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Editorial Board

Table of Contents

Articles

Case Study

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MSMEs Distress in COVID-19 Pandemic in Bangladesh: An Analysis of the Stimulus Package Design and Implementation Options

Monzur Hossain[*]

Abstract

Micro, small and medium enterprises (MSMEs) faced the worst hurdles during the Covid-19 pandemic and subsequent lockdowns. To support the recovery of losses, the Bangladesh government declared a credit-based stimulus package of Tk. 200000 million in the middle of 2020 to support employment and working capital of MSMEs. The government incurred a 5% interest subsidy out of a 9% interest. Given the poor access of MSMEs to bank finance due to stringent rules and the lack of a database of MSMEs, the bank-dependent stimulus would not likely be successful. To this end, this paper provides an estimate of the projected number of MSMEs in 2020 using the inter-census and available survey data that could help outline a reasonable stimulus package for this sector. Furthermore, it highlights two financing strategies that could help reach out to the most distressing MSMEs involving banks and micro-finance institutions.

Keywords: Micro, Small, and Medium Enterprises (MSMEs); stimulus package; bank loan; database of MSMEs; micro-finance institutions

1. Introduction

The COVID-19 crisis affects micro, small and medium enterprises (MSMEs) enormously worldwide. They were the worst hit by the COVID-19 pandemic because of suppressed domestic and international demand and supply-side constraints, such as lockdown and social-distance measures and autonomous suspension of demand due to fear of infection among the people. The production of the firms was affected to a great extent. The situation in Bangladesh was not different. The government enforced social-distancing measures for the citizens by declaring general holidays (a relaxed lockdown) since March 25, 2020, which ended on May 30, 2020, after 67 days. Similar lockdowns were imposed in 2021 and 2022 to face the second and third waves of Covid infections, respectively. Most of the people stayed at home during the lockdown period; therefore, MSMEs' products and services were significantly disrupted (Hossain and Chowdhury, 2021/2022).[1] During this challenging time of economic stalemate caused by the COVID-19 pandemic, finding an effective policy response to address MSME distresses is among the priority policy agenda of the government.

It is to be noted that MSMEs are the mainstay of developing economies like Bangladesh in creating employment for millions as they are quite predominant in the industrial structure, comprising over 97% of all economic units (Economic Census, BBS 2013). More than 8 million workers are being employed in these sectors. The contribution of the MSME sector to GDP is estimated at about 25% (ADB, 2015), which makes the sector an engine of growth. However, the pandemic placed the MSME sector in jeopardy. The lack of organized trade bodies often deprives MSMEs of policy support, as realized by strong trade associations for other sectors. Many countries in the world have designed various stimulus packages for SMEs to foster their recovery (World Bank, 2020). For example, the Government of Bangladesh has declared a subsidized credit package worth $1 billion, while India announced $87 billion in cheap finance for the SME sector (Hossain 2020; Bhagwati 2020). ADB helped the Government of Nepal to implement its pandemic response plan through $250 million in budget support under the CARES Program. The program supports health response measures, social protection and relief programs, and economic recovery. Similarly, considering the importance of SMEs in developing economies, countries worldwide attempted to lend support to SMEs in their capacities.

The government of Bangladesh declared a stimulus package worth Tk. 200000 million (or US$1 billion) in the middle of 2020 to help MSMEs recover their losses and maintain the economy's vibrancy. The government intends to provide loans to MSMEs under this stimulus at a 4% interest rate and the rest 5% interest subsidy from the government[2]. Therefore, the whole stimulus is a credit package, of which the government's contribution is about Tk. 10000 million as interest

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[1] In a telephone survey of 500 SMEs, they find that SMEs lost 66% of their revenue in the first month of lockdown compared to the same month in the previous year.

[2] In Bangladesh, the government has fixed interest rate for lending at 9% and deposit at 6% since April 2020 for all purposes except consumer credit.

subsidy in a year. The central bank (Bangladesh Bank) has relaxed the cash reserve ratio (CRR) and advance-deposit ratio (ADR) and created refinancing schemes to ensure a greater supply of liquidity in the banking sector to implement the stimulus package. In particular, Bangladesh Bank created a refinancing scheme of Tk. 100000 million so that the bank can implement the stimulus package (Bangladesh Bank, SMESPD circular no. 2, April 26, 2020). The pertinent questions are: whether and to what extent MSMEs would benefit from the declared bank-based stimulus package. And, what are the ways to make the stimulus more effective for this sector? This article will reflect on these aspects and some workable financing modes to make the stimulus more inclusive and effective. For this purpose, this paper estimates the losses incurred by the MSMEs during the lockdown period based on survey data in the absence of official statistics on MSMEs in Bangladesh. The exercises in this paper could set an example to design any support measure in the context of either a crisis or sectoral incentives.

Implementing any support measure or stimulus package successfully, the first and foremost condition is to have a comprehensive database of MSMEs. Because most of the MSMEs are out of the formal registration system and it is not easy to reach them. Moreover, there is a dearth of updated data on MSMEs in Bangladesh, which is one of the impediments to devising an effective incentive package for this sector. After every ten years, a census of economic enterprises is conducted by the government's statistical agency, the Bangladesh Bureau of Statistics (BBS) though the census lacks adequate information on firms' production/revenue and other flow data. The latest Economic Census was conducted in 2013 that identified about 7.8 million economic enterprises, of which roughly one million are MSMEs. This is the only available information on MSMEs, which is surely outdated. Among them, 11% are micro, 88% are small, and 1% are medium enterprises. Two other organizations working on MSMEs, namely SME Foundation (SMEF) and Bangladesh Small and Cottage Industries Corporation (BSCIC), but they do not have a comprehensive list of MSMEs. Therefore, to estimate the aggregate losses of the MSMEs in the face of covid-19 crisis, it is necessary to have an updated estimate of the number of MSMEs, such as their numbers, productions/revenues, their employees, and wage bills at the outset.

The second aspect of the stimulus implementation is related to its design and modalities. It is to be noted that the lack of access to bank finance is the main obstacle to the development and growth of MSMEs. This is true not only for Bangladesh but also for the whole world (Beck et al., 2006). A recent study

(Hossain et al., 2017) found that less than 40% of SMEs have access to bank finance in Bangladesh and 49% got finance from NGOs/MFIs. If micro-businesses are included, the percentage of small enterprises staying out of banks' coverage is much bigger. MSMEs find it hard to comply with complicated loan procedures to get a stimulus loan. Banks will ask for collateral, guarantee, papers, etc. that they usually don't have. So, only the firms that have access to bank finance can only take benefit from the stimulus credit package. The banking sector is not yet in its full capacity to serve the MSMEs, which is evident from a recent study (Hossain et al., 2020). In this context, more than 70% of MSMEs will likely be left out of the benefit of the government's COVID-19 stimulus for the MSME sector. It is thus important to look into the suitability of alternative models of SME financing to make the stimulus workable during the pandemic.

The paper is organized as follows. Section 2 provides an estimate of the number of MSMEs, their revenues and wage payments, etc. Section 3 estimates the potential losses of MSMEs and proposes an outline of stimulus packages. Section 4 discusses how to make the stimulus workable by focusing on some innovative financing strategies. Finally, in section 5, some policy recommendations are made to address the distress of MSMEs in inclusive and effective ways.

2. An Estimation of the number of MSMEs in Bangladesh in 2019

In the context of the unavailability of updated information about MSMEs in Bangladesh, in this section, an attempt has been made to estimate the number of MSMEs and other relevant indicators that could be the first step to understand the need for the MSMEs. The estimates would aid the policymakers in devising a workable stimulus package for the MSME sector. The latest official statistics on MSMEs is the Economic Census, 2013. It is observed that MSMEs grew at an annual rate of 7.2%, and workers grew at a 6% rate during the inter-census period, 2001/3 and 2013. Using these growth rates, the number of MSMEs in 2019 is estimated at 1.35 million, and the estimated number of the cottage and household economic units (employee<10 persons) is estimated at 9.58 million units, and the corresponding workers are 17.3 million. In total, smaller economic units are estimated at about 11 million, and the total number of persons engaged is over 34 million (Table 1).

Table 1: Estimated number of MSMEs and their employees in 2019

	Number of enterprises		Number of employees (workers)		
	2013	2019	2013	2019	2019*
MSMEs	970431	1,358,603	7,306,797	9,937,244	8,744,775
Economic Household, cottage, and others	6848134	9,587,388	17,194,053	24,363,946	17,324,130
Total	7,818,565	10,945,991	24,500,850	34,301,190	26,068,904

*Adjusted by deducting unpaid family workers (at 3%); (Manufacturing Units= 54,344; Trade & service= 1,304,259)

The size distribution of units is as follows: 11% are Micro, 88.9% are small, and 0.8% are medium. Regarding employment, 7.1% of jobs are in micro firms, 83.9% in small firms, and 9% in medium firms (Table 2). So, there is the overwhelming dominance of small firms in the MSME sectors.

Table 2: Distribution of units and their workers

	Number of units	Percentage	Number of workers	Percentage
Micro (TPE: 10-24)	145,610	10.7	706,059	7.1
Small (TPE: 25-99)	1,203,045	88.5	8,339,104	83.9
Medium (TPE: 100-249)	9948	0.8	892,080	9.0
Total	1,358,603	100	9,937,243	100

*TPE: Total persons engaged

Wage payment and production:

Using data from the MSME surveys conducted by a survey of BIDS in 2017, the average salary paid to over 8 million workers based on skill level is estimated. The wages paid by the MSMEs are estimated at Tk. 642.7 million per month (Table 3).

Table 3: Estimated monthly wage payment by MSMEs

Types of workers	% of types	Total workers	Average monthly salary	Monthly amount paid (in Tk.)
Skilled	58	5,071,969	8500	43,111,739,023
Semi-skilled	32	279,833	6000	16,789,967,327
Unskilled	10	874,477	5000	4,372,387,325
Total		8,744,774		64,274,093,675

Source: BIDS Survey, 2017.

We further estimated the wage payments according to the size of the firms (Table 4). Monthly wage payments made by firms are as follows: Micro: Tk. 4612 million; Small: Tk. 54472 million; and Medium: Tk. 5827 million. The estimated production/sales of MSMEs per month is estimated at Tk. 400,650 million (Table 4), which did not estimate the production/sales of the smallest units (the cottage and household economic units). The estimated production of different categories of manufacturing firms is as follows: Micro-Tk. 1812 million; Small-Tk. 165,069 million; and Medium: Tk. 54325 million.

Table 4: Estimated sales/production of the manufacturing MSMEs across the size

Size	Average annual sales	Average monthly sales	number of firms adjusted	Total monthly sales/production	Average monthly sales of trading and service firms	Grand total (monthly average sales)
Micro/Cottage	20.01	1667500.00	1086.88	1,812,372,400	Total firms: 1304259	
Small	40.5	3375000.00	48909.6	165,069,900,000		
Medium	149.95	12495833.33	4347.52	54,325,885,333	Monthly average sales: 1,37,500 Taka	
Total	48.87	4072500.00	54344	221,315,940,000	179,335,648,800	400,651,588,800

Loan and Interest payment:

In addition to wage and production losses, interest payment on bank loans is also a loss as the capital doesn't generate rent during the lockdown. Based on survey data of MSMEs, we estimated the interest payment and total outstanding loans to this sector (Table 5). A BIDS survey in 2017 revealed that about 40% of MSMEs have access to a bank loan. Considering this figure, we estimated that about 543441 enterprises had access to bank loans. On an average, a micro firm had an outstanding loan of Tk. 8.56 million, a small firm had Tk.12.94 million, and a medium-sized firm had Tk. 37.25 million. The total outstanding loan in the MSME sector stood at Tk. 2192939 million (as of October 2019). Using the survey data, it is estimated that the MSME sector paid interest worth Tk. 21929 million every month.

