

RESEARCH ARTICLE



A Comparative Examination of Productivity in Islamic and Conventional Banking in Bangladesh

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Abstract: This study aims to evaluate and compare the productivity of Islamic and conventional (traditional) banks in Bangladesh from 2018 to 2022. To measure productivity, a sample of 10 commercial banks in Bangladesh, 5 of which are Islamic and 5 of which are conventional, is used, and a productivity model, financial tools, and statistical tools are chosen for data analysis. The selection of sample banks in each category is based on the highest profit earned in relation to the number of employees and branches in 2022. This study considers deposit, advance/investment, revenue and profit as output and number of employees, number of branches, and amount of capital as input to the productivity model. The results indicate that the productivity of Islamic banks (IBs) is higher in deposit procurement, distribution of new investments, net spread income per employee, and net spread income per unit of capital than that of conventional banks (CBs), while the productivity of CBs is higher in net interest income (NII) per branch, net non-interest income, operating profit, and net profit than that of IBs. Analysis of variance shows that the differences in productivity measures—employee productivity (EP), branch productivity (BP), and capital productivity (CP)—between CBs and IB are not significant, except for NII per unit of capital. IBs can take steps to increase non-investment income and fee-based earnings and control administrative and other overhead expenses, while CBs can take steps to increase more deposits and advances through the utilization of their available input resources: EP, BP, and CP.

Keywords: productivity, commercial banks, financial tools, ANOVA

1. Introduction

Banking is a mechanism through which savings of surplus units of the economy are channeled into productive endeavors for growth and the general welfare of a country [1]. Commercial banks are classified into two groups: conventional banks (CBs) and Islamic banks (IBs). In Bangladesh, conventional banking has been in existence for a long time, whereas Islamic banking commenced on March 13, 1983, with the establishment of the first Islamic bank, Islamic Bank Bangladesh Limited. Traditional interest-based commercial banks prioritize economic well-being and profit maximization, incorporating the time value of money and transferring risk from depositors and the bank to borrowers or entrepreneurs. In contrast, interest-free Islamic Shariah-based banking operates on the principle that money is not a commodity and has no inherent price. It emphasizes an ethical, social, and moral framework while promoting risk-sharing among depositors, the bank, and borrowers or entrepreneurs [2]. In recent years, CBs have been moving toward an Islamic banking system, resulting in significant growth of IBs, Islamic banking branches, and Islamic banking windows. In Bangladesh, as of December 31,

2022, out of 58 commercial banks, there are 10 full-fledged IBs, 11 CBs having Islamic banking branches, 13 CBs having Islamic banking windows, and 24 full-fledged CBs. Thus, 34 banks are involved in Islamic banking, representing 58.62% of the banks functioning under the Islamic Shariah principles. These recent trends indicate that the whole banking industry may adopt Islamic Shariah principles in the future. IBs have a steady growth trend and bright prospects in Bangladesh [3]. Since its inception, Islamic banking has been steadily growing its market share in Bangladesh [4]. Bank's greater market share determines more profit [5]. The conversion from conventional banking to Islamic banking has increased the assets, deposits, equity, net income, and financial position of the converted banks in the Gulf Cooperation Council (GCC) countries [6]. Islamic banking is flourishing in GCC countries, and the Islamic financial market accounts for 41% of the total Shariah-compliant assets in the world [6].

Commercial banks are producing financial products and delivering services to customers with the goal to add their brand value and brand image and maximize profit as well as shareholders' wealth through the attraction of more deposits and disbursement of more quality lending. Productivity analysis is one of the important measures for the performance evaluation of a commercial bank. The bank's productivity can be maximized through proper utilization of the available input resources, namely, employees, branches, capital, and assets to earn more profit by generating more revenue, effectively controlling cost, and optimizing operational efficiency.

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IBs maintained deposits, investments, remittances, total excess liquidity, and the total number of branches as of December 31, 2022, in terms of 25.81%, 29.20%, 54.53%, 6.60%, and 19.88%, respectively, of the total banking industry [7].

Traditional banks operate on a predetermined interest-based system, whereas IBs follow a PLS model [8]. CBs primarily make a profit from the spread between interest received on loans and advances and interest paid on deposits, whereas IBs make a profit doing banking transactions according to Islamic Shariah principles, where currency cannot be traded like a commodity, interest receipts and payments are completely prohibited, and dealing in unethical business is also restricted.

The major research contribution of this study is the comparison of the productivity between the Bangladeshi traditional and Islamic banks during the years 2018–2022. Therefore, the aim of this study is to evaluate the performance of both banking systems through the measurement of productivity indicators comprising employee productivity (EP), branch productivity (BP), and capital productivity (CP). By way of this comparative analysis, our goal is to contribute to the expanding body of knowledge on Islamic banking in Bangladesh, which can provide meaningful suggestions for practitioners, authorities, and investors who are engaged in or planning to transition to Islamic banking systems.

2. Literature Review

Hassan [9] examined 21 banks, choosing 7 from each of Bangladesh's first-, second-, and third-generation bank categories. Capital adequacy, liquidity, and profitability ratios were used to compare the financial performance of these banks. The study examined the mean performance on profitability ratios by analysis of variance (ANOVA) test and found no significant difference. The study showed standard positive results and financial soundness among the three-generation banks.

Ara [10] studied 19 CBs and 5 IBs during 2004–2008 and discovered that IBs' overall performance was superior to that of CBs. The study showed that the profitability and cost efficiencies of both types of banks are steadily in growing trends over time though IBs have higher profit efficiency (PE) than CBs and CBs have higher cost efficiency (CE) than IBs.

Ahmad [11] compared IB and conventional (traditional) banks of Bangladesh for the period 2013–2018 based on technical, allocated, and cost efficiency by using data envelopment analysis (DEA) under the Constant Returns to Scale (CRS) and Variable Returns to Scale (VRS) approach and found Technical Efficiency (TE) of traditional banks is greater than that of IBs but Allocative Efficiency (AE) and CE of IBs are greater than that of traditional banks.

Mahmud and Rahman [12] compare the financial health of 6 Islamic PCBs and 17 conventional Private Commercial Banks (PCBs) of Bangladesh using CAMEL ratings during 2015–2019 and found that Islamic PCBs have, on average, better asset quality and management efficiency, while conventional PCBs have, on average, better capital adequacy, earnings quality, and liquidity.

