

# Technological Influences on Employment and Unemployment: An Empirical Study on Banking Sector in Bangladesh

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**Abstract:** *This paper aims at finding the stimulus of technology on employment generation or increase the unemployment rate. We have tried to show the scenario if technology affects to increase the employment in banking sector in Bangladesh. To do this research, we followed a structured questionnaire to survey. Both descriptive statistics and independent sample t test are used for 80 respondents in different banks chosen by random sampling to clarify the findings. We found that structural unemployment occurred only because of changing in the processes or systems of production and frictional unemployment occurs due to frequent switching between the jobs have been baroque for last couple of decades. Above all, the employment is generated due to the blessings of technological advancements where a few of the people lose their jobs and can't manage it immediately. These findings may be used as a source of future research in this selected areas as well as organizations may find it effective for their IT/IS investment decision.*

**Key Words:** Bangladesh, Banking sector, Employment, Influence, Technology, Unemployment

## 1. Introduction

Adoption of new technology in last ten to fifteen years proclaims the broader horizon of employment opportunity through introducing new jobs. But very beginning of that time period this introduction in some context had been liable for structural unemployment (widespread usage of different hardware and software system, a bunch of labor-saving technology in lieu of labor-based technology, promoted this type of unemployment) which isn't now vestige of presence. Since then the picture has been changing abruptly where all the sectors of labor market have been rather familiar with labor-saving technology. Labors still have been migrating themselves from traditional sector (agriculture sector) to modern sector (manufacturing sector) (The two-sector surplus model; W. Arthur Lewis; though the model ignores consideration of labor-saving technology) (C., 2012, pp. 115-120). There are different types of job opportunities are available in the market where technology has been in the driving seat to let it go. Outsourcing, freelancing etc. are epitome for the adoption of technology.

Not only job creation and lowering unemployment technology also helps to search a suitable person in a suitable position through using different technology-driven system which is undoubtedly labor-saving system. Technology lessens different workloads or different activities by assigning minimum number of workers for multiple tasks. For example; one stop service etc. It also introduces multiple-task machines and in essence creates structural unemployment. For example; less use of postal order etc. Introducing battery-generated three-wheeler is liable of unemployment for the traditional rickshaw drivers. The situation is more devastating for the developing countries like Bangladesh, where agriculture plays a vital role for the employment opportunities. Different stages of paddy production have already been replaced by technology-driven system: use of power tiller and tractor for land

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preparation, use of rice trans-planter for transplanting, use of power thrasher, peddle thrasher for thrashing reduces the use of labor.

The banking sector has already introduced financial technologies which change the money management technique means people found the way of managing money efficiently. It will accelerate the banking activities more in near future. Paper checks won't be used throughout the world rather chip cards will be replaced on paper check. This is because people feel inherent risk, chance of fraudulence along with identity theft while they are paying paper checks. Fintech companies like Venmo and Paypal have already started changing the individual payment behavior. People are losing interest in standing in online for banking or financial transaction. On the other hand, it is expected that blockchain technology (debatable in some cases) will multiply in couple of upcoming years and due to this major changes can be taken place, in the banking sector, for example fewer intermediaries, fast-tracked transaction etc. Since the technology has been used in every aspect of society especially banking sector, it is obvious that some of the position will be obsolete and many people will be sufferer from losing the jobs.

The objective of the paper includes:

***Broad Objective:***

- To study the generations and digitized banking system in Bangladesh
- To identify the factors involved in shifting into modern banking

***Specific Objective:***

- To find out if employment or unemployment occurs due to the technology implementation

**2. LITERATURE REVIEW:**

**2.1 Employment and Unemployment**

There was a debate about the nexus between machines and unemployment in the nineteenth century and that debate finally broken down into two; first one led by the debates among different economists and policy makers for "technological unemployment" in the late 1920s and 1930s, second one broken up by "structural unemployment" in the late 1950s and 1960s (Woirol, 1996). Structural unemployment started in the winter of 1958-59 and had contrasted with demand-deficient unemployment (Woirol, 1996).