Table 5: Outstanding bank loan and interest payment by the MSMEs

Size	Average amount of outstanding loan (Tk. in million)	Average bank interest rate	Number of firms	40% of firms have access to bank loan	Total interest to be paid per month	Total outstanding loan to be repaid (Bangladesh bank 2019)
Micro/Cottage	8.59	12.25	145609.8	58243.92		
Small	12.94	11.91	1203045.2	481218.1		
Medium	37.25	12.35	9948.4	3979.36		
Average	13.15	12.0	1358603.4	543441.4	21,929,397,000	2192939,700,000

Note: The figures are estimated based on firms' survey data in 2017. This figure may not be accurate, but it might give an idea about the incentive package planning.
Source: BIDS Survey (2017) and Bangladesh Bank

In sum, as the 2013 Economic Census data is outdated, updated data are required to understand the needs of the MSME sector. Based on the inter-census growth of

MSMEs and their employees, the total number of MSMEs is estimated at 1.35 million, of which 0.54 million are manufacturing units and the rest 1.30 million are trading and service units. Trading and service units comprise about 96% of the total MSMEs. In 2019, the total number of employees (persons engaged) was estimated at 9.9 million in the MSME sector, which was 7.3 million in 2013. After deducting unpaid family workers, roughly 8.74 million wage/salaried workers were engaged in this sector. The sector paid a monthly salary of an amount of Tk. 60000 million, and it produced goods and services worth Tk. 400000 million. Those who have bank loans paid interest worth Tk. 20000 million per month (information on loans from MFIs is not available).

3. Estimated Losses of MSMEs and an outline of a stimulus package

The estimated loss of the MSMEs could have varied, considering the level of strictness of the lockdown. In Bangladesh, initially, the government imposed a 67-day lockdown (Scenario I). After that, zone-based (red zones) lockdowns were imposed with dictated health protocols in other zones (yellow and green), which is Scenario II.

The losses in scenario-I are estimated by accumulating wage payments, production, revenues, and interest payments for two months[3]. The loss is therefore estimated at Tk. 960000 million based on the estimates in the previous section.

The estimate of losses in scenario II is a bit tricky because correct information on the operational status of firms was not available after reopening. Thus an assumption is made that about 60% of the capacities of MSMEs are being realized. The reason is that the service sectors (for example, hotels and restaurants) are not in full operation due to the health protocol of social distancing. Some sectors could not start its operation due to the unavailability of raw materials (either import-dependent or locally produced). Under scenario II, the estimated monthly loss would be Tk. 192000 million. This scenario of losses in this sector depends on the availability of an effective vaccination drive and a semblance of normality.

An outline of the stimulus package:

A stimulus package under Scenario I is derived considering the fact that during the complete lockdown, enterprises paid a 50% salary to their employees and realized 50% of profit (on average, it is 20% of revenue as per the BIDS survey, 2017) to continue employment and maintain their livelihood. Thus, for the owner, 10% of revenue is considered compensation for their losses. It would be a reasonable approach to waive interest payments for about six months for all the MSMEs considering their distresses in the Covid-19 crisis. Furthermore, it is assumed that scenario II will continue for six months (July-November, 2020). Based on these assumptions, the estimated size of the stimulus package would be as follows.

>>For Scenario-I: During complete lockdown (2 months: April-May 2020):

- Wage support: 50% wage payment for two months
- Employer support: 10% of revenue support for two months for their livelihoods
- Interest payment waiver: 100% for two months
- Suspension of Interest payment: 100% for two months

>> For Scenario-II: Limited operation with zone-based lockdown (June-November)—Assuming 60% of capacity is realized

- Wage support: 50% of 40% of employees, i.e. 20% wage payment for six months
- Revenue support: 10% of 40% of firms, i.e. 4% of revenue support for six months
- Interest payment waiver: 50% of the total for six months
- Suspension of interest payment: for six months

Table 6: Summary of the proposed incentive/stimulus packages

Support areas of compensation	**Scenario-I** (Strict lockdown): applicable to all enterprises			**Scenario-II** (relaxed lockdown): applicable to 40% of enterprises		Grand total
	Modalities of compensation [A]	Duration [B]	Amount in a million Tk. [C]	Duration [D]	Amount in a million Tk. [E]	Amount in a million Tk. [F]
Employee support (Salary compensation)	50% of the total salary payment	Two months	60000	Six months	72000	132000
Employer support (debt relief or capital finance)	10% of total revenue/ production	Two months	800000	Six months	96000	176000
Interest waived	100%	Two months	40000	50% waiver for six months (gross)	90000	150000
Total			180000		258000	438000

Note: Assuming that 60% of MSMEs get back to operation during the reopening period and the rest 40% are struggling due to various reasons, such as zone-wise lockdown, limited operation for health protocol (say, restaurants), or nature of businesses that need to be in contact with customers (say, household painting, etc.).
Source: Author's estimate.

[3] Interest payment is considered as loss because this is the rental price of capital that has not been employed in production during the lockdown.

Thus, for Scenario I, the estimated support needed for the sector is about Tk. 180000 million, and for Scenario II, the estimated support needed for the sector is about Tk. 258000 million. Therefore, according to our estimation, the total support package for the MSMEs required is estimated at Tk. 438000 million for eight months, which is about 1.5% of GDP. However, the stimulus package declared by the government was Tk. 200000 million; which might compensate only 40% or less of the distressed MSMEs during the lockdown period under Scenario II.

Therefore, it may be concluded that the declared stimulus packages of the government were not based on a proper estimation of losses under different predictable scenarios, presumably due to the lack of proper data on the MSME sector.

4. Making the stimulus workable

As already mentioned, the government of Bangladesh has declared a credit-based stimulus of an amount of Tk. 200000 million for the MSME sector. While access to finance is the main impediment to the development and growth of this sector (Hossain et al., 2020), a credit-based stimulus package is hardly accessible to most MSMEs. In Bangladesh, a recent survey suggests that about 38% of MSMEs have access to bank finance, while 49% have access to finance from NGOs and MFIs (BIDS-SMEF Survey, 2018). Further, during the pandemic, it is difficult for the firms to manage collateral and guarantor as required for securing a bank loan. Even without credit guarantees from the government, banks are reluctant to implement stimulus loans. Considering loan default culture in the Bangladeshi banking sector (at present, 11% of the total loan is non-performing, and for the state-owned commercial banks, the non-performing loan ratio is much higher), and with a high probability of moral hazard, it may not be a feasible option for the government to implement a credit guarantee scheme to operationalize stimulus packages. Unlike India, Pakistan, and other countries, in the absence of a dedicated SME bank in Bangladesh, two alternative modes of financing are suggested here. The involvement of the SME Foundation through its Credit Wholesale Program and NGO/MFIs can be an option to reach out to the majority of the smaller firms with a low risk of loan default.

A. Credit wholesale program of the SME Foundation: An innovative and very successful SME financing program is the 'credit wholesale program' of the SME Foundation, which was initiated in 2009 to provide collateral-free credit to the clustered MSMEs in Bangladesh. The program has been implemented in 177 SME clusters in Bangladesh, with 50-70 enterprises in each cluster. The program has several interesting features: (i) it charges a single-digit interest rate, which is lower than the market rate and does not require any collateral and guarantor; (ii) the program is steered through banks and non-bank financial institutions (NBFIs), which are called partner financial institutions (PFIs). SME Foundation provides funds to PFIs at 4-5% interest, which they later disburse to SMEF beneficiary firms at 9%[4]; (iii) in the absence of any credit guarantee from SMEF, PFI adopts a group-based lending approach, which works as a joint liability-type arrangement used in micro-credit programs. The repayment rate under the program is about 95% (SME Foundation, 2017).

The experience of the CWS program can be used to disburse stimulus credit to MSMEs. SME Foundation can get funds from Bangladesh Bank's refinancing window, and then the fund can be disbursed through PFIs under the modalities of the CWS program. Adopting the CWS mechanism for stimulus package implementation might reduce the risk of defaults and facilitate easy access to stimulus finance for MSMEs.

B. Involving NGO/MFIs in disbursing stimulus: Another option to enhance the implementation of stimulus credit to MSMEs would be to involve micro-finance institutions (MFIs) in disbursing funds to MSMEs as long as 50% of MSMEs having a loan from these institutions. Moreover, the MFI network at the grass-root level can be used to identify good borrower firms, which will help reduce the asymmetry of information about the borrower firms and the default risks. MFIs can be entrusted to disburse funds to only cottage, micro, and smaller firms up to a certain limit. Bangladesh Bank might engage the Palli Karma-Shahayak Foundation (PKSF), a quasi-government organization that handles MFIs as the nodal point of NGO/MFI networks[5]. To involve NGOs/MFIs, it would be necessary to increase the subsidized interest rate to incentivize the NGOs/MFIs to disburse the government's declared stimulus credit.

[4] The program targets the firms that are non-financial beneficiaries of SMEF (e.g those received training and other capacity building initiatives) and located in clusters/clientele only (such as technology based potential SME manufacturing industries, agro-based industries)

[5] Established in 1990, and being a network of MFIs, PKSF provides financial services (Micro-credit, Agricultural credit, Micro-Enterprise credit, Micro-Insurance), technical knowhow, capacity building, and comprehensive community development services through a network of Partner Organizations.

5. Policy recommendations

This paper provides an estimation of the number of MSMEs in 2020 in the absence of updated official statistics. The analysis underscores the importance of an updated MSMEs database for implementing government-sponsored incentive packages or policy supports.

The discussion and analysis in this paper draw some policy suggestions to make the government-declared stimulus more inclusive and effective for the revival of the MSMEs.

First, identifying and targeting MSMEs for a new loan under the stimulus is a complex and cumbersome task. If BSCIC and SME Foundation could devise a database of MSMEs, that could be helpful to bring them under the credit-based stimulus package. In BSCIC industrial estates, about 5000 MSMEs are in operation. SME Foundation provides various interventions in 177 natural clusters of MSMEs having more or less 8000 firms. These cluster-based firms, thus can easily be identified for the stimulus loan following the CWS method. BSCIC also provides small credit to MSMEs for their capacity building, which also gives BSCIC leverage to identify some MSMEs outside BSCIC estates. Coordination from Bangladesh Bank with SME Foundation and BSCIC is therefore important, mainly to make the stimulus package more effective.

Second, as a large section of MSMEs has access to MFIs and NGOs, it is suggested to implement a part of the stimulus through NGOs/MFIs. The PKSF can be given the responsibility to implement a part of the stimulus through MFIs.

Third, as part of modalities, the credit amount can be divided into wage payment and capital financing. A 50-50 ratio can be considered for smaller firms. Following the experience of the ready-made garment sector's package, wage bills can be disbursed directly to employees' bank/mobile accounts. Otherwise, there will remain possibilities of employee retrenchment and layoff situations.