Rafiq [13] analyzed and contrasted the performance of five Bangladeshi IB with five CBs using CAMEL over the period 2008–2014 and discovered that IB were in a better position in terms of capital ratio, tier-1, and growth in total deposits while CBs were in satisfactory position in relation to the cost-to-income ratio, return on assets (ROA), and return on equity (ROE).

Islam and Kassim [14] examined and contrasted 25 Bangladeshi commercial banks—7 Islamic and 18 conventional—using the DEA approach for the period 2009–2013 and found that IBs have pure technical efficiency while CBs have scale efficiency.

Abduh et al. [15] investigated five IB in Bangladesh using DEA with the Malmquist Productivity Index and ratio analysis and found that Islamic banks were on a rising trend during 2006–2010.

Kamarudin et al. [16] examined GCC countries' CBs and IBs during 2007–2011 using a nonparametric DEA approach and found that for IBs only, greater revenue competency results in higher PE, while in CBs, PE is lower than cost competency, and it is more efficient in terms of cost, revenue, and PE metrics.

Johnes et al. [17] compared IBs and CBs of 18 countries during 2004–2009 using DEA and Meta-Frontier Analysis (MFA). They found no significant difference in gross CRS efficiency between the two types of banks; however, Islamic Banks exhibited higher net CRS efficiency but lower type CRS efficiency compared to Conventional Banks.

Islam et al. [18] studied Islamic banking and finance in Bangladesh and found significant contributions to the country's economic growth.

Nugrohowati et al. [19] studied 44 IBs from 10 countries including Bangladesh during 2015–2018 using the Malmquist Index and found that technical efficiency isn't the most favorable due to scale inefficiency; however, the average productivity of IBs is on an increasing trend in the world.

Shohrowardhy [20] studied IBs in Bangladesh using Structural Equation Modeling (SEM) and found the strongest customer satisfaction, which has a significant effect on operational efficiency and growth.

Gazi et al. [21] studied 10 Bangladeshi commercial banks—5 traditional and 5 Islamic—during 2016–2020 using Financial Ratio Analysis (FRA) and discovered that both banks' financial performance is satisfactory, with IBs performing particularly well.

Ismail et al. [22] studied 17 domestic commercial banks—9 conventional and 8 Islamic—in Malaysia from 2006 to 2009 using DEA and Tobit regression analysis. The DEA method demonstrated that both technical and allocation efficiencies contribute to cost-effectiveness for CBs and IBs, respectively, but scale efficiency has contributed to technical efficiency for both banks.

Octrina and Jamilah [23] compared productivity between 10 IBs and 95 CBs in Indonesia during the pandemic of COVID-19 using Malmquist Productivity Index (MPI) and DEA, and average Total Factor Productivity Change (TFPCH) shows IBs are more productive in managing their inputs and outputs than CBs. However, the difference is not very noticeable.

Mawla and Khanam [24] measured the performance of five Bangladeshi IBs over the years 2006–2016 and discovered an increasing growth trend in deposits, investments, branches, and satisfactory productivity performance in terms of working fund to total expenses and total income to total expenses.

Rana and Kamruzzaman [25] compared Bangladeshi commercial banks, five conventional and five Islamic, during 2010–2019 using the Bank-o-Meter model, and both banks are sound, but IBs are financially less sound than the conventional ones.

Parsa [26] examined the level of Islamic and both types of CBs' resilience during the financial crises and discovered that the stability of both kinds of banks against the consequences of the crises does not differ significantly.

Based on the analysis of [27], IBs outperform CBs in terms of performance, and it is noteworthy that the variance of the CBs is greater than that of IBs.

According to [28], the efficiency of 1,460 financial institutions was examined using a well-established tool, DEA, as the measuring standard; the outcome demonstrated that IBs outperformed CBs in terms of efficiency. They discovered that small IBs with assets below

\$2 billion are more efficient than their counterparts in CBs with 14.61% of the former in the most efficient category in comparison to only 1.47% of the latter.

Murad et al. [29] established that the two types of banks have improved their market value for both the banks and shareholders through different operational strategies where the IB adopted the asset-based financing model compared to the loan-based model of the CBs. This research also identified a rising tendency of CBs to adopt Islamic banking practices as shown by the increase in the number of CBs that are opening new Islamic banking branches and converting their existing branches to IBs.

Izzeldin et al. [30] concentrated on the efficiency dynamics of CBs and IBs for a number of nations from 1999 to 2014 and the convergence study. The study revealed that both banking systems reach similar steady-state efficiency and move at the same rate, thus implying that the two systems operate at par despite the difference in principles on which they are based.

Safullah [31] looked at the efficiency in the financial stability of 188 banks in 28 countries between 2003 and 2018, with an equal number of conventional (traditional) and Islamic banks. According to the study, when it comes to financial stability, IBs are 5.30% more stable and efficient than traditional banks.

Yusuf et al. [32] used panel data from 26 commercial banks—13 traditional and 13 Islamic—from 2014 to 2019 and applied stochastic frontier analysis to examine the relative efficiency of IBs and CBs in Indonesia. The study discovered no efficiency gaps, which means that IBs have developed quickly and are on par with traditional banks.

Saleh et al. [33] measured the productivity and efficiency of GCC banks using a nonparametric approach and the Malmquist–Luenberger productivity index, which takes into account undesirable outputs. This paper revealed that the global financial crisis of 2008–2009 led to a major decline in productivity in GCC banks and that while the IBs have experienced a subsequent increase in efficiency relative to their commercial counterparts, the efficiency gap has not been closed entirely. This improvement indicates that the IBs have done better in their performance and are implementing more competition in the GCC banking sector.

Junaidi et al. [34] investigated the effects of extrinsic and intrinsic religious factors on consumer buying behavior in the context of Indonesian CBs and IBs. The study found that religiosity significantly affects consumer decision-making, with brand image and materialism acting as partial mediators in shaping preferences, particularly when bank products align with Islamic principles.

Haque et al. [35] used DEA in conjunction with financial ratios like ROE and ROA to compare the performance of IBs and CBs in Saudi Arabia from 2014 to 2018. According to the study, CBs perform better than IBs in terms of ROA. IBs show better performance in terms of ROE.

Gazi et al. [36] found that firm-specific variables (Equity to Asset Ratio (EAR), Debt to Equity Ratio (DER), Loan to Deposit Ratio (LDR), and Deposit to Asset Ratio (DTAR)) do not individually have a significant impact on bank profitability. However, EAR and LDR positively influence ROA, while DER and DTAR negatively affect profitability, whereas DTAR, LDR, and EAR positively impact ROE, demonstrating their greater role in enhancing bank productivity.

