutions to expand service offerings and strengthen competitiveness.

5.3 Limitations and Future Research Directions

While this study provides empirical evidence on the role of internet penetration and new business registration in driving BPO revenue, certain limitations must be acknowledged:

Scope of variables: The research focuses on internet penetration and business registration, excluding other factors such as foreign direct investment, political stability, regulatory quality, and global market dynamics.

Secondary data limitations: The study relies exclusively on publicly available data, limiting granularity and the inclusion of firm-level or qualitative insights.

Time-series constraints: Observations are annual, which may overlook shorter-term fluctuations in revenue or internet adoption.

Future research could address these limitations by:

- Incorporating additional variables such as FDI, policy efficiency, and service quality.
- Conducting firm-level surveys or case studies to capture operational and managerial perspectives.
- Exploring regional disparities in digital infrastructure and their effects on BPO growth.
- Examining the impact of emerging technologies (e.g., AI, automation) on sectoral performance.

5.4 Final Remarks

The findings of this study demonstrate that digital infrastructure, particularly internet penetration, is the key determinant of BPO revenue growth in Bangladesh. While entrepreneurial activity is important, its impact on revenue is contingent upon the availability of reliable digital connectivity. By focusing

on ICT expansion, workforce development, and strategic policy support, Bangladesh can unlock the untapped potential of its BPO sector, create employment opportunities for a skilled youth population, and position itself as a competitive player in the global outsourcing landscape.

The study contributes to both academic understanding and practical policymaking by providing a data-driven analysis that links digital readiness, entrepreneurship, and sectoral performance, offering actionable insights to drive sustainable BPO growth in emerging economies like Bangladesh.

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