Fourth, a one-stop service window facility for the MSME sector is a need of the hour to tackle the difficulties of the pandemic. Though a one-stop service center is included in the mandated activities of the SME Foundation, it has not yet been established. Therefore, it is an urgent call to develop a one-stop service facility in each district with a central one in Dhaka.

Fifth, a lack of statistics on MSMEs is a significant limitation for developing this sector in Bangladesh. Moreover, an updated MSME database is important for providing policy support to this sector and estimating the sector's contribution to the economy. Therefore, a periodical update of the MSMEs database is needed. The BBS and the SME Foundation may be given the responsibility to maintain and update the MSME database.

Finally, the analysis in this paper suggests, if any bank-based stimulus package is not properly implementable under the "business as usual" policy, some innovative financial mechanism needs to be adopted to reach out to distressed COVID-19 firms. With estimated figures, this paper outlines the feasible stimulus package and some policy responses with lessons from innovative financing approaches to address the woes of the MSMEs. The policy options highlighted in this paper would work as a guideline for managing the MSME sector's distress in other developing countries in any crisis.

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Recycled Plastic Based Industries of Bangladesh: Current Scenario and Future Prospects

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Abstract

This paper investigates the opportunities and challenges to expand the recycled plastics products industry in Bangladesh. The assessment was done through field-survey, focus group discussions and key informant interviews of stakeholders both from the recycling industry and the products manufacturing industry. Financial feasibility analysis for investments in the production of plastic products from recycled resins was found to be a profitable business; despite that the industry was not growing as expected due to a number of barriers. Business models developed for 20 products show that most of them have low payback period (less than 3 years) and the initial capital investment requirement is also low (less than 15 million Taka). The SWOT analysis and FGDs have revealed that (i) the products made from recycled resins are of inferior quality and the intrinsic value of the plastic resin is being gradually destroyed, and (ii) if many entrepreneurs enter the market with new products or if existing producers increase their volume of production, there will be a shortage of recycled plastic resins. The production process (import of high-quality machines) needs to be improved so that higher value products can be made and the recycled resins can be used several times. Additionally better management of post-consumer plastics (waste segregation at source and collection system improvement) is needed so that recycling of waste plastics can be increased. Ways of incentivising the setting up of industries for plastics products from recycled resins for promoting the industrial activities in this sector have been suggested.

Keywords: Plastics recycling; recycled products; profitability; payback period

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1. Introduction

Bangladesh is a resource scarce country. It needs to import most of its raw materials for its growing economy. Being a small country in terms of area, it faces shortage of timber and other construction materials used for rural housing. In this context plastics is a very important material. From wood to metals it can replace in many applications most of the materials that we now use in the modern society. For Bangladesh, the most important aspect of plastic is its low cost for a given application, thus making it affordable even to the poor. With the increase in plastic consumption, there is always associated the issue of proper disposal of plastics wastes. Current practice in Bangladesh with the disposal of waste plastics is landfilling at the dumping sites (Shimo, 2014; Hossain, 2016). To continue the use of plastic at the prevailing high rate, it is necessary to reuse of waste plastic.

In the recycling category there are more than 300 industries ranging in size from medium to small in Bangladesh[1]. Many of the plastics industries in both categories are part of the informal sector and are thus ideal candidates for being classified as a small and medium enterprise (SME). The market value of the present plastics manufacturing industries alone is close to US$ 4 Billion[1], and for an assumed conservative growth rate of 7% per year, the market value will exceed US$ 8 Billion by 2030.

Data on plastics waste recycling remain inadequate and unreliable for Bangladesh. In a study conducted by Waste Concern in 2006, it was found that nearly 51% of the plastics consumed annually is recycled (Waste Concern, 2006). This was a very positive sign with the expectation that the recycling industry would grow, and the percentage of plastics waste recycled would increase. This expectation did not materialise because in a recent study done in 2019 by Waste Concern, it was found that the percent of plastics waste recycling has gone down to 36% (*National Workshop on Sustainable Management of Plastic to Leverage Circular Economy and Achieve SDG in Bangladesh, 2019*). An analysis of the constituents of municipal solid waste (MSW) in 2014 showed that the percentage of waste plastics was 8.5%[2]. A very recent investigation by the Chemical Engineering Department of BUET found that 11.8% of the MSW is plastics waste[3]. Thus, the proportion of plastics waste in MSW is steadily increasing. This indicates that post-consumer plastics waste is not being managed properly.

[1] Personal communication with Bangladesh Plastic Goods Manufacturers & Exporters Association (BPGMEA)
[2] Personal communication with Waste Concern
[3] Personal communication with the Principal Investigator of Integrated Concept for Solid Waste to Energy (InConSolE) project (funded by Energy and Power Research Council, Government of Bangladesh)

The increase in the percentage of waste plastics in MSW can largely be attributed to the widespread use of multilayer packaging of foodstuffs. The problem with multilayer packaging is that these cannot be recycled and, being small, pose huge collection problems. This collection problem can be confirmed by two facts – a significant quantity of material in MSW is plastics packaging and the widespread littering of plastic packaging. An interesting finding of the analysis of MSW is that all the waste plastics in MSW are packaging material (soft plastics, i.e., Low Density Polyethylene - LDPE, Polypropylene - PP and Polyvinyl Chloride - PVC). Nearly all the hard plastics such as HDPE (High Density Polyethylene), PET (Polyethylene Terephthalate) and Polycarbonates have been dutifully collected, and hence recycled. Therefore, any increased recycling must come from the management of soft waste plastics.

Recycled waste plastics are extensively used in Bangladesh, but the use in most of the cases is to produce low-end products; this process is known as downcycling. Moreover, the range of products made from recycled plastics is limited. Only recently, the large, reputed manufacturers have started using recycled resin because some of their clients, especially from Europe, have placed orders that require the inclusion of recycled plastics. There remains significant potential of increasing waste plastics recycling and reusing plastic waste as value added products in Bangladesh. Waste Concern, a research and consulting company, claimed that with improved plastic recycling, Bangladesh would be able to save a further 801 million USD as a result of less plastic resin import (*Prospects of Plastics Waste Recycling in Bangladesh*, 2016).

There is a great need to increase the number of products made from recycled plastics as well as to improve the quality of the products manufactured. In this study, the challenges and opportunities of plastic recycling industries of Bangladesh was assessed through field-survey, focus group discussions (FGDs) and key informant interviews (KII) performed on the stakeholders of this sector. Moreover, a number of business models for plastic recycling to assess their economic feasibility for future investments were identified.

2. Methodology

A desk study was conducted to gather information on the current practices in plastic industries, with an emphasis on Bangladeshi practices. Reports, journal and conference papers, and web based (verifiable) sources were used as the source of the desk study.

A field survey was conducted on several local companies who are directly involved with production of recycled plastic-based products. The questionnaire focused on a few major considerations, i.e. – i) how the recycled plastic is handled, ii) what quantity of recycled plastic can be processed per day, iii) what are the characteristics of the final product from recycled plastic, iv) who are the main consumers and the price of the product), and v) how much profit can be made from this business.

Three focus group discussions (FGD) were conducted with entrepreneurs, local and national trade bodies/ associations/ chambers in three different locations: Dhaka, Narayanganj and Chittagong.

Twenty-eight key informant interviews (KII) of the stakeholders relevant to recycled plastic product manufacturing was carried out. The key informants can be grouped in four broad categories: plastic product producers, plastic product retailers, end users and policymakers from various govt. and semi-govt. organizations.

Business models for twenty products manufactured from recycled plastic pellets have been developed. The assumptions for developing the business models are:

(i) Plant life is 20 years;
(ii) Operating days are 25 days per month;
(iii) Minimum Acceptable Rate of Return (MARR) is 10%;
(iv) Tax is 30%; and
(v) Scrap value of machinery is 10% of the initial cost.

The typical scale of the industry varied from 600 pieces to 5000 pieces production of recycled plastic product per day, depending on the type of product. All plant machinery was assumed to be state-of-the-art (imported).
The ROI was calculated as (Yearly Profit*100/Investment), while discounted payback period was calculated using equation (1) below:

$$\sum_{k=1}^{\theta} (R_k - E_k)\left(\frac{P}{F}, i\%, k\right) - I \geq 0$$

Where R_k excess of receipts over expenses in period k; E_k excess of expenditures over receipts in period k; where i% is the MARR, I is the capital expenditure

(CAPEX) usually made at the present time (k = 0), and θ is the smallest value that satisfies equation (1).

3. Current Practices in Plastic Recycling

There are approximately 5000 small, medium and large size plastic goods manufacturing units in Bangladesh with around 1.2 million workforces directly or indirectly employed in this sector, with an investment of 185.5 billion Taka (Islam, Hasan and Hossain, 2017). Large firms are mostly located in and around the major cities of the country. Small and medium firms are in highly fragmented clusters scattered around the country with the largest cluster being in the Lalbagh-Islambagh area of Dhaka.

The plastic forward supply chain, involving the production of plastic products from virgin plastic resins, starts with the extraction and refining of crude oil, followed by manufacturing of plastic pellets. Bangladesh does not have a petrochemical industry and as a result all polymer pellets have to be imported. The value of import of these plastic materials according to their HS code (Harmonized Commodity Description and Coding System), explained in Table 1, between 2013-14 and 2017-18, are shown in Figure 1. The breakdown of import of polymer resin pellets, totaling 1465 kiloton, for the year 2017-18 is shown in Figure 2. Total cost of import were 154 billion Taka (~1.8 billion USD) and accounted for 2.79% of the total national import for the year. At approximately 375 kilotons, Polyethylene (PE) and its copolymers were the leading category, closely followed by PP, PVC and PET. All other plastics combined were approximately 240 kilotons for the year 2017-18. Average price of virgin plastic resins in 2020 was approximately 105 Taka per kg; price, however, is directly linked to the price of crude oil.