2.1. Research gap

Despite a substantial body of literature on the performance of IBs and CBs globally, there remains a critical gap in empirical research specifically comparing the productivity of these banking systems in Bangladesh. Existing studies have primarily focused on overall financial performance, market share expansion, and the

operational frameworks of IBs and CBs. However, a comprehensive analysis of productivity—encompassing key indicators such as EP, BP, and CP—has been largely overlooked.

Furthermore, the interplay between efficiency indicators (such as deposit acquisition, revenue generation, and profitability) and the comparative performance of traditional and Islamic banks remains underexplored. Additionally, the impact of the risk-sharing model, a fundamental principle of Islamic banking, on financial performance and operational productivity has not been thoroughly examined.

This study aims to bridge these gaps by providing an empirical assessment of productivity across both banking systems in Bangladesh from 2018 to 2022.

2.2. Research questions

The following research questions are the focus of this study:

- 1) In Bangladesh, how do IBs' and CBs' productivity metrics compare between 2018 and 2022?
- 2) To what extent does the change from conventional to Islamic banking contribute to enhancing the financial performance of the converted banks?

This paper is an attempt to make a comparative analysis that can help to enrich the existing knowledge based on the subject of Islamic banking in Bangladesh and can be useful for the policymakers, the managers, and the investors who are involved in the process of implementation of the Shariah-compliant banking services.

2.3. Research hypothesis

For the study, the following hypotheses have been developed and will be examined with a one-way ANOVA:

H₁: The productivity of conventional (traditional) and Islamic banks per employee does not differ significantly between 2018 and 2022 in Bangladesh.

H₂: The productivity of both types of banks per branch does not differ significantly between 2018 and 2022 in Bangladesh.

H₃: The productivity of both types of banks per unit of capital does not differ significantly between 2018 and 2022 in Bangladesh.

The study uses the significance (P-value) as a criterion for making decisions. If the P-value is less than 0.05, the null hypothesis will be rejected, and the alternative hypothesis will be accepted; if the P-value is greater than 0.05, the alternative hypothesis will be rejected, and the null hypothesis will not be rejected.

3. Methodology

The following subsections describe the research design, sampling approach, data collection, and analysis tools used for assessing the productivity or efficiency of both banking (Islamic and conventional) systems in Bangladesh from 2018 to 2022.

3.1. Study sample

A sample of 10 commercial banks—5 Islamic and 5 traditional (conventional)—are the subject of the study. These banks were selected based on the highest profit earnings comparatively with respect to the number of branches and number of employees during the year 2022.

Five Islamic Shariah-based banks, which are named Islami Bank Bangladesh Ltd. (IBBL), First Security Islami Bank Ltd. (FSIBL), Social Islami Bank Ltd. (SIBL), EXIM Bank Ltd., and Shahjalal Islami Bank Ltd. (SJIBL), and five CBs, which are named Pubali Bank Ltd. (PBL), Prime Bank Ltd., Brac Bank Ltd. (BBL),

Eastern Bank Ltd. (EBL), and Dutch Bangla Bank Ltd. (DBBL), are taken as the sample for the study [37].

3.2. Source of data

The study has been prepared on the basis of collected data from annual financial reports and documents of the central bank and the selected commercial banks covering the period from 2018 to 2022. The main source of data collection in the study is secondary data.

3.3. Productivity analysis

Productivity, which is the ratio of outputs to inputs, highlights the bank's efficiency in utilizing its resources. In particular, this study quantifies productivity with the help of several indicators and applies various statistical techniques for comparison and assessment.

Productivity Measurement Model: The primary model for assessing productivity is the productivity model. Equation (1) presents the productivity measurement model:

$$P = \frac{TO}{TI} \quad (1)$$

where P, TO, and TI represent productivity, total output (total deposits, loans and advances, net interest income, net profit, etc.), and total input (employees, branches, capital, etc.), respectively.

Statistical Tools: The data are analyzed and interpreted using the average (mean), SD (standard deviation), and CV (coefficient of variation) statistical methods.

Compound Growth Rate (CGR): The growth trend in productivity performance is measured using the CGR.

ANOVA: To assess the statistical significance of differences in productivity between CBs and IBs, an ANOVA test is used.

Productivity Indicators: The study employs three productivity indicators to evaluate the efficiency of both banking (Islamic and conventional) systems: EP, BP, and CP. The following measures are used to analyze each's productivity:

- 1) Deposit
- 2) Loans and advances
- 3) Total business
- 4) Net interest income (NII)
- 5) Net non-interest income (NNII)
- 6) Operating profit
- 7) Net profit

4. Data Analysis

4.1. Productivity analysis of banks

The study covers EP, BP, and CP of both banking (Islamic and conventional) systems in Bangladesh from 2018 to 2022.

4.1.1. Employee productivity (EP)

In the banking industry, EP includes a range of key performance indicators (KPIs) that assess how workers contribute to the bank's overall financial performance and operational success. EP is the ratio of output to input, where the output represents the bank's performance contributed by employees and the input is the number of employees.

Rahaman et al. [38] identify competence, compensation, leadership, and motivation as significant factors influencing employee performance in Bangladeshi commercial banks, advocating for targeted interventions to boost productivity. Moreover, the impact of work-life balance on EP has been highlighted, with studies indicating that a positive work-life balance correlates with higher productivity levels, particularly in relation to the COVID-19 outbreak [39]. Alam et al [40] suggest that enhancing job satisfaction can be achieved through career growth, employee autonomy, and performance recognition. Addressing these factors creates a more rewarding work environment, leading to a more productive, engaged, and loyal workforce.

The following ratios are used to measure EP:

- 1) Deposit per employee = Total deposits/Total number of employees
- 2) Loans and advances (investments) per employee = Total loans and advances/Total number of employees
- 3) Total business per employee = Total business/Total number of employees

where Total business = Total deposit + Total loans and advances (investments)

- 4) Net interest (net investment) income (NII) per employee:

- 1) For CBs, NII per employee = (Interest income – Interest expenses)/Total number of employees
- 2) For IBs, NII per employee = (Investment income – Profit paid on deposit)/Total number of employees

- 5) Net non-interest (net non-investment) income (NNII) per employee:

- 1) For CBs, NNII per employee = (Non-interest income – Non-interest expenses)/Total number of employees
- 2) For IBs, NNII per employee = (Non-investment income – Administrative and other expenses)/Total number of employees

- 6) Operating profit per employee = Total operating profit/Total number of employees

- 7) Net profit per employee = Total net profit after tax/Total number of employees

Table 1 presents the measurement of per EP.