The contribution of American workers has already declined from 1% to 2% over the last three decades because of continuous increase in the productivity through mechanization that is major contribution is already transformed from human to machine (Lawrence, 2014). An empirical study conducted by Georges V. Hounghonon and Pascal Da-Costa to show the declining share of labor wage in 4760 international companies over 20 years, from 1994 to 2013; where labor share declined by 15% in 20 years, from 80% in 1994 to 65% in 2013; on the other hand R & D (Research and Development) intensity declined slightly by 0.2%, from 1.55% in 1994 to 1.35% in 2013 (Da, 2017). There had been significant labor share decline in some developed countries from 1970 to 2010, in some developing and emerging economies from 1970 to 2007 (International Labor Organization(ILO), 2013). Millions of workers have lost their jobs from the economic activities and different organizational posts have already been shrunk, in some cases restructured or obsolete (Rigdon, 1994). All the basic traditional sectors of the economy like agriculture, service and manufacturing have been exercising displacement due to technological innovations, different service based emerging sectors like elite entrepreneurs, technicians, and consultants have already introduced (Shah Vivek, 1998).

Labor market mismatches between the two opposing forces, demand and supply eventually are liable for the structural unemployment. The structural unemployment is the result of qualitative imbalance between labor demand and labor supply (Katsoulacos, 1986). The two consequences after the post-world war II, first is the transformation in the retail markets by employing high tech business machines and new mode of labor saving packaging shrunk the labor demand; second is the introduction of labor-saving devices reduced demand for permanent servants (Mishan.E.J, 1996).

Technological unemployment, the most important factor of structural unemployment in some cases immutable particularly in the short run which has been characterized by John Maynard Keynes in 1930s, who said as "only a

temporary phase of maladjustment' (Keynes, 1931). Automation in the operation due to technological advancement also causes for job losing. Among all type of U.S jobs 47 percent are under thread of automation (Frey & Osborne, 2017). This findings are totally independent of future unemployment. But another findings regarding agricultural jobs suggest that 90 percent of arduous tasks have already been obsolete (Weiner, 2014). In U.S.A, automation causes for 1.75 million unemployed drivers in next 15 years, 95 percent of air traffic will be controlled by robot by 2028, less than 20 workers will work in most factories by 2034 and robots will conduct maximum surgical operation by 2036 (Dreyfuss, 2017). But introducing technology to the workplaces tends to transform the tasks rather eliminate (Chui Michael, 2015). Robots are taking away human jobs seems to be unfounded, whereas technology is bringing up new jobs and employment in the industrial sectors especially in East Asia (The World Bank, IBRD.IDA, 2019).

Some other context of technology through innovations has positive impact on employment. An empirical study conducted by two German economists Stefan Lachenmaier and Horst Rottmann over the manufacturing firms for the years 1982-2002 found that process innovation had greater impact on employment than product innovation (Horst, 2011). This finding also supported by another study conducted in USA over manufacturing industries where explored that innovations on firm level generate more jobs than to effect on firm behavior (Coad Alex, 2011). Another recent study over the period of 1998-2011 for 11 European countries found the greater employment effect of innovations on medium-and high-tech industries whereas no employment effect on low-tech industries (Piva Mariacristina, 2017). But a study over 21 industrial countries from 1985 to 2009 has shown the negative impact of technology on employment, where a regression analysis suggested a positive relationship between technological change and unemployment over three years (Horst F. , 2013).

How information technology has changed the mode of operation in the banking industry? Technological innovations in the banking sectors can be grouped into four distinct periods like early adoptions: introduction of telecommunication in the banking sectors (1864-1945), specific application: introduction of computers to foster business volume and to solve specific problem in banking operations (1945-65), emergence: banks became the dominant users of hardware and software applications to operations (1965-80) and diffusion: spread of IT in all aspects of banking external and internal operations (1980-95) (Douglas, 2002). Information technology has been practiced under two dimension in banking: one is Business Process Reengineering and another is Communication and Connectivity (Khajeh, 2011). Also IT in the banking saves the time for the employees and the customers, reduces expanses and facilitates the network transactions (Khajeh, 2011).