Table 1: Harmonized Commodity Description and Coding System as per National Bureau of Revenue (NBR, 2020)

HS Code	Name of the commodities
3901	Polymer of ethylene, in primary forms
3902	Polymers or propylene or of other olefins, in primary forms
3903	Polymers of styrene, in primary forms
3904	Polymers of vinyl chloride or of other halogenated olefins, in primary forms
3905	Polymers of vinyl acetate or of other vinyl esters, in primary forms; other vinyl polymers in primary forms
3906	Acrylic polymers in primary forms
3907	Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms
3908	Polyamides in primary forms
3909	Amino-resins, phenolic resins and polyurethanes, in primary forms
3910	Silicones in primary forms
3911	Petroleum resins, coumarone-indene resins, polyterpenes, polysulphides, polysulphones and other products, in primary forms
3912	Cellulose and its chemical derivatives, in primary forms
3913	Natural polymers and modified natural polymers, in primary forms
3914	Ion-exchangers based on polymers of HS code Nos. 3901 to 3913, in primary forms
3915	Waste, parings and scrap, or plastics

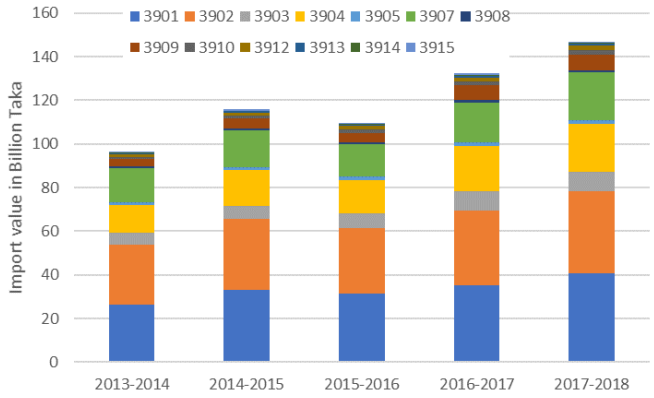

Figure 1: **Import value of plastic raw materials between 2013-14 and 2017-2018**

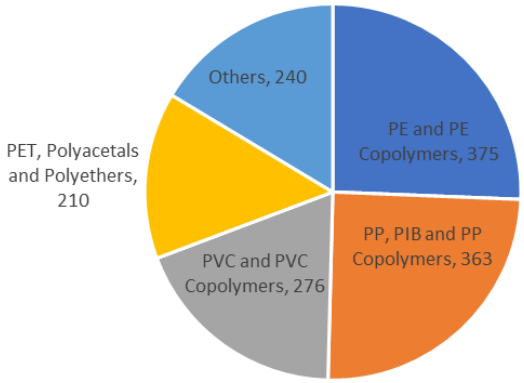

Figure 2: **Plastic raw materials import in 2017-2018 in Kilo Ton**

The forward supply chain for plastics in Bangladesh starts from the import of pellets. The pellets are supplied to the plastic product manufacturers who then produce different types of plastic products. The plastic products are then either sent to the retail sector or used by the industrial sector before reaching the consumers. The discarded plastics from the manufacture of plastic products and post-consumer plastic wastes then contribute to the industrial, commercial and municipal solid wastes, respectively. Figure 3 shows the forward supply chain for plastics in Bangladesh.

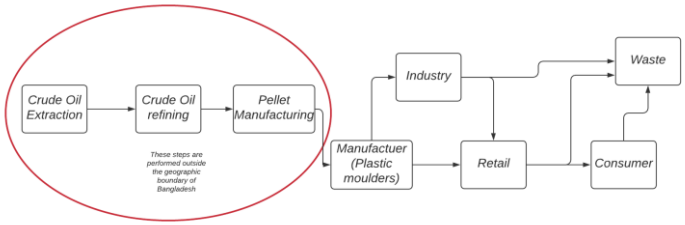

Figure 3: Plastic forward supply-chain in Bangladesh

The plastic recycling supply-chain starts with the collection of used plastic. The existing plastic recycling supply-chain is shown in Figure 4.

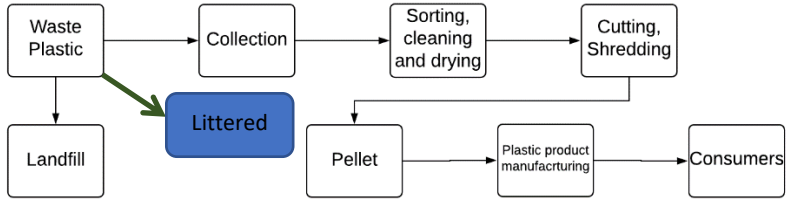

Figure 4: **Plastic recycling supply-chain in Bangladesh**

There is no accurate data on the amount of waste plastic generated every year. It is estimated that 25% of the total annual generation ends up as waste, which is approximately one million tons (Enayetullah and Sinha, 2019). Bangladesh currently does not have a formal system of collection and recycling of waste plastics. The waste plastic generation in the country can be categorized according to their source of generation: industrial, commercial, and household. The waste generated from the first two categories can be collected more efficiently than the waste generated from household uses. The household waste is generally collected by waste collectors who usually provide their service in exchange of a monthly fee. The plastic wastes disposed by the households are usually separated by these waste collectors at the source before transferring the waste to the secondary transfer stations for MSW. The soiled waste plastic is usually not collected and finds its way to landfilling sites operated and maintained by the city corporations or municipalities.

Littering is a common practice, and therefore, a significant quantity of plastic wastes accumulates in streets, parks, cannels, rivers and in the sewerage system. Littered plastic products, as well as plastic items from the dustbins, dumpsters, secondary transfer stations and landfills, are also collected by street children and sold to small-scale buyers. A material flow diagram of waste plastics in Bangladesh for the year 2019 (Enayetullah and Sinha, 2019) is shown in Figure 5.

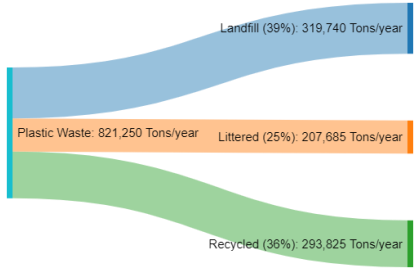

Figure 5: Plastic waste situation of urban areas of Bangladesh for the year 2019 (Enayetullah and Sinha, 2019)

The plastic products are sorted according to their types and colours. The sorting is done manually. The workers use their limited knowledge on plastic to sort the items. The sorting also includes separation of soiled and unsoiled categories. The soiled plastics are washed using in-house water drums/tanks or in the river.

Sorted and cleaned plastic are sent for cutting and shredding. The shredders used in Bangladesh are mostly locally fabricated. The shredded plastic is washed and dried before sending to the pellet manufacturers. The pellet mills use moulding followed by cooling and cutting to prepare recycled plastic pellets.

The small-scale plastic products manufacturers collect the recycled plastic pellets according to their needs and manufacture various items. When it comes to recycled products, the usual practice for a small-scale manufacturer is to produce one product only. This is because moulds are very expensive, and they usually own only one mould to produce a particular product. Some manufacturers mix virgin pellets with recycled ones to improve the quality of the final products.

Large-scale recyclers are mostly involved in recycling of PET. Bangladesh Petrochemical Company Limited (BPCL) is the first of its kind and can produce 10,500 tons of recycled PET resins every year. Several other companies also have processing lines for waste PET bottles.

The local manufacturers are currently producing a wide array of products mostly to meet the need of the local market. Production for local market accounts for more than 80% of total production (Islam, Hasan and Hossain, 2017). Majority of the export-oriented producers are co-dependent on the garment industries as they produce plastic products as accessories for apparel. Some manufacturers export their products directly to Europe, USA, Canada, and Asian countries.

Small manufacturers depend on wholesalers to market their products. Medium manufacturers also depend on wholesalers. However, some of the medium sized producers own shops in major wholesale markets. Large manufacturers usually have their own distribution channels. The distribution channels usually consist of a network of distributors, dealers, and retailers. In addition to these channels some of the large manufacturers have their own chain shops around the country to directly sell their products to the consumers.

4. General business structure

The scale of business of the recycle resin producers is small to medium. The owners usually start their business as a sole proprietor, and it remains the same for the duration of the business. The business is usually operated from a rented place, with no more than one technician, a few skilled workers and some unskilled sessional workers. In many places, the proprietor also serves the role of technician. The proprietor, technician and skilled workers are usually male, while there is a larger share of female in the unskilled labour group. According to the survey, partnerships are not unheard of but are rare for this business.

The survey showed a wide variation in the age of the proprietors, from below 30 to 60 years. Even the younger owners have long experience of this business since they start very young, in their early twenties. At the initial stage of the business the owners take loans from private individuals as well as from Banks and other money-lending organizations. However, there is a wide range on the interest rates for loan from private individuals and varies from 5% to 19%. On the other hand, loans from various financial organizations have similar cost; the interest rate varies between 14 to 17%, identified from the field survey.

The businesses are usually a part of trade bodies such as Bangladesh Plastic Goods Manufacturing and Exporters Association (BPGMEA). Most of the owners have got trade license for their business. However, none of the trade licenses are current as they were not renewed after expiration.

The machineries used by the recycled resin manufactured are locally fabricated with a few exceptions. The imported machines were sourced from China or Taiwan. The purchased cost of the imported machines was expensive, even costing 10 times of the locally fabricated machines for per unit capacity of production. All recycled resin manufacturing facilities have pellet machine (also known as “dana” machine), while some facilities also have cutting machine (for cutting/shredding of the waste plastic to make flakes) and mixing machine (for cleaning and adding colour).

The scenario is opposite for the plastic product manufacturers. The injection moulding machines were sourced from China or Taiwan. Only one the manufacturers have locally fabricated moulding machine.

According to the proprietors, there is no shortage of raw materials. However, there may be delays in the supply of raw materials during monsoon as the supply slow down due to difficulties in collecting and transporting of waste plastic. The

recycled resins are products of high demand and readily consumed by the plastic product manufacturers. The resins recycled by the pellet manufacturers include but not limited to LDPE, HDPE, PP, PS (polystyrene), PVA (Polyvinyl Alcohol) and ABS (Acrylonitrile Butadiene Styrene).

For the plastic product manufacturers, they usually own moulds for single products. The products range from disposable spoons, plates, glasses, food-boxes, buckets, shoes to electrical switch boards and components of celling fans.

5. SWOT Analysis

A strength, weakness, opportunity, and threat (SWOT) analysis was performed based on 28 key informant interviews (KII) performed on a wide range of representatives directly or indirectly connected to the recycled plastic sector. The roles of the interviewees can be classified into four major categories: plastic products producer, plastic dealer, plastic user and policymaker/technology developer. The summary of the KIIs as SWOT analysis is presented in Table 2.

Table 2: SWOT Analysis of recycled plastic sector based on Key Information Interviews

Strength	• Low cost of recycled plastic products • Huge demand for plastic products due to their versatile properties • Recyclability of plastic products • Low labor cost and high profitability • Good balance between the supply and demand of plastic products	• Overpriced raw materials • Poor quality of available machineries • The absence of proper supply chain for recycled resins • Lack of skilled manpower • Post-consumer collection of plastic goods • Absence of guideline for recycling plastics • Absence of health and safety measures	Weakness
Opportunity	• Products from recycled resins can be increased by introducing new items • New products can be produced by recycling PVC, HDPE, and PPE • Plastic waste segregation at source and collection system improvement would create new possibilities • Production can be increased by promoting more recycling • Soft loans on easy terms and better technology for recycling, can open up new opportunities	• Disruption of the informal supply chain leading to shortage of waste plastic • Biodegradable and environment friendly products like jute and fabric products can be used as alternative products • Government restrictions on plastics products especially on the use of recycled materials as food grade plastics • Entry of large-scale factories for recycled plastic product • No policy support from the Government for plastic recycling industries	Threat

Along with the KIIs, three focus group discussions based on three locations (Dhaka, Chattogram and Narayanganj) were carried out to identify the potential issues hindering the rapid growth of this sector. The discussants pointed out the core issues

that are relevant to recycled plastic processing and production of recycled plastic products. They highlighted the possibilities of developing new products and, asked for supports from the concerned bodies of the government to make this sector flourish. The major issue with recycling plastic and recycled plastic products in Bangladesh was identified as the quality control and lack of technical knowledge. Training is needed for plastic sector to identify the food grade plastics and other types of plastics. Moreover, automation can be brought in by large companies, but for small and medium enterprises, it is important to organize training sessions to run the local recycled plastic production machines efficiently and safely. Without good quality products, it will not be possible to keep the export oriented recycled product producing industries in operation. Also, the participants expressed their opinion to consider the recycled plastic product sector as a green or environment friendly sector by national and international bodies.