Table 1
Per employee productivity measurement

	Deposits	Loans and advances (investments)	Total business	NII	NNII	Operating profit	Net profit
Conventional banks (CBs)							
Mean	66.28	63.69	129.97	2.10	–0.02	2.08	0.93
Std. deviation	7.99	8.62	16.42	0.32	0.40	0.24	0.13
Coefficient of variance (CV)	12.06	13.54	12.63	15.39	–1656.97	11.72	14.22
Max. value	76.56	76.08	152.65	2.47	0.34	2.37	1.11
Min. value	56.72	56.74	113.45	1.63	–0.59	1.82	0.81

(Continued)

Table 1
(Continued)

	Deposits	Loans and advances (investments)	Total business	NII	NNII	Operating profit	Net profit
Compound growth rate (CGR)	7.79	7.78	7.75	– 2.68	–39.98	5.94	7.53
Islamic banks (IBs)							
Mean	89.98	89.00	178.98	2.35	–0.67	1.68	0.62
Std. deviation	6.71	6.18	12.24	0.17	0.15	0.18	0.08
Coefficient of Variance (CV)	7.46	6.94	6.84	7.28	–22.66	10.63	13.06
Max. value	96.36	94.95	189.14	2.53	–0.43	1.88	0.75
Min. Value	80.06	80.43	160.49	2.14	–0.85	1.46	0.55
Compound Growth Rate (CGR)	3.05	4.28	3.64	–3.96	–7.80	–0.78	8.12
ANOVA test of Traditional (Conventional) & Islamic Banks							
F-ratio	0.40	0.42	0.39	0.71	1.28	0.18	0.37
P-value	0.80	0.79	0.81	0.59	0.29	0.95	0.83

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.

The average deposit per employee for CBs ranges from 56.72 to 76.56 with a mean of 66.28, while the average deposit per employee for IBs ranges from 80.06 to 96.36 with a mean of 89.98. The average deposit per employee in IBs is more stable and 1.36 times greater than that of CBs.

In CBs, the average loans and advances per employee range from 56.74 to 76.08 with a mean of 63.69, and in IBs, the average loans and advances per employee range from 80.43 to 94.95 with a mean of 89.00, and IBs have more consistent average loans and advances per employee, which are 1.40 times greater than that of CBs.

In CBs, the average total business per employee ranges from 113.45 to 152.65 with a mean of 129.97, and in IBs, the average total business per employee ranges from 160.49 to 189.14 with a mean of 178.98, and IBs have a more consistent average total business per employee, which is 1.38 times greater than that of CBs.

In CBs, the average NII per employee ranges from 1.63 to 2.47 with a mean of 2.10, and in IBs, the average NII per employee ranges from 2.14 to 2.53 with a mean of 2.35, and IBs have a more stable average NII per employee, which is 1.12 times greater than that of CBs.

In CBs, the average NNII per employee ranges from –0.59 to 0.34 with a mean of –0.02, and in IBs, the average NNII per employee ranges from –0.85 to –0.43 with a mean of –0.67, and CBs have a more stable average NNII per employee, which is 0.03 times greater than that of IBs.

In CBs, the average operating profit per employee ranges from 1.82 to 2.37 with a mean of 2.08, and in IBs, the average operating profit per employee ranges from 1.46 to 1.88 with a mean of 1.68. Although the average operating profit per employee in IBs is more stable, it is still 1.23 times greater in CBs than that of IBs.

In CBs, the average net profit per employee ranges from 0.81 to 1.11 with a mean of 0.93, and in IBs, the average net profit per employee ranges from 0.55 to 0.75 with a mean of 0.62. Although the average net profit per employee in IBs is more stable, it is still 1.52 times greater in CBs than that of IBs.

Thus, the position of IBs is superior to that of CBs in terms of deposit per employee, loans and advances per employee, total business per employee, and NII per employee, and the position of CBs is superior to that of IBs in terms of NNII per employee, operating profit per employee, and net profit per employee. ANOVA demonstrates that the variation in per EP in terms of deposits, loans and advances (investments), total business, NII, NNII, operating profit, and net profit of the two modes of the banking system is not significant at the

5% significance level, meaning the null hypothesis is not rejected. Therefore, per BP trends are identical over the study period.

4.1.2. Branch productivity (BP)

BP comprises an assortment of KPIs, which aid in the evaluation of branch operations' efficacy, the identification of enhancement opportunities, and the formulation of strategic decisions to boost productivity. BP is the ratio of output to input, where the output represents branch performance and the input is the number of branches.

Sulaimon and Ametepe [41] note that investments in state-of-the-art technology not only enhance customer satisfaction but also facilitate better networking among employees, thereby improving overall productivity. This aligns with the broader trend of digital transformation in the banking sector, which has been shown to create opportunities for enhancing productivity through innovative service delivery [42].

The following ratios are used to measure BP:

- 1) Deposit per branch = Total deposits/Total number of branches
 - 2) Loans and advances (investments) per branch = Total loans and advances/Total number of branches
 - 3) Total business per branch = Total business/Total number of branches
- where Total business = Total deposit + Total loans and advances (investments)
- 4) Net interest (net investment) income (NII) per branch:
 - 1) For CBs, NII per branch = (Interest income – Interest expenses)/Total number of branches
 - 2) For IBs, NII per branch = (Investment income – Profit paid on deposit)/Total number of branches
 - 5) Net non-interest (net non-investment) income (NNII) per branch:
 - 1) For CBs, NNII per branch = (Non-interest income – Non-interest expenses)/Total number of branches
 - 2) For IBs, NNII per branch = (Non-investment income – Administrative and other expenses)/Total number of branches
 - 6) Operating profit per branch = Total operating profit/Total number of branches
 - 7) Net profit per branch = Total net profit after tax/Total number of branches