Changing of operational regime due to technological prospects without having cautionary measures generally leads irrevocable unemployment in an economy. So only robots and machines are not responsible for unemployment rather lack of knowledge, proper training and information to get into the new mode of operation. (Dhaliwal, 2018). Labor saving technology has been adopting since world's birth. The most effected field is agriculture where the workforce percentage has declined to under five from over fifty in last two hundred years (Bruce, 1983). Adoption of ICT on operating systems of banks geared up the impact to its physical branches (Commission, 2008). Modern distribution channel, the internet, mobile banking, widespread usage of ATM and payment card networks, are said to be major catalysts for the reducing amount of bank branches and controlling operating costs (al. H. S., 2012). All global economics have been introducing new mode of online transactions like utility payments, fund transfers, trading of goods using e-channels as like internet, cell phone etc. Different infrastructural feasible setup for ICT based banking have already been established in Bangladesh. But the inevitable threat of ICT based banking like identity theft where hackers deploy their self-interest through deceitful transactions and unauthorized access is yet to be assuage (pp. 05,13).

Due to technological improvement information passes properly to the bankers and it creates opportunity for them to switch one bank to another and finally creates frictional unemployment. Asymmetric information between bankers and customers loses the faith on banks. With the advancement of technology asymmetric information has been declining because more and more customers have easy access to proper information of banking services (et, 2012). The inevitable unemployment due to structural change which stems from technological advancement creates opportunity for new workers to get suitable workstation. (Habib, Chowdhury, & Siddique, 2015). Involuntary and circumstantial unemployment occur due to change in business mode of production like acquisition, merger and most importantly adoption of new technology in the production process. (Habib, Chowdhury, & Siddique, 2015).

## 2.2 Banking Evolution in Bangladesh by Generation

Table 1: Banking Evolution in Bangladesh

	1 <sup>st</sup> Generation (Before 1991)	2 <sup>nd</sup> Generation (1991-1999)	3 <sup>rd</sup> Generation (1999-2011)	4 <sup>th</sup> Generation (2011-Present)
<b>Banking History</b>	AB Bank, Islami Bank Bangladesh, National Bank, IFIC Bank, Pubali Bank, The City Bank, United Commercial Bank, Uttara Bank, ICB Islamic Bank, Agrani Bank, Janata Bank, Rupali Bank, Sonali Bank, BASIC Bank, Bangladesh Krishi Bank, Rajshahi Krishi Unnayan Bank	Prime Bank, Dhaka Bank, Dutch-Bangla Bank, Eastern Bank, Al-Arafah Islami Bank, NCC Bank, Social Islami Bank, Southeast Bank	Jamuna Bank, Bangladesh Commerce Bank, Bank Asia, BRAC Bank, Mercantile Bank, Mutual Trust Bank, First Security Islami Bank, One Bank, Premier Bank, Standard Bank, Trust Bank, EXIM Bank, Shahjalal Bank.	Union Bank, Modhumoti Bank, Farmers Bank, NRB (Global) Bank, NRB Bank, Meghna Bank, Midland Bank, NRB Commercial Bank, South Bangla Agriculture & Commerce Bank.

## 2.3 Varieties of e-Banking Services

Table 2: e-Banking Services

Generation of Electronic Banking	Back Office	Front Office
First Generation	<ul style="list-style-type: none"> <li>- Ledger</li> <li>- Cash Management</li> <li>- Head office MIS</li> </ul>	<ul style="list-style-type: none"> <li>- Cash dispensers</li> </ul>
Second Generation	<ul style="list-style-type: none"> <li>- Transaction Processing offline</li> <li>- ACHs</li> <li>- Generation of Information for record keeping</li> <li>- Fund transfer</li> </ul>	<ul style="list-style-type: none"> <li>- Telephone bill payment</li> <li>- POS systems</li> <li>- Check verification</li> <li>- ATMs</li> <li>- Authorization</li> </ul>
Third Generation	<ul style="list-style-type: none"> <li>- Online transaction processing</li> <li>- Centralized processing at country level</li> <li>- Internet banking</li> <li>- Inter-bank transaction processing</li> </ul>	<ul style="list-style-type: none"> <li>- Automatic Fund Transfer</li> <li>- Online Banking</li> <li>- Home banking electronic</li> <li>- Direct deposit</li> <li>- Check transactions</li> <li>- Lock box check</li> <li>- Electronic fund transfer</li> <li>- Internet banking</li> </ul>

(Raihan, 2001)

## 2.4 Payment Statistics

Table 3: Payment Statistics

Services Category	2014	2015	2016	2017	2018 up to May 31, 2018
Inward Remittance	37.95	38.15	74.71	84.1	51.95
Cash In transaction	43939.7	66570.3	100019	132661	65051.9