Another issue (especially for PET flakes) is the raw material unavailability. Moreover, there is no grading of the recycled plastic products (logo or, marking to determine the quality or, grade of the product). There is no dedicated body to take care of this issue to segregate the plastic products according to their quality. Also, laboratory support to test these products would be also essential for this sector to identify good quality recycled products.

Focus group discussants coincided on the verdict that recycling plastic and producing recycled plastic products help the environment as plastic products cannot be completely avoided in any future scenario. Emphasis was given on converting waste to asset through plastic recycling and reusing it through new innovative application areas.

6. Economics of Plastics Products Manufacturing Using Recycled Resins

Natural gas and crude oils are the primary raw materials of plastic. Therefore, the production cost of plastic products depends on the natural gas and oil price around the world. If there is a hike in gas and oil prices, the virgin plastic resin price increases.

Landfilling, incineration and recycling are the three main processes to deal with post-consumer plastics wastes. Among the above 3 routes, the most environmentally friendly option is the recycling of plastics (Chen *et al.*, 2019). Energy can be recovered from waste plastic from incineration. However, the process is not environmentally friendly. The waste plastic handling is to landfill which has the highest environmental burden because plastics can remain in its original state and cause all kinds of problems for hundreds of years. other processes

such as hydrocracking, pyrolysis and fluid catalytic cracking are yet to achieve full commercialization (Ragaert, Delva and Van Geem, 2017; Gu *et al.*, 2020).

The financial analysis has been performed for the entire business model to determine the financial parameters such as return on investment (RoI) and payback period (discounted at 10% MARR). The key outputs from the models are provided in Table 3. The return on investment is high for most of the investments. All the industries from the recycled plastic products were found to be very profitable except business model number–7, which takes 7 years to recover the investment.

It has been observed that the production cost of plastic products from recycled resin is significantly lower than from virgin resins, thus making the investment recoverable in a short period. From the financial analysis, it has been seen that recycled plastic-based industries are highly profitable. That the risk of investment in this sector is low has also been confirmed by surveys of small and medium industries in Dhaka and Narayanganj.

An interesting finding of this research is that the recycled plastics products are mostly made from polypropylene (PP). As can be seen from Table 3, all but three products utilise PP. From Figure 2, it can be seen that PP constitutes only about 25% of the total polymers used in the country. The other polymers are therefore either not being collected properly or the recycling techniques of these polymers are not well established in Bangladesh. This could be one of the reasons why the recycling rates are low. This implies that a lot of applied research is needed in Bangladesh in expanding recycling of others polymer types such as PVC, HDPE and PET.

Table 3: Key outputs from the business models

Sl. No.	Product Name	Raw Material	CAPEX (Tk)	OPEX **(Tk/month)	Payback Period (years)	Return on Investment (%)
01	Footwear	PVC	9913075	408075	3	42
02	Bucket	PP	10803500	873500	3	49
03	Mug	PP	10254100	584100	3	45
04	Fan blade	PP/ABS/HIPS	10116750	511750	1	165
05	Switchboard	Crystal HIPS*	14797500	3017500	1	112
06	Jorda pot	PP	12863750	1958750	4	36
07	Egg tray	PP	10528800	728800	7	22
08	Jewelry box	PP	10116750	511750	3	41
09	Hanger	PP	9979400	439400	3	48
10	Flower tub	PP	10803500	873500	3	49
11	Waste Bin	PP	10803500	873500	3	49
12	File Cover	PP	9773375	330875	4	37
13	Gardening water can	PP	10116750	511750	3	41
14	Water Pot	PP	10116750	511750	3	41
15	Toys (cars)	PP	9773375	330875	4	37
16	Service Tray	PP	10288437	602187	2	94
17	Mobile Cover	PP	9979400	439400	2	90
18	Showpieces	PP	9979400	439400	5	27
19	Plastic Tool	PP	10116750	511750	2	62
20	Plastic bobbin	PP	9773375	330875	4	37

* HIPS - High Impact Polystyrene
**OPEX – Operating Expenditure

However, the availability of financial support is inadequate for investing in this lucrative sector. This is mostly due to the wrong portrayal of the sector and due to the lack of proper authorization of the industries from authorities such as the Ministry of Industries and Department of Environment (DoE). The sector still needs support from the Government and other relevant authorities and organizations and academics. There are still plenty of scopes for improvement in all aspects: collection, production, profitability, workers' safety, etc. Besides, recycling plastic is limited by the number of recyclers. If plastic is recycled twice, it might not be possible to recycle anymore (depending on the type of plastic).

7. Existing Policies and Implementation

To obtain the maximum benefit from plastic recycling, the so-called circular economy has been proposed for the European Union(European Commission, 2014). It maintains a hierarchy of using of plastic products (when to recycle and when to dispose) through minimum waste generation; the fundamental concept being plastic products need to be designed in such a way to make them easily distributable, collectable and reusable/recyclable. To reduce the environmental burden of plastic wastes, sooner or later, Bangladesh will have to adopt a circular economy or, similar strategy (e.g., 3R - Reduce, Reuse and Recycle) to balance the plastic product uses, recycling and final disposal as incineration or, conversion to energy.

Regarding the plastic industries in Bangladesh, a draft for national plastic industry development policy has been prepared in 2020 by the Ministry of Industries (modification is on-going on the draft) (*National Plastic Industry Development Policy Draft, Ministry of Industry*, 2020). This policy is developed for the plastic product producers and their waste management. However, there is

no definite guideline for recycled plastic product manufacturers. To include the efforts of the plastic recyclers and support the recycled plastic product manufacturers, a clear policy is required to identify the method for plastic waste collection and their reuse. To ensure this, it could be proposed that at least 40-60% recycled plastic should be used in non-food grade plastic products. Incentives might be given to the small-scale recycled product manufacturers to rejuvenate this sector.

Apart from the National Plastic Industry Development Policy, there are three other government policies that are relevant to plastic industries (as listed in BPGMEA), namely – export policy, import policy and industrial policy. Apart from these, SME policy strategies (published in 2005) is also considered as a relevant policy. However, all these documents merely mention that the plastic industry is a potential thrust sector for business which might need support for further development. Also, all of these documents are published before 2011. Moreover, none of the policies are directly relevant at providing any sort of guideline for developing sustainable industries and practices for plastic and recycled plastic. It is imperative to revise the existing policies and to formulate new policies to support the sustainable growth of these industries through appropriate guidance.

The polyethylene bags under 55 μm thickness are banned under section 6(A) of the Bangladesh Environmental Conservation Act (BECA) 1995 (*The Bangladesh Environment Conservation Act*, 1995). Also, the High Court recently directed the concerned authorities to ban single-use plastic products in coastal areas, hotels, motels and restaurants across the country as these are causes of health and environmental hazards (Rahman, 2020). However, this ban has not been implemented.

The Department of Environment (DoE) and World Bank are implementing a technical assistance (TA) program to develop a roadmap to reduce plastic pollution. The TA program consists of a baseline study to formulate a circular economy model for plastic in Bangladesh. The study includes waste plastic generation in three major cities: Dhaka, Chittagong, and Cox's Bazar.

Another component of the on-going TA project is a three-phase approach of Extended Producer Responsibility (EPR) policy in Bangladesh. The first phase is a pilot study in Narayanganj and includes formalization of plastic collection and recycling led by private sector. Second phase is focused on pilot institutionalization of EPR policy by formulation of fee structure (e.g., fee

charged to manufacturers, producers and refund/subsidy provided to collectors/recyclers). The final phase is development of legislation of EPR policy and setting up standards for recycled materials.

DoE has published a solid waste management rule in late 2021 (*Solid Waste Management Rules (SWMR), 2021*, 2021). This rule emphasizes on recycling plastic wastes after segregation from organics, and in some cases, incineration (wherever applicable). While the rules are in place, it is necessary to implement those to obtain the desired results to mitigate the environmental burden as well as to motivate the small and medium entrepreneurs who are contributing to the plastic recycling process.

8. Conclusions and recommendations

This study focused on the downstream part of the recycled plastic industry, i.e., the production of retail plastic goods from recycled waste plastic resins. The study also looked briefly at the recycling of plastics wastes, i.e., the production of waste plastics resins. Also, for the sake of completeness the import of virgin resins and the production of plastic goods from those resins, which ultimately after use end up as post-consumer wastes, was scanned.

The five main findings of the study are –

1. The waste collection system is totally unorganized leading to huge quantities of wastes rounding up in landfills and being littered
2. The production of recycled resins is done mainly by the informal sector in small to medium scale industries
3. The supply of sufficient quantity of good quality resins prevents manufacturers from making better quality products
4. The production of plastic products from recycled plastics is a vibrant and profitable business, however, many challenges exist, such as unskilled workforces, operation without approval from proper authority, insufficient policy-level support, etc.
5. The plastics recycling industry need to be strengthened both for reducing the environmental burden and promoting the production of products using recycled plastics

At its current state, the production of plastic products from recycled resins is a viable industry and new products can be promoted. Business models developed for 20 products show that most have low payback period (less than 3 years) and the initial capital investment requirement is also low (less than 15 million Taka). Thus these are ideal as SMEs.

The SWOT analysis and FGDs have revealed that there are several serious weaknesses and threats in this business. Two noteworthy issues that need to be considered in promoting the business are (i) the products produced from recycled resins in Bangladesh are of inferior quality and the intrinsic value of the plastic resin is being gradually destroyed, and (ii) if many entrepreneurs enter the market with new products or if existing producers increases their volume of production, there will be a shortage of recycled plastic resins in the market. Therefore, there is need and urgency to improve the production process (import of high-quality machines) so that the recycled resins can be used several times and higher value products can be made. Additionally better management of post-consumer plastics (waste segregation at source and collection system improvement) is needed so that recycling of waste plastics can be increased. To provide additional incentives to plastics waste recycling (i) tax on virgin resins can be imposed (ii) extended producer responsibility (EPR) can be introduced (iii) an industrial zone can be created, (iv) a plastic quality testing/certifying laboratory can be set up, and (v) a training institute can be established.

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The Political Economy of a COVID-19 Stimulus Package in Bangladesh: The Case of Women-Owned Enterprises

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Abstract

Women entrepreneurs became the new "engines of growth" in the post-Great Recession economic landscape, especially in developing countries like Bangladesh. The adversities of the COVID-19 pandemic, however, posed a serious challenge to their advancement. To protect the cottage, micro, small, and medium enterprises, including those owned by women entrepreneurs, from the pandemic-induced economic crisis, the government of Bangladesh announced a stimulus package worth a total of Tk. 40,000 crore in two phases. Many politico-economic factors tend to affect the formation and disbursement of this stimulus fund, leaving important implications for its effectiveness. Against this backdrop, this paper attempts to carry out a political economy analysis of the implementation of the stimulus package with a particular focus on the women entrepreneurs' access to the package benefits. The findings suggest that women entrepreneurs reap little benefit from the stimulus package as their access to the benefits is constrained by various macro-structural, institutional, and local factors. A tailor-made incentive structure for women entrepreneurs following a comprehensive need assessment may help to deal with these constraints.