Table 2
Per branch productivity measurement

	Deposits	Loans and advances (investments)	Total business	NII	NNII	Operating profit	Net profit
Conventional banks (CBs)							
Mean	1917.13	1838.91	3756.03	68.43	-7.39	61.04	28.74
Std. deviation	290.40	306.28	592.11	8.44	10.23	7.79	3.66
Coefficient of variance (CV)	15.15	16.66	15.76	12.33	-138.47	12.76	12.74
Max. value	2324.39	2308.84	4633.22	77.37	1.48	69.11	34.03
Min. value	1550.89	1542.64	3093.53	55.04	-20.46	52.73	25.61
Compound growth rate (CGR)	10.69	10.77	10.69	0.57	-114.37	8.02	7.57
Islamic banks (IBs)							
Mean	2297.27	2281.57	4578.85	59.79	-17.88	41.90	14.96
Std. deviation	244.46	270.98	503.02	2.02	3.09	4.53	2.16
Coefficient of Variance (CV)	10.64	11.88	10.99	3.37	-17.27	10.81	14.44
Max. value	2525.88	2637.81	5103.80	62.24	-14.55	46.10	18.69
Min. value	1941.42	1958.03	3899.45	57.96	-22.56	35.46	13.38
Compound Growth Rate (CGR)	6.31	7.74	7.00	-0.98	-1.24	1.16	8.81
ANOVA test of traditional (conventional) and Islamic banks							
F-ratio	1.20	1.27	1.22	0.33	0.71	0.36	0.38
P-value	0.32	0.29	0.32	0.86	0.59	0.84	0.82

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.

Table 2 presents the measurement of per BP.

For CBs, the average deposit per branch ranges from 1550.89 to 2324.39 with a mean of 1917.13, and in IBs, the average deposit per branch ranges from 1941.42 to 2525.88 with a mean of 2297.27, and the average deposit per branch in IBs is more consistent, which is 1.20 times greater than that of CBs.

In CBs, the average loans and advances per branch ranges from 1542.64 to 2308.84 with a mean of 1838.91, and in IBs, average loans and advances per branch range from 1958.03 to 2637.81 with a mean of 2281.57, and IBs have more consistent average loans and advances per branch, which is 1.24 times greater than that of CBs.

In CBs, the average total business per branch ranges from 3093.53 to 4633.22 with a mean of 3756.03, and in IBs, the average total business per branch ranges from 3899.45 to 5103.80 with a mean of 4578.85, and IBs have a more consistent average total business per branch, which is 1.22 times greater than that of CBs.

In CBs, the average NII per branch ranges from 55.04 to 77.37 with a mean of 68.43, and in IBs, the average NII per branch ranges from 57.96 to 62.24 with a mean of 59.79, and IBs have a more stable average NII per branch that is 1.14 times greater than that of CBs.

In CBs, the average NNII per branch ranges from -20.46 to 1.48 with a mean of -7.39, and in IBs, the average NNII per branch ranges from -22.56 to -14.55 with a mean of -17.88, and CBs have a more stable average NNII per branch, which is 0.41 times greater than that of IBs.

In CBs, the average operating profit per branch ranges from 52.73 to 69.11 with a mean of 61.04, and in IBs, the average operating profit per branch ranges from 35.46 to 46.10 with a mean of 41.90. Although IBs' average operating profit per branch is more stable, conventional banks' average operating profit per branch is 1.46 times greater than IBs'.

In CBs, the average net profit per branch ranges from 25.61 to 34.03 with a mean of 28.74, and in IBs, the average net profit per branch ranges from 13.38 to 18.69 with a mean of 14.96, and CBs have a more stable average net profit per branch, which is 1.92 times greater than that of IBs.

Thus, the position of IBs is superior to that of CBs in terms of deposit per branch, loans and advances per branch, and total business per branch, and the position of conventional banks is superior to that of IBs in terms of NII per branch, NNII per branch, operating profit per branch, and net profit per branch. ANOVA demonstrates that the variation in per BP in terms of deposits, loans and advances (investments), total business, NII, NNII, operating profit, and net profit of the two modes of the banking system is not significant at the 5% significance level, meaning the null hypothesis is not rejected. Therefore, per BP trends are identical over the study period.

4.1.3. Capital productivity (CP)

CP is a key metric used to evaluate the efficiency and effectiveness of capital utilization within a bank. It measures how well a company is generating returns from its investment in capital assets.

CP remains a vital aspect of banking performance. [43] highlight the significant impact of wages and welfare facilities on employee productivity, mediated by work motivation, suggesting that effective capital allocation can lead to improved productivity outcomes.

The following ratios are used to measure CP:

- 1) Deposit to per unit of capital = Total deposits/Total capital
- 2) Loans and advances (investments) to per unit of capital = Total loans and Advances/Total capital
- 3) Total business to per unit of capital = Total business/Total capital
where Total business = Total deposit + Total loans and advances (investments)
- 4) Net interest (net investment) income (NII) to per unit of capital:
 - 1) For CBs, NII to per unit of capital = (Interest income – Interest expenses)/Total capital
 - 2) For IBs, NII to per unit of capital = (Investment income – Profit paid on deposit)/Total capital

5) Net non-interest (net non-investment) income (NNII) to per unit of capital:

- 1) For CBs, NNII to per unit of capital = (Non-interest income – Non-interest expenses)/Total capital
- 2) For IBs, NNII to per unit of capital = (Non-investment income – Administrative and other expenses)/Total capital

6) Operating profit to per unit of capital = Total operating profit/Total capital

7) Net profit to per unit of capital = Total net profit after tax/Total capital

Table 3 presents the measurement of per unit of CP

For CBs, the average deposit per unit of capital ranges from 7.40 to 7.94 with a mean of 7.56, and in IBs, the average deposit per unit of capital ranges from 10.18 to 10.66 with a mean of 10.41, and IBs have a more stable average deposit per unit of capital, which is 1.38 times greater than that of conventional banks.

In CBs, average loans and advances per unit of capital range from 6.37 to 7.71 with a mean of 7.01, and in IBs, average loans and advances per unit of capital range from 10.01 to 10.87 with a mean of 10.29, and IBs consistently offer more loans and advances per unit of capital, which is 1.47 times greater than that of CBs.

In CBs, the average total business per unit of capital ranges from 13.77 to 15.64 with a mean of 14.57, and in IBs, the average total business per unit of capital ranges from 20.39 to 21.05 with a mean of 20.69, and IBs have a more stable average total business per unit of capital, which is 1.42 times greater than that of CBs.

In CBs, the average NII per unit of capital ranges from 0.19 to 0.32 with a mean of 0.25, and in IBs, the average NII per unit of capital ranges from 0.25 to 0.33 with a mean of 0.28 and compared to CBs, and IBs have a more consistent average NII per unit of capital, which is 1.09 times higher.