Cash Out Transaction	38661.7	57669.6	90222.4	120222	58406.7
P2P transaction	17995.6	27879.6	35124.3	47156.5	23950.7
Salary Disbursement (B2P)	584.42	1298.57	2455.02	4599.23	2529.84
Utility Bill Payment (P2B)	1142.22	1456.25	2286.55	2546.44	1090.79
Merchant Payment	0	0	0	735.6	786.89
Government Payment	0	0	0	1113.35	310.84
Others	768.49	2861.05	4504.14	5466.52	2022.16

## 2.5 Number of Branches

**Table 4: Number of Branches**

Year	Number of Branches of Commercial banks in 3 largest cities
2004	6304
2005	6404
2006	6565
2007	6727
2008	6902
2009	7244
2010	7641
2011	8009
2012	8382
2013	8724
2014	9111
2015	9468
2016	9722

The number of employees in the banking sector of Bangladesh was 99287 at the end of June, 2006 (Bangladesh Bank, 2006). Another study revealed that total number of employees in this sector declined to 81245 in 2017 from 90265 in 2016 whereas 5700 were forced to leave the job due to cost minimization strategies and structural changes (Mohammad, 2018). Introduction of new mode of accessibility like mobile banking (NexusPay, bkash etc.) is obsoleting the jobs created by different telecom industries like flexi load, I top-up etc.

### 3. METHODOLOGY:

This quantitative research is descriptive in nature and predominantly relied on primary data those are collected using questionnaires to emanate unemployment and secondary data using books, journals, research papers, magazines to show increasing dimensions in the banking sectors. Both descriptive statistics and independent sample t test are used for 80 respondents in different banks chosen by random sampling to clarify the findings.

### 4. DATA ANALYSIS AND FINDINGS:

#### 4.1 Survey results:

Conducted survey on 80 employees in three different divisions of a private commercial bank: general banking division, credit risk division and foreign exchange division to find out two types of unemployment like structural unemployment only because of technological advancement and frictional unemployment due to information technology.

**A. Structural Unemployment:**

**Table 5: Descriptive Statistics**

	N	Mean	Std. Deviation
Gender	80	1.3375	0.47584
Age	80	2.075	0.85351
Level of Education	80	2.875	0.4321
Education	80	2.225	1.00599
Experience	80	1.6375	0.9174
Job quitted	80	2.2	0.75305
Last position	80	1.6625	0.65495
Years in Last Institution	80	2.5	0.69355
Current Position	80	1.7	0.81753
Years in Current Position	80	1.7875	0.7061
Source of Job	80	1.6	0.97565
Time between Last to present	80	2.2125	0.88151
Reason of Job Switch	80	1.5375	0.65495

**Table 6: Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.726	0.727	10

**Table 7: Item-Total Statistics**

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
GBQ1	37.325	16.703	0.429	0.698
GBQ2	37.25	16.747	0.43	0.697
GBQ3	37.0375	17.024	0.489	0.689
GBQ4	37.1375	17.513	0.361	0.709
CDQ1	37.475	18.328	0.248	0.724
CDQ2	37.3875	17.304	0.413	0.7
FEDQ1	37.4125	16.929	0.427	0.698
FEDQ2	37.3	18.111	0.34	0.712
FEDQ3	37.225	17.62	0.434	0.699
FEDQ4	37.1625	18.188	0.293	0.719

From (Table 6), the value of Cronbach's alpha coefficient for the 10 items is .726. It supports that derived items have comparatively high internal consistency. 'Cronbach's alpha if item (Table 7) measures probable value of the Cronbach's alpha, if it is needed to dispose of a particular item. Therefore, from the (Table 7), it is obvious that that none of the values of that column is greater than the current alpha of the whole scale: .726. It states that it is not necessary to delete any items.

**Table 8: Item-Total Statistics**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %

1	2.946	29.465	29.465	2.946	29.465	29.465	2.299	22.994	22.994
2	1.926	19.258	48.723	1.926	19.258	48.723	1.815	18.155	41.149
3	1.429	14.293	63.016	1.429	14.293	63.016	1.673	16.727	57.876
4	1.128	11.276	74.292	1.128	11.276	74.292	1.642	16.416	74.292
5	0.821	8.206	82.499						
6	0.534	5.341	87.84						
7	0.445	4.448	92.288						
8	0.34	3.404	95.691						
9	0.23	2.304	97.995						
10	0.2	2.005	100						

Extraction Method: Principal Component Analysis

Only 4 factors have been extracted from (table 8), since cumulative percentage is greater than .70 at the very next level. It is recommended that factors with eigenvalues greater than 1.0 should be retained thus 4 factors have been retained that signposts the adequacy of the analysis using these factors.