Keywords: Stimulus Package, Women's Entrepreneurship, Political Economy, COVID-19, the Government of Bangladesh

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Introduction

Women's entrepreneurship as a means of economic advancement has captured the attention of national and international development actors, policymakers, business organizations, and academia alike. It is argued that the emphasis on women's entrepreneurship in the global development literature is an expression of gender-sensitive neoliberal initiatives that promote equal access to credit and labor markets (Roberts and Zulfiqar, 2019). Entrepreneurial ventures provide a powerful platform for women's empowerment, especially in a developing country like Bangladesh. Besides, women entrepreneurs are considered the new "engines of growth" in the post-Great Recession economic landscape (Anderson and Cessou, 2014; Vita, Mari, and Poffesi, 2014). However, many factors of political economy come into play when policy decisions to provide business opportunities for women entrepreneurs are to be formulated and implemented, particularly in the wake of a crisis like the ongoing COVID-19 pandemic.

Early evidence suggests that women tend to be disproportionately affected by the adversities of the COVID-19 pandemic (Women Entrepreneurship Knowledge Hub, 2020). With the pandemic's effects still emerging, women's economic activities are more likely to undergo a serious setback than men's because of COVID-19 safety measures such as travel restrictions, border closures, and social distancing. The crisis tends to exert a particularly negative impact on women by slowing down many of the sectors that have a larger share of female employees. For example, cottage, micro, small, and medium enterprises (CMSMEs), which offer enormous employment opportunities for women, are likely to bear the brunt of these safety measures more than bigger enterprises as the former have limited capacity to cope with the exigencies of the pandemic. Moreover, a large share of the CMSMEs is owned or managed by women who, compared to their male counterparts, have lower levels of financial resources and limited access to public funds. As a result, the survival of women-owned CMSMEs will be at considerable risk in the new normal.

With these above-mentioned challenges, it can be speculated that the existing vulnerabilities facing women in Bangladesh's economy are likely to intensify because of the pandemic-induced macroeconomic adversities. As World Trade Organization (2020) notes, many channels through which the pandemic is having a greater impact on women in a developing country like Bangladesh lie at the heart of gender inequalities, such as lower wages for women, fewer educational opportunities, limited access to finance, greater reliance on informal

employment, and social constraints. In addition, limited access to digital technologies and lower information technology skills further weaken women's position in the sphere of teleworking and e-commerce, thereby reducing their capacity to adapt to the current crisis.

In the first phase (July 2020 – June 2021), the government of Bangladesh (GoB) announced a CMSME stimulus package worth Tk. 20,000 crore to help the pandemic-affected CMSMEs, including those owned by women entrepreneurs, for their recovery. The CMSMEs have received Tk. 15,386 crore during this phase as stimulus loans, representing 76.93 percent implementation of the stimulus package. However, of the total disbursement, only Tk. 1,518 crore, representing 7.59 percent of the disbursed stimulus loan, was received by 5,435 women entrepreneurs (Table I). In the second phase (July 2021 – May 2022), another Tk 20,000 crore fund was formed targeting the CMSMEs. About 54 percent of this fund was disbursed during the second phase. Of which, just 2.65 percent was disbursed to women entrepreneurs.

Table I: Key Statistics on the Implementation of the CMSME Stimulus Loan

	1st phase (July 2020 to June 2021)	2nd phase (July 2021 to May 2022)
Amount of the CMSME stimulus package	Tk. 20,000 Crore	Tk. 20,000 Crore
Disbursement amount	Tk. 15386 crore	Tk. 10,830 crore
Number of borrowers (disbursement)	97,814	60,941
Percentage of disbursement	76.93%	54.15%
Number of women entrepreneur borrowers	5435	4913
Disbursement among women entrepreneurs	Tk. 1518 crore	Tk. 531 crore
Percentage of disbursement among women entrepreneurs	7.59%	2.65%

Source: SMESPD, Bangladesh Bank (2021)

It is important to note that the problem of women entrepreneurs' limited access to financial assistance programs such as the CMSME stimulus package can be analyzed from both demand- and supply-side perspectives. A recent study by The Asia Foundation (2020) suggests that the demand-side problems mostly include the lack of knowledge among women entrepreneurs about the available business opportunities and credit facilities as well as their unwillingness to engage in formal banking. The supply-side problems, on the other hand, include the absence of an appropriately designed incentive structure for women entrepreneurs as well as the unwelcoming attitude of formal lending agencies toward women entrepreneurs. Moreover, the implementation of the fiscal stimulus package involves diverse interest groups, which largely affect the structural as well as institutional efficiency of the delivery of stimulus services.

Against this backdrop, this paper aims to conduct a political economy analysis of the GoB's financial support mechanism for safeguarding the women entrepreneurs during COVID-19. The political economy analysis is expected to help to understand how the disbursement process of stimulus benefits can be streamlined by serving the common interests that facilitate the women entrepreneurs' access to resources. The political economy analysis focuses on the macro-structural and institutional factors as well as the local governance settings that are responsible for the successful implementation of the stimulus package for women entrepreneurs.

Literature Review

Looking through a gender lens at the macro-structural factors affecting women-led SMEs, we have found mixed observations in the current body of literature. Evidence from cross-country studies indicates that robust institutional and legal frameworks are essential for SMEs' access to short- and medium-term financing (Beck et al., 2011). For example, using cross-country data from the Business Environment and Enterprise Performance Survey (BEEPS), Muravyev et al. (2009) show that women borrowers are less likely to get loan approval and are subject to higher interest rates. Consequently, women find it challenging to pursue entrepreneurship and run businesses efficiently. A study on three Caribbean countries indicates that women-led businesses are more likely to be financially constrained (Presbitero et al., 2014). Another study on European SMEs shows that women-led businesses tend to face more difficulties accessing bank loans (Mascia and Rossi, 2017). On the contrary, many studies do not find evidence of gender-based discrimination in access to formal credit (Storey, 2004; Bardasi et al., 2011; and Aterido et al., 2013), while one study finds that women-owned enterprises face lower credit constraints in South Asia (Hewa Wellalage and Locke, 2017).

In addition to the credit market discrimination, challenges for women-owned firms include cultural obstacles, the concentration of industry in low-productivity areas, and small business size, which widen the performance difference between male-run and female-run enterprises (Klapper and Parker, 2011). Actors in local settings also play a critical role in providing financial support to SMEs. A World Bank study (2003) noted that SME financing could be constrained by distortions of financial sectors, lack of know-how on the banking part, information asymmetry (access to business information), and the high risk associated with lending to small enterprises. Regardless of risk profile considerations, administering SME funding is an expensive endeavor, according to Zavatta

(2008). Many financial institutions believe that small businesses need far more advisory assistance than large corporate clients, which has cost implications. Kumar and Rao (2015) showed that the lack of knowledge about the availability of sources of finance and banks' reluctance to grant credit to SMEs as significant barriers to SMEs' access to finance.

The financial sector's structure and level of bank competition are also critical to facilitating SMEs access to finance. According to Love and Martinez-Peria (2015), increased bank competition has a favorable impact on businesses' access to credit, and the impact is dependent on the coverage of credit bureaus. Beck et al. (2013) examined the effects of the weight of non-bank institutions in the financial system on the use of financial services by businesses of various sizes, paying particular attention to the function of specialized lenders like leasing and factoring firms and low-end financial institutions like cooperatives, credit unions, and microfinance institutions. Their findings suggest that obtaining overdraft facilities or loans for SMEs is more likely when specialized lenders are given a higher weight.

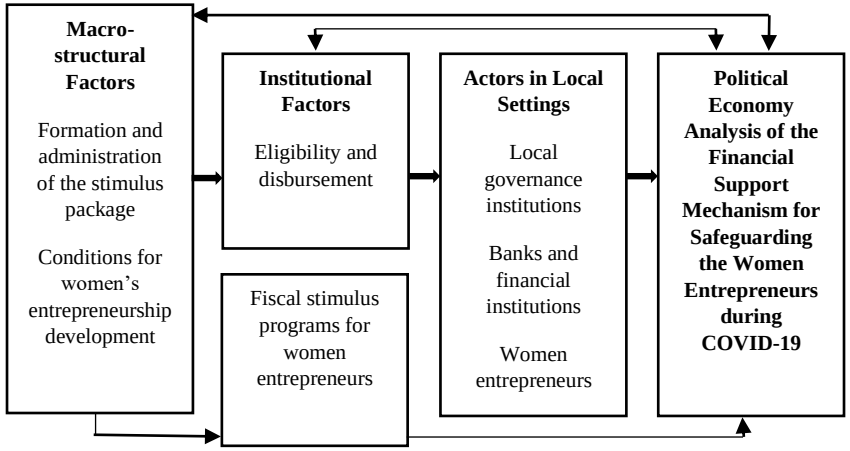
Regarding institutional factors, some requirements demanded by the loan application often constrain entrepreneurs. For instance, Obaji and Olugu (2014) notes that the collateral requirements of the loan application are the biggest challenge for SMEs' access to finance. Another study by Kihimbo et al. (2012) pointed out that many financial institutions require both personal and private assets and documents as collateral to get credit.

It has been reported that political ties can help firms get loans with little or no collateral requirements and experience little or no collateral requirements (Yeh et al., 2013). In a cross-country context, Lashitew (2014) shows that strong political connections enhance firms' access to credit facilities. Faccio (2006) also finds that political ties enable businesses to receive favorable regulatory treatment and preferential access to credit from state-owned entities. Several other studies have also observed similar findings (Claessens, Feijen, and Laeven, 2008; Guo, 2019; Khwaja and Mian, 2005; Saeed, Belghitar, and Clark, 2015). Apart from this, it has also been observed that connections between venture capitalists and entrepreneurs can facilitate access to seed capital (Batjargal and Liu, 2004).

Analytical Framework

As the literature review indicates, macro-structural, institutional, and local factors can be at play across the various stages of the financial support mechanism, and the factors of political economy are important in this setting that can either facilitate or exacerbate the conditions for women-led businesses. Therefore, the current political economy analysis will be based on the diagnosis of macro-structural, institutional, and local factors that contribute to the success or failure of the fiscal stimulus program in creating intended results in the sphere of women's entrepreneurship development. A simple illustration of the analytical framework for the political economy analysis is presented in Figure I.

Figure I: A Simple Framework for Political Economy Analysis of the GoB's Financial Support Mechanism for Safeguarding the Women Entrepreneurs during COVID-19



Source: Authors' illustration.

Methodology

This paper employed qualitative research techniques to analyze data collected through key informant interviews (KIIs), focus group discussions (FGDs), and in-depth interviews. The analysis begin with an extensive survey of documents such as journal articles, survey findings, conference proceedings, and news reports. This review exercise was undertaken to construct the analytical framework mentioned in the previous section. The factors affecting access to finance for SMEs were also analyzed in this review exercise. While doing so, cross-country situation in many instances was considered. Besides, the study made an extensive review of circulars from the central bank of Bangladesh issued for the stimulus fund disbursement. Fund disbursements were tracked through these circulars.

To gather qualitative data and understand political economic factors in light of the COVID-19 situation, 10 KIIs were undertaken with a wide range of stakeholders, including the central bank, the Ministry of Finance, the SME Foundation, Bangladesh Small and Cottage Industries Corporation (BSCIC), local government agencies, and selected commercial banks and financial institutions. Five FGDs were conducted with members of various district woman chambers across Bangladesh. Finally, the findings were synthesized and shared with stakeholders in a multi-stakeholder consultation. The feedback from the consultation was incorporated into the analysis to validate the study findings.