In CBs, the average NNII per unit of capital ranges from –0.02 to 0.11 with a mean of –0.03, and in IBs, the average NNII per unit of capital ranges from 0.06 to 0.11 with a mean of –0.09, and CBs have a more stable average NNII per unit of capital, which is 0.33 times higher than that of IBs.

In CBs, the average operating profit per unit of capital ranges from 0.20 to 0.25 with a mean of 0.22, and in IBs, the average operating profit per unit of capital ranges from 0.16 to 0.23 with a mean of 0.19, and CBs have a more stable average operating profit per unit of capital, which is 1.17 times greater than that of IBs.

In CBs, the average net profit per unit of capital ranges from 0.09 to 0.12 with a mean of 0.10, and in IBs, the average net profit per unit of capital ranges from 0.06 to 0.08 with a mean of 0.07, and CBs have a more stable average net profit per unit of capital, which is 1.56 times greater than that of IBs.

Thus, the position of IBs is superior to that of CBs in terms of deposit per unit of capital, loans and advances per unit of capital, total business per unit of capital, and NII per unit of capital, and the position of CBs is superior to that of IBs in terms of NNII per unit of capital, operating profit per unit of capital, and net profit per unit of capital. ANOVA demonstrates that the variation in per unit of CP in terms of deposits, loans and advances (investments), total business, NNII, and operating profit, and net profit of the two modes of the banking system is not significant at the 5% significance level, meaning the null hypothesis is not rejected and per unit of CP trends are identical in these six parameters. However, the difference in average NII per unit of capital is significant at the 5% significance level, leading to the rejection of the null hypothesis, which shows the trend is not identical in this parameter.

4.2. Growth rate analysis

Growth rate analysis involves examining the percentage change in various KPIs over a specific period to assess the rate at which these metrics are increasing or decreasing.

4.2.1. Deposit growth rate

As shown in Table 4, along with Figures 1 and 2, it is evident that both of the sectors fluctuate, with the individual bank's deposit growth rate ranging from 1.17 to 1.35 for the CBs and 1.18 to 1.40 for the IBs. IBBL is the highest as per the deposit growth rate at

Table 3
Per unit of capital productivity measurement

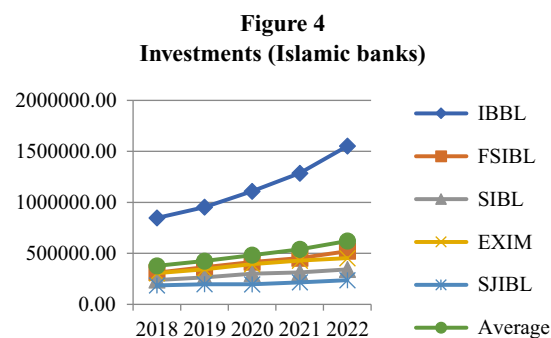
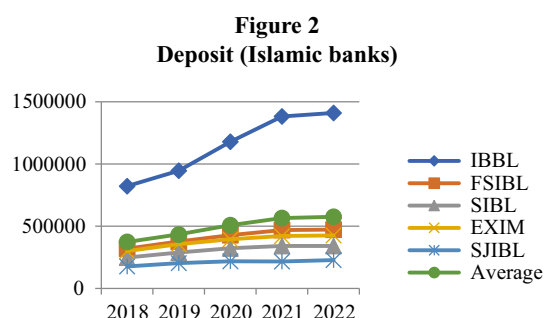
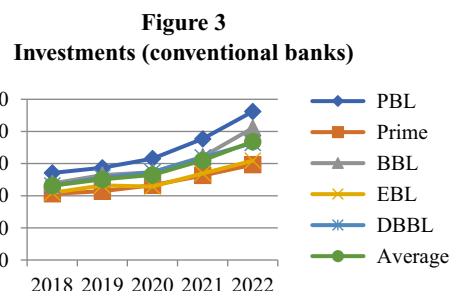
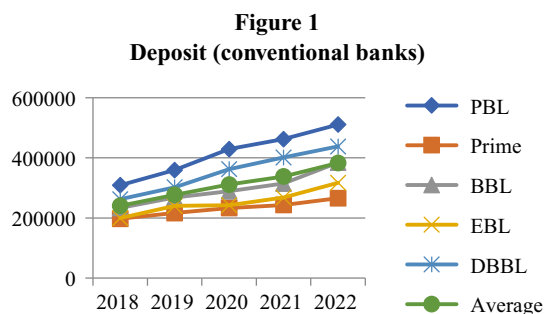
	Deposits	Loans and advances (investments)	Total business	NII	NNII	Operating profit	Net profit
Conventional Banks (CBs)							
Mean	7.56	7.01	14.57	0.25	–0.03	0.22	0.10
Std. deviation	0.22	0.49	0.68	0.06	0.05	0.02	0.01
Coefficient of variance (CV)	2.90	6.95	4.66	25.00	–164.47	8.04	10.96
Max. value	7.94	7.71	15.64	0.32	0.11	0.25	0.12
Min. value	7.40	6.37	13.77	0.19	–0.02	0.20	0.09
Compound growth rate (CGR)	1.68	2.06	1.82	–6.33	11.86	2.16	–1.39
Islamic Banks (IBs)							
Mean	10.41	10.29	20.69	0.28	–0.09	0.19	0.07
Std. deviation	0.17	0.36	0.28	0.04	0.02	0.03	0.01
Coefficient of Variance (CV)	1.68	3.54	1.33	13.36	–18.20	17.46	13.55
Max. value	10.66	10.87	21.05	0.33	0.11	0.23	0.08
Min. value	10.18	10.01	20.39	0.25	0.06	0.16	0.06
Compound Growth Rate (CGR)	–0.50	1.19	0.31	–6.51	–9.00	–4.78	4.76
ANOVA test of traditional (conventional) and Islamic banks							
F-ratio	0.01	0.25	0.07	2.65	1.44	2.45	0.45
P-v alue	1.00	0.91	0.99	0.049	0.24	0.06	0.77

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.

Table 4
Growth rate of deposit

Conventional banks (CBs)	PBL	Prime	BBL	EBL	DBBL	Average
	1.34	1.17	1.28	1.27	1.35	1.29
Islamic banks (IBs)	IBBL	FSIBL	SIBL	EXIM	SJIBL	Average
	1.40	1.29	1.24	1.26	1.18	1.32

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.