**II. Group Statistics**

**Table 11: Group Statistics (a)**

**B. Frictional unemployment:**

**I. Group Statistics**

**Table 9: Group Statistics (a)**

	What's your gender?	N	Mean	Std. Deviation	Std. Error Mean
How many jobs you have quitted?	Male	53	1.6415	.94247	.12946
	Female	27	1.6296	.88353	.17004

**Table 10: Independent Samples Test (b)**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
How many jobs you have quitted?	Equal variances assumed	.366	.547	.054	78	.957	.01188	.21829	-.42271	.44647
	Equal variances not assumed			.056	55.547	.956	.01188	.21371	-.41631	.44007

Based on independent sample t-test where,

$H_0$  : Mean ( $\mu$ ) number of jobs quitted of male = Mean ( $\mu$ ) number of jobs quitted of female

$H_1$  : Mean ( $\mu$ ) number of jobs quitted of male  $\neq$  Mean ( $\mu$ ) number of jobs quitted of female

We reject null hypothesis where the variances between these two mean are statistically insignificant. Levene's test for equality of variances suggests that males have more tendency to quit jobs frequently than females do.

	What was the way of your apply for the current job?	N	Mean	Std. Deviation	Std. Error Mean
How many jobs you have quitted?	Online	44	1.7045	.97836	.14749
	Postal	29	1.5862	.86674	.16095

**Table 12: Independent Samples Test (b)**

Based on independent sample t-test where,

$H_0$ : Mean ( $\mu$ ) number of jobs quitted through online = Mean ( $\mu$ ) number of jobs quitted through postal

$H_1$ : Mean ( $\mu$ ) number of jobs quitted through online  $\neq$  Mean ( $\mu$ ) number of jobs quitted through postal

We reject null hypothesis where the variances between these two mean are statistically insignificant.

Levene's test for equality of variances suggests that employees have more tendency to quit jobs through online.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
How many jobs you have quitted?	Equal variances assumed	.786	.378	.529	71	.599	.11834	.22386	-.32803	.56471
	Equal variances not assumed			.542	64.949	.590	.11834	.21831	-.31766	.55434

**III. Group Statistics**

**Table 13: Independent Samples Test (a)**

	How many years of job experience you have?	N	Mean	Std. Deviation	Std. Error Mean
How many jobs you have quitted?	<1	23	1.3913	.78272	.16321
	6-10	21	1.4286	.59761	.13041

**Table 14: Independent Samples Test (b)**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
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		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
How many jobs you have quitte	Equal variances assumed	.150	.700	-.176	42	.861	-.03727	.21149	-.46407	.38953
	Equal variances not assumed			-.178	40.776	.859	-.03727	.20891	-.45924	.38471

Based on independent sample t-test where,

$H_0$ : Mean ( $\mu$ ) number of jobs quitte who have less than one year job experience = Mean ( $\mu$ ) number of jobs quitte who have job experience between six to ten years.

$H_1$ : Mean ( $\mu$ ) number of jobs quitte who have less than one year job experience  $\neq$  Mean ( $\mu$ ) number of jobs quitte who have job experience between six to ten years.

We reject null hypothesis where the variances between these two mean are statistically insignificant.

Levene's test for equality of variances suggests that employees have more tendency to quit jobs who have more experiences.

**Conclusion:**

Structural unemployment only because of changing in the processes or systems of production and frictional unemployment because of frequent switching between the jobs have been baroque for last couple of decades. A great alchemy in the whole system of labor market can resolve the identified unemployment though technology generates employment on the other side of the system. It will certainly be a challenge for us to limit unemployment headed by the technology unless we adopt proper training for the existing employees to adjust with the new transformed tasks and arrange decent workplace so that employees discourage themselves not to switch the current job sporadically even if they have easy access to do so due to technology.

There are 57 banks which are operating their business in Bangladesh (Bangladesh Bank, 2019). Hence, due to the time limitation, it was not possible to consider every bank for the survey. Along with this only 80 survey samples were taken as it is an independent research.

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