Analysis of the Findings

Macro-Structural Factors

To deal with the adverse impact of the COVID-19 pandemic on the women-owned enterprises, the Government of Bangladesh (GoB) has introduced loan facilities for women entrepreneurs under a 3-year stimulus package, also known as the CMSME stimulus package. As mentioned earlier, a total of Tk. 40,000 crore (two phases) has been allocated for the stimulus package, which is disbursed as working capital for the entrepreneurs through 56 banks and 20 financial institutions based on banker-client relationships. While the main purpose of the stimulus package is to incentivize the pandemic-affected enterprises, the GoB is also well aware of the possible risks and challenges facing the banks and financial institutions in disbursing and recovering the loans during the new normal. As a result, the government will subsidize the market interest rate of 9 percent for the stimulus loan by paying 5 percent of the interest while the recipients will pay the interest at 4 percent.

The central bank has undertaken a number of initiatives to facilitate the disbursement of the stimulus package loan among eligible women entrepreneurs. The participating banks and financial institutions have been assigned to disburse 100 percent of the stimulus package loans by October 31, 2020. However, as of June 2021, 76.93 percent of the stimulus package amounting to Tk. 15,386 crore has been disbursed among 97,814 borrowers. The central bank has been striving hard to expedite the disbursement of stimulus loans with the following initiatives:

- Each participating bank and financial institution will establish a help desk to facilitate the loan application and disbursement.
- The loan application form has been made simple and easy to understand.
- A ‘Special Monitoring Cell’ has been established at each of the participating banks and financial institutions to oversee the disbursement of the stimulus package loans.
- Regular meetings between the concerned departments of the central bank and the chief executives of the banks and financial institutions are held to expedite the implementation of the stimulus package.
- At the district level, a District SME Loan Monitoring Committee works under the supervision of the district administrators to ensure that the loan disbursement process runs appropriately.
- A Credit Guaranty Scheme (CGS) has been initiated for the CMSEs under the stimulus package loan.
- A Portfolio Guaranty Cap up to a maximum of 30 percent of the total portfolio will be provided to each CGS-participating bank and financial institution for disbursing loan to CMSE sector. For an individual borrower, a guaranty coverage up to 80 percent will be provided under the Portfolio Guaranty Cap.
- The lowest and highest loan amount under the CGS has been set to Tk. 2 lacs and Tk. 50 lacs respectively, regardless of the existing limit on CMSE loans.

Although the central bank has adopted these initiatives to streamline the financial support mechanism for the CMSME sector, women entrepreneurs, especially in the CMSE sector, tend to reap little benefit from them. As of June 2021, a total of Tk. 1518 crore has been disbursed among only 4913 women entrepreneurs, constituting only 7.59 percent of the total CMSME stimulus package. The expected ratio of female to male borrowers under the CMSME stimulus package is, however, 15 percent, as argued by a central bank official during a key informant interview. Moreover, it is argued by the women entrepreneurs that the structural features of the CMSME stimulus package do not consider the risks and challenges they are facing. For instance, one women entrepreneur during an FGD reported that a large portion of the women-owned CMSEs operated in rural areas where banks and financial institutions seemed to be reluctant to offer stimulus loan services. Instead, they were more interested in serving the entrepreneurs in urban areas as they could serve many clients at a relatively lower operating cost. This problem of the rural-urban difference in implementing CMSME stimulus package for women entrepreneurs was further intensified after the central bank announced the removal of disbursement targets specific to rural and urban areas. As reported by a president of a women chamber during an in-depth interview, banks and financial institutions find it more convenient and profitable to provide the CMSME stimulus loan services in urban areas than in rural areas as one loan

officer in an urban branch could serve many borrowers. Moreover, most of the women-owned SMEs are located in urban and semi-urban areas while the cottage and micro enterprises are based in rural locations. As a result, banks and financial institutions find it more profitable to offer bigger loans to small and medium women entrepreneurs at a lower operating cost than to offer smaller loans to cottage and micro women entrepreneurs at a higher operating cost.

The major macro-structural factor that contributed to the low rate of disbursement of CMSME stimulus package among women entrepreneurs is the duration of loan. An individual borrower can receive the loan under the stimulus package for only one year. Moreover, the borrower is required to repay the loan with interest in equal monthly installments (EMI). It is needless to say that women entrepreneurs, especially those in CMSE sector, find it more difficult than the medium and large entrepreneurs to repay the loan on a monthly basis. As put forth by most of the participating women entrepreneurs during and FGD, the women entrepreneurs in CMSE sector, who were hit hard by the ongoing pandemic, used the stimulus package loan to meet the operating cost of their businesses, i.e. paying the salary of the staff. With limited or no business activity during the pandemic, the women entrepreneurs found it extremely difficult to repay the loan on EMI basis. They demanded that the loan should be for at least two years with a quarterly installment system and an initial grace period of six months. However, as argued by the central bank officials as well as the representatives from the participating banks and financial institutions, working capital loans that the entrepreneurs receive under the CMSME stimulus package usually have an EMI-based repayment system without a grace period. The term loans, however, enable the borrowers to enjoy a grace period as well as a quarterly installment mechanism. Many entrepreneurs are of the view that the CMSME stimulus package loans should, therefore, be provided as term loan instead of working capital loan, especially for the women entrepreneurs in CMSE sector.

A summary of the views of both demand- and supply-side stakeholders on the key macro-structural factors affecting the implementation of CMSME stimulus package for women entrepreneurs is given in Table 1.

Table II: Stakeholders' Views on the Key Macro-structural Factors Affecting the Implementation of the CMSME Stimulus Package for Women Entrepreneurs

Macro-structural Factors	Views of the Demand-Side Stakeholders	Views of the Supply-Side Stakeholders
Rural-urban difference	The participating banks and financial institutions are less willing to provide CMSME stimulus loans to rural women entrepreneurs as they find it more profitable to serve the urban clients.	While it is true that the participating banks and financial institutions prefer to serve women entrepreneurs in urban areas over those in rural areas, the latter group also shows some degree of reluctance to receive loans from formal banking channels as they lack the necessary documentation.
Duration of loan	The women entrepreneurs are skeptical about the usability of the CMSME stimulus package loan as its duration is only one year. Given the limited or no business operation during the pandemic, women entrepreneurs find it difficult to ensure productive use of the stimulus loan and thus feel that they might fail to repay the loan within one year.	The government has set the duration of the stimulus package loan to one year so that the recovery rate remains good. While a few supply-side actors believe that the one-year duration of the stimulus loan discourages many entrepreneurs, they argue that an increased loan duration might lead to a higher incidence of loan default.
Type of loan	The CMSME loan is provided as working capital loan, which is inappropriate for the women entrepreneurs especially in cottage and micro enterprises. Moreover, the borrowers of working capital loan are required to repay the loan on EMI basis, which is extremely difficult for the cottage and micro women entrepreneurs with little working capital. Therefore, the women entrepreneurs argue that the CMSME stimulus loan should be given as term loan rather than as working capital loan.	Term loan would indeed be more appropriate than working capital loan for the women entrepreneurs in CMSE sector. Many of the women-owned enterprises in CMSE sector operate on little working capital. As a result, when the amount of loan is determined as 30 percent of working capital, many women entrepreneurs find it too small to be useful. The central bank has imprudently decided to provide the CMSME stimulus package loan as working capital loan for the women entrepreneurs.
Unwillingness of participating banks and financial institutions	The participating banks and financial institutions seem to show some degree of unwillingness to work with cottage and micro women entrepreneurs.	The banks and financial institutions cannot serve the cottage and micro women entrepreneurs mostly because of the latter's unwillingness to engage in formal banking.
Banker-client relationship	The participating banks and financial institutions do not want to provide the CMSME stimulus loan to new women entrepreneur clients assuming a higher risk of default associated with new borrowers. They, therefore, prefer to serve the existing borrowers.	The participating banks and financial institutions are less willing to serve the new female clients as they are concerned about loan recovery from new or unknown customers. However, the CGS initiated by the central bank will help reduce such unwillingness of the banks and financial institutions to serve female clients.

Institutional Factors

In implementing the CMSME stimulus package for women entrepreneurs, institutional factors play a crucial role in determining the interplay between political and economic dimensions of the demand for and supply of stimulus benefits. Institutions are usually the key actor in creating an enabling environment for growth-enhancing economic activities. When it comes to developing women's entrepreneurship, especially in a resource-constrained country like Bangladesh, institutions are expected to facilitate the efficient use of scarce resources allocated for the potential women entrepreneurs. However, as evident in the implementation of the CMSME stimulus package, women entrepreneurs largely fail to reap the stimulus benefits. In addition to the above-mentioned macro-structural factors, several institutional challenges limit the effectiveness of the CMSME stimulus package in safeguarding the pandemic-affected women entrepreneurs.

First, the major institutional rigidity that the women entrepreneurs face in accessing the CMSME stimulus package loan is the requirement of a valid trade license. Cottage and micro women entrepreneurs often operate their businesses from home and lack such documents as tax identification number (TIN), value added tax (VAT) registration number, and trade license. Without these documents, the participating banks and financial institutions deny providing services to the women entrepreneurs. As a result, most of the cottage and micro women enterprises can't afford to access the stimulus loan. As argued by one rural women entrepreneur from Khulna division during an FGD:

> We are passing an unprecedented situation due to the COVID-19 pandemic. We had to shut down our businesses because we could not avail ourselves of the financial assistance provided by the GoB under the CMSME stimulus package. We lacked the necessary documentation required for the loan application. It would be of great help to us if the GoB could temporarily waive the requirement of such documentation for cottage and micro women entrepreneurs considering the adversities of the ongoing pandemic facing the entrepreneurs like us.

It is also evident from the interviews and discussions with the women entrepreneurs that many of the women-owned enterprises with trade licenses, especially in the CMSE sector, have been operated on an expired trade license for a long time. They never felt the need for renewing their trade license before they came to learn about the CMSME stimulus loans that require a copy of valid trade license with loan application. As a result, it has become cumbersome for the women entrepreneurs to renew their trade licenses by paying the dues and fines accumulated over the years. Taking into account the costs and bureaucratic complexities associated with the renewal of their trade licenses, many women entrepreneurs in CMSE sector lost their interest in applying for the stimulus package loans.

Second, the lack of sector-specific assessment of the needs also limits the implementation of the CMSME stimulus package for women entrepreneurs. The current stimulus package does not seem to take account of the need, nature, and characteristics of the women-owned CMSEs. A key informant from the central bank argued that "the CMSME stimulus loan package should have been tailor-made for women entrepreneurs. The current provisions of the package reflect those of general loan schemes for large entrepreneurs or industrialists." For instance, a sector-specific need assessment would tell the policymakers that CMSME stimulus loans should be provided as term loans instead of working capital loans for women entrepreneurs as most of them in CMSE sector operate on little working capital. The SME Foundation could have played an important role in conducting such an assessment.

Third, the oversight mechanism for implementing CMSME stimulus package for women entrepreneurs appears to be weak. Although several initiatives, including the establishment of 'Help Desk' at each of the participating banks and financial institutions and the creation of 'District Loan Disbursement Monitoring Committee', have been undertaken, little progress is observed toward implementing these initiatives effectively. As pointed out by a key informant from the SME Foundation, although the central bank instructed each participating bank and financial institution to serve the CMSM entrepreneurs through a dedicated help desk, many of them are yet to do so. In terms of the activities of the District Loan Disbursement Monitoring Committees, little is known about their practical role in streamlining the implementation of CMSME stimulus package, especially for women entrepreneurs.