1.40. All in all, both types of banks exhibit positive growth, and on average, IBs have slightly better deposit growth.

4.2.2. Loans & advances (investments) growth rate

Insights from Table 5 and Figures 3 and 4 demonstrate that among IBs, IBBL has the highest loans and advances growth rate of 1.36, and SJIBL has the lowest growth rate of 1.11. Among the CBs, BBL has the highest growth rate of 1.27, and Prime has the

lowest growth rate of the lot with 1.18. Overall, IBs' loan and advance growth is marginally superior to that of CBs.

4.2.3. Import business growth rate

This is as follows in Table 6 as well as in Figures 5 and 6 also; among the IBs, SJIBL has the highest import business growth rate of 1.35, whereas FSIBL has the lowest growth rate of 0.78 only. In the CBs, PBL has the highest growth rate of 1.32, and DBBL has the lowest of 0.96. In general, the IBs present a slightly better trend

Table 5
Growth rate of loans and advances (investments)

Conventional banks (CBs)	PBL	Prime	BBL	EBL	DBBL	Average
	1.26	1.18	1.27	1.19	1.25	1.23
Islamic banks (IBs)	IBBL	FSIBL	SIBL	EXIM	SJIBL	Average
	1.36	1.33	1.22	1.26	1.11	1.29

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.

Table 6
Growth rate of import business

Conventional banks (CBs)	PBL	Prime	BBL	EBL	DBBL	Average
	1.32	1.03	1.14	1.16	0.96	1.12
Islamic banks (IBs)	IBBL	FSIBL	SIBL	EXIM	SJIBL	Average
	1.31	0.78	1.01	1.16	1.35	1.20

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.

Figure 5
Import business (conventional banks)

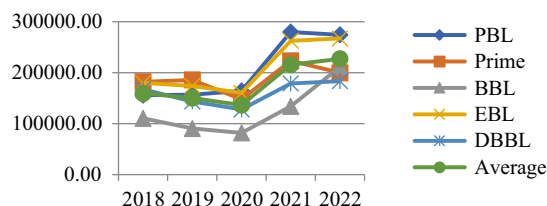


Figure 6
Import business (Islamic banks)

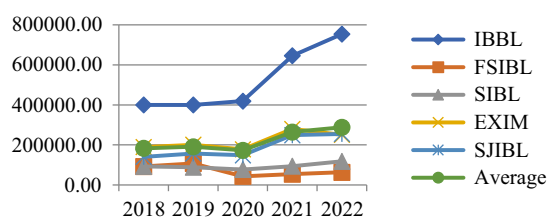


Figure 7
Export business (conventional banks)

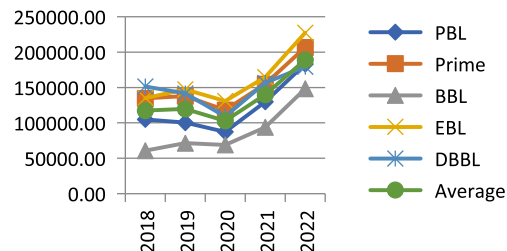
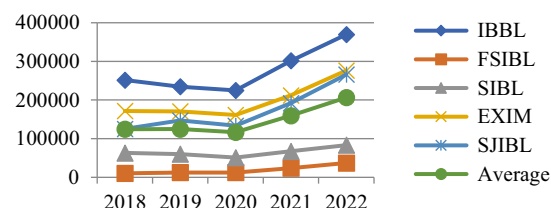


Figure 8
Export business (Islamic banks)



of growth in import business than the CBs, though the performance could be volatile within sectors.

4.2.4. Export business growth rate

Insights from Table 7 and Figures 7 and 8 indicate that among the IBs, FSIBL has the highest export growth rate of 1.86, and SIBL has the lowest growth rate of 1.03. For the CBs, the growth rate is highest in BBL (1.46) and lowest in DBBL (0.97). In any case, the export business of both sectors has nearly the same growth pattern, but on average, IBs' growth is slightly better, and the better growth is led by FSIBL in the IBs.

4.2.5. Number of branches opening growth rate

Both Table 8 and Figures 9 and 10 provide evidence that the number of branches opening growth rate of CBs is between 1.00 and 1.29, with DBBL having the highest growth rate at 1.29, while other CBs have slightly lower growth rates of around 1.00. IBs have more

homogeneity in their growth profile, all of them having a growth rate of around 1.08. Altogether, there is a continuing trend of new branches of IBs, while moderate fluctuations in CBs are observed, although DBBL has demonstrated better results than the others.

Figure 9

Branches opening (conventional banks)

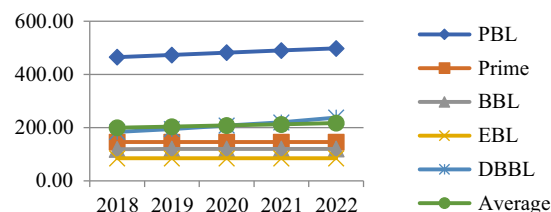


Table 7
Growth rate of export business

Conventional banks (CBs)	PBL	Prime	BBL	EBL	DBBL	Average
	1.15	1.12	1.46	1.19	0.97	1.14
Islamic banks (IBs)	IBBL	FSIBL	SIBL	EXIM	SJIBL	Average
	1.10	1.86	1.03	1.16	1.38	1.18

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.

Table 8
Growth rate of number of branches opening

Conventional banks (CBs)	PBL	Prime	BBL	EBL	DBBL	Average
	1.07	1.00	1.01	1.00	1.29	1.09
Islamic banks (IBs)	IBBL	FSIBL	SIBL	EXIM	SJIBL	Average
	1.08	1.07	1.08	1.09	1.08	1.08

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.

Figure 10
Branches opening (Islamic banks)

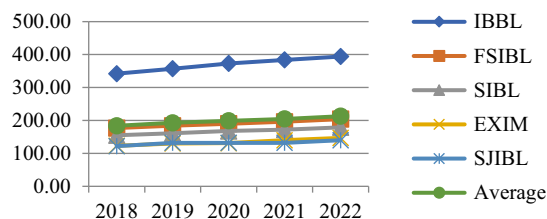
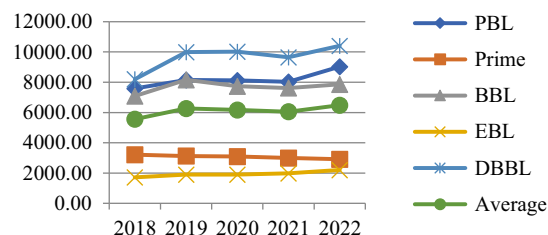


Figure 11
Employees (conventional banks)

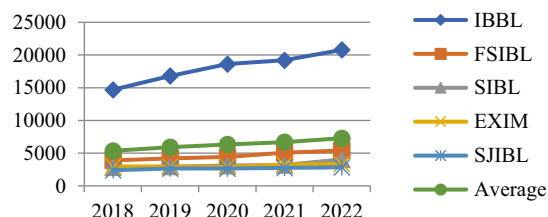


4.2.6. Number of employees growth rate

According to Table 9 and Figures 11 and 12, it is observed that the number of employees' growth rate is high in IBs, where SIBL has the highest growth rate of 1.42, followed by EXIM and SJIBL with growth rates of 1.13 and 1.18, respectively. In the CBs, the growth rates vary from 0.91 (Prime) to 1.28 (EBL), where the growth rate of Prime is the lowest. In general, the number of employees in IBs has increased more and has been more stable in comparison with conventional ones.

Consequently, IBs are growing at a faster rate than CBs in the mentioned parameters except for the number of branches growth rate.

Figure 12
Employees (Islamic banks)



5. Findings and Recommendations

5.1. Findings

IBs outperform CBs in terms of deposit per employee, loans and advances per employee, total business per employee, NII per employee, deposit per branch, loans and advances per branch, total business per branch, deposit to per unit of capital, loans and advances (investments) to per unit of capital, total business to per unit of capital, and NII to per unit of capital, but these differences are insignificant in all cases except NII per unit of capital.

The position of (CBs is superior to that of IBs in terms of NNII per employee, operating profit per employee, net profit per employee, NII per branch, NNII per branch, operating profit per branch, net profit per branch, NNII to per unit of capital, operating profit to per unit of capital, and net profit to per unit of capital, but the differences are insignificant.

IBs have a higher growth rate than CBs with respect to deposits, investments, import business, export business, and number of employees, but CBs have a higher growth rate than IBs with respect to the number of branches.

The findings demonstrate the higher productivity of IBs in deposit procurement, disbursement of fresh investment, net investment income per employee, and net investment income per unit of capital, while CBs are more productive in NII per branch, NNII,

operating profit, and net profit from 2018 to 2022. IBs are better at investment decisions, resulting in on-average earning more profit than CBs [44].

Generally, more deposits and more advances/investments lead to generating more income. Islamic banks, however, conduct purchase-and-sale transactions (such as Murabaha) with customers for a defined period. Due to Shariah principles, they cannot recognize profit beyond the expiry of the contract if the transaction does not result in actual returns.. Islamic banks have paid more profit on their depositors' funds due to their profit-loss sharing (PLS) principles. Islamic banks have also incurred more administrative and other expenses than CBs. Therefore, IBs' net profit, operating profit, and NNII were lower than those of CBs over the study period.

5.2. Recommendations

Bank management of IBs should not depend on investment income as a single source of revenue but should also focus on increasing revenue through non-investments and fee-based income, while effectively controlling administrative and other overhead costs to boost NNII.

Bank management of CBs should increase the total business by mobilizing more deposits and advancing more quality loans.

A special legal and supervisory framework is essential to comply with and monitor the IBs Shariah issues [45].

Table 9
Growth rate of number of employees

	PBL	Prime	BBL	EBL	DBBL	Average
Conventional banks (CBs)	1.19	0.91	1.11	1.28	1.27	1.17
	IBBL	FSIBL	SIBL	EXIM	SJIBL	Average
Islamic banks (IBs)	1.41	1.39	1.42	1.13	1.18	1.36

Source: Authors' calculations based on the 2018–2022 annual reports of the respective banks.

6. Conclusion and Implications

In the banking business, human capital is a vital resource for running the branch and branch banking activities. IBs have utilized their human capital (employees) in a more effective and productive manner to get the maximum output, which results in the mobilization of more deposits and disbursement of more advances than CBs. Thus, EP, BP, and CP show that compared to CBs, IBs exhibit superior growth trends and overall productivity performance for the years 2018–2022. IBs' productivity is determined by human capital efficiency [46]. In recent years, IBs' increasing trends of productivity have convinced CBs to open separate Islamic banking windows or separate Islamic banking branches or reform their entire modes of operation into Islamic banking. IBs should concentrate to increase non-investment income and control administrative and other overhead costs effectively. CBs should concentrate to procure more deposits and disburse more quality loans and advances by utilizing their available resources and employees' productivity. However, both banks are significantly contributing to the expansion of the Bangladeshi economy.

This study has significant implications for both academics and practitioners. For academic researchers, it contributes to the growing body of literature on Islamic banking performance, particularly in the context of Bangladesh. The findings suggest that IBs have a competitive edge in terms of human capital efficiency and capital utilization, which could influence future studies on the role of human capital in bank performance. For bank managers, the study emphasizes the importance of improving non-investment income and controlling operational costs in IBs while encouraging CBs to explore more efficient ways of managing deposits and advancing loans.

7. Future Research Directions

Future studies could examine a comparative analysis between IBs and CBs in other regions to determine whether the patterns seen in Bangladesh are consistent globally. Additionally, further studies could investigate the long-term effects of Islamic banking windows in CBs and whether these separate branches contribute more significantly to overall performance. Another potential area for future research is the role of digital banking and technological advancements in enhancing the productivity (efficiency) of banks, both conventional and Islamic, especially in terms of improving employee and BP.

8. Limitation of the Study

This paper is prepared as per the collected secondary data, and the accuracy of the findings completely depends on the accuracy of the data. The study covers only 5 years of data from 10 commercial banks, that is, 5 Islamic and 5 conventional. A large sample of data covering a long period can depict more accurate results.

Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

The data that support the findings of this study are openly available in "figshare" at <https://figshare.com/s/dba755d63b7caee42714>.

Author Contribution Statement

G. M. Anwar Hossain: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Project administration. **Md. Ruhul Amin:** Methodology, Validation, Formal analysis, Resources, Supervision. **Md. Shahbub Alam:** Formal analysis, Writing – review & editing, Visualization, Supervision. **Atifa Kafi:** Writing – review & editing, Visualization, Supervision, Project administration.

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