Fourth, as argued by a women entrepreneur during a KII, formal banks and financial institutions show considerable indifference toward female borrowers. Although there are provisions that require banks and financial institutions to provide loans to women entrepreneurs up to Tk. 25 lacs without collateral, in practice, no banks or financial institutions grant loans to women entrepreneurs, especially if they are new borrowers, without collateral. Moreover, as reported by several women entrepreneurs during an FGD, many banks and financial

institutions require a government employee as a guarantor for women entrepreneurs who intend to apply for a loan even under the CMSME stimulus package.

Fifth, the lack of coordination between the government agencies involved in implementing the CMSME stimulus package further contributes to the inaccessibility of stimulus loans for women entrepreneurs. Although the participating banks and financial institutions under the central bank's directives are mainly responsible for disbursing the stimulus loans, other actors such as the SME Foundation and BSCIC also have an important role in implementing CMSME stimulus package especially for women entrepreneurs. For instance, the SME Foundation strategizes the development of the SME sector by facilitating financial support for SMEs, providing skill development and capacity-building training, facilitating adaptation with appropriate technologies, and providing business support services. BSCIC, on the other hand, also provides entrepreneurship development services, including its own loan scheme named 'BINIT' to potential cottage, small, and medium entrepreneurs. BSCIC does not, however, grant the BINIT loan to the entrepreneurs who are not their members. Despite their key role in developing entrepreneurship in the country, these two organizations and the central bank seem to miss the opportunity of making a concerted effort to design and implement the CMSME stimulus package for women entrepreneurs effectively. As argued by a key informant from the central bank, there exists significant scope for collaboration between Bangladesh Bank's SME and Special Programs Department and the SME Foundation. However, the two agencies tend to work in an uncoordinated manner leaving many important aspects of women's entrepreneurship development unaddressed.

Finally, misinformation from the supply-side actors and lack of awareness among the demand-side actors also contribute to the low disbursement of CMSME stimulus loan among the women entrepreneurs. As reported by a president of a district woman chamber of commerce and industry, the participating banks and financial institutions show reluctance to offer stimulus loan to women entrepreneurs especially in rural areas by misinforming them that they no longer provide loan under the CMSME stimulus package. Instead, the participating banks and financial institutions tend to promote their own loan schemes by highlighting the demerits of the stimulus package loans. Along a similar vein, a key informant from the central bank notes:

> The participating banks and financial institutions may not want to promote the stimulus package loan over their own loan schemes among the new clients as they are concerned about achieving the target of recovering the stimulus loan within one year. However, the introduction of the CGS will reduce the risk of default loan for the banks and financial institutions and thus will motivate them to promote stimulus package loans.

It is also important to note that many women entrepreneurs who are eligible for stimulus package loans lack adequate knowledge and information about the CMSME stimulus package. In addition to their unwillingness to engage in formal banking for loans, women CMSE entrepreneurs are often unaware of the stimulus package benefits. As a result, many of the women CMS entrepreneurs rely on local microfinance institutions (MFIs) for loan at a very high interest rate as they process the loan quickly with little paperwork. Taking account of the women CMSE entrepreneurs' preference for MFI loans over formal bank loans, the central bank has introduced a new refinance loan scheme through the MFIs instead of the formal banking channels.

Actors in Local Setting

In a politico-economic analysis of an incentive structure like the CMSME stimulus package for women entrepreneurs, local actors receive particular attention because of their vital role in determining who will receive the incentives or benefits. As evident from the interviews and discussions with various supply- and demand-side stakeholders, the interaction among local actors, including the local administrators and government representatives, banks and financial institutions, and the association of women entrepreneurs is critical to the implementation of the CMSME stimulus package, especially in rural areas.

One of the reasons for the low disbursement of stimulus loans among women entrepreneurs in the CMSE sector is the lack of commitment from the local governments toward fostering the growth of women-owned enterprises. As discussed during an FGD with a group of women entrepreneurs, the local governments lost considerable revenues due to the COVID-19 pandemic. As a result, they were reluctant to waive the fee for renewing the trade licenses of the entrepreneurs who needed a valid trade license to be eligible for the CMSME stimulus package loans. Instead, the local governments took the opportunity to mobilize their revenues by imposing fees on the renewal of trade licenses. Consequently, the women cottage and micro entrepreneurs, lacking money to pay the fee for renewing their trade licenses, felt particularly discouraged to access the CMSME stimulus package loans.

In providing stimulus package benefits, local actors often manipulate the selection of eligible recipients, thereby causing selection bias in implementing the stimulus package. In practice, such selection bias results from politically motivated conflict or dissension between the local government agencies involved in the implementation of stimulus package. For instance, a president of a district women chamber during a KII reported that the uncooperative attitude of the city corporation mayor and the district administrator toward each other resulted in selection bias during the implementation of cash support program for the poor and vulnerable people during the COVID-19. Political beliefs were given priority over eligibility in selecting the recipients for the cash support program. As a result, many micro and cottage women entrepreneurs, who lost their livelihoods during the pandemic, did not receive financial assistance despite being genuinely eligible for the cash support program.

Table III: Summary of the Macro-structural, Institutional, and Local Governance-Related Factors Determining the Political Economy of the Stimulus Package for Women Entrepreneurs

Macro-structural Factors	• Rural-urban difference in the disbursement of stimulus loan • Short duration (one year) of the loan • Inappropriate type of the stimulus loan (working capital loan in place of term loan) • Unwillingness of participating banks and financial institutions to serve women CMSE entrepreneurs, especially in rural areas • Banker-client relationship benefitting existing customers and leaving new borrowers behind
Institutional Factors	• Regulatory rigidities (e.g., requirement of a valid trade license for accessing stimulus package loans) • Lack of sector-specific need assessment flawing the design and implementation of CMSME stimulus package for women entrepreneurs • Lax oversight mechanism for the implementation of CMSME stimulus package for women entrepreneurs • Unwelcoming attitude of banks and financial institutions toward new female borrowers • Lack of coordination between the government agencies involved in the implementation of CMSME stimulus package • Misinformation from the supply-side actors (e.g., participating banks and financial institutions) and lack of awareness among the demand-side actors (e.g., women entrepreneurs)
Actors in Local Setting	• Weak commitment from the local government actors toward fostering the growth of women-owned enterprises • Selection bias caused by the local actors involved in the implementation of stimulus package

Conclusions and Policy Implications

It is needless to say that women entrepreneurs, especially in the CMSME sector, are one of the groups that have been hit hard by the adversities of the COVID-19 pandemic. Unlike other sectors of the economy, the CMSME sector requires special attention from the policymakers and development actors for several reasons. First, many entrepreneurs in this sector operate their businesses in the rural and semi-urban areas where formal banking and financial facilities are still inadequate. Second, the women-owned CMSMEs are an important source of women's economic empowerment as they create employment opportunities for women, especially in rural areas where the scope of women's labor market participation is limited. Third, compared to their male counterparts, women entrepreneurs are less likely to engage in formal banking on the one hand, and formal banks and financial institutions also show some degree of unwillingness to serve women entrepreneurs on the other. As a result, despite having comparable entrepreneurial capacity, women entrepreneurs lag behind their male counterparts in reaping the benefits of various incentives or assistance programs offered by the government and other development actors for entrepreneurship development.

In view of the challenges facing the women entrepreneurs in the new normal, the GoB needs to streamline the implementation of CMSME stimulus package with a revitalized emphasis on the needs of women entrepreneurs. The women entrepreneurs seem to reap little benefit from the CMSME stimulus package, although half of the package has already been implemented. In order to enable the women entrepreneurs to take advantage of the CMSME stimulus benefits in an effective manner, the following measures may be taken into considerations.

- A tailor-made incentive structure for women entrepreneurs can be initiated within the CMSME stimulus package. Several of the current provisions of the CMSME stimulus package, e.g., short-term loan, working capital loan instead of term loan, requirement of a valid trade license, have reduced the accessibility of the stimulus benefits to the women entrepreneurs. A rigorous need assessment highlighting the challenges facing by the women entrepreneurs, especially in rural areas, would serve a useful purpose in devising a tailor-made incentive structure for them.
- The district woman chambers and the local associations of women entrepreneurs may be involved in designing and implementing stimulus packages as they can serve as an epistemic community in the policymaking for women entrepreneurs. For instance, the district woman chambers can act

as guarantor for women entrepreneurs who intend to apply for stimulus package loans, thereby reducing the hassle that women entrepreneurs face in finding an individual guarantor. Moreover, an effective collaboration among the district women chambers, participating banks, and financial institutions can expedite the disbursement of stimulus loan among women entrepreneurs.

- Effective implementation of the provisions such as collateral-free loan for eligible women entrepreneurs needs to be ensured through institutionalizing a strict monitoring mechanism. Besides, the banks and financial institutions must increase their commitment toward granting loan to women entrepreneurs following the introduction of the CGS by the central bank. To facilitate the financing for women's entrepreneurship development and increase women entrepreneurs' engagement in formal banking system in the long run, the GoB may consider forming a women development bank that would provide both financial and technical assistance to the women entrepreneurs.
- Finally, to overcome the existing macro-structural, institutional, and local governance-related challenges associated with the implementation of the CMSME stimulus package for women entrepreneurs, a concerted effort needs to be made by all policy actors. Strong political commitment from the government together with effective institutional coordination would create an enabling environment for women entrepreneurs to benefit effectively from the stimulus package. A possible mapping of the policy actors and the scope of their intervention in dealing with the current structural, institutional, and local governance-related challenges affecting the implementation of the stimulus package for women entrepreneurs are presented in Table IV.

Table IV: A Possible Mapping of the Policy Actors and the Scope of Their Intervention in Dealing with the Current Structural, Institutional, and Local Governance-Related Challenges Affecting the Implementation of the Stimulus Package for Women Entrepreneurs

Macro-structural, Institutional, and Local Governance-Related Challenges	Bangladesh Bank	SME Foundation	BSCIC	District Woman Chambers	Local Government	Banks and Financial Institutions	MFIs and NGOs
Rural-urban difference in the disbursement of stimulus loan	x	X	x	x	x	x	
Short duration (one year) of loan	x	x	x			x	
Inappropriate type of loan (working capital loan in place of term loan	x			x		x	
Unwillingness of participating banks and financial institutions to serve women CMS entrepreneurs, especially in rural areas	x	x				x	x
Banker-client relationship benefitting existing customers and leaving new borrowers behind	x					x	x
Regulatory rigidity (e.g., requirement of a valid trade license for accessing stimulus package loans)	x				x	x	
Lack of sector-specific need assessment flawing the design and implementation of CMSME stimulus package	x	x	x	x	x	x	x
Lax oversight mechanism for the implementation of CMSME stimulus package	x	x	x			x	
Unwelcoming attitude of banks and financial institutions toward new female borrowers	x			x		x	x
Lack of coordination between the government agencies involved in the implementation of CMSME stimulus package	x	x	x		x		
Misinformation from the supply-side actors and lack of awareness among the demand-side actors	x			x	x		
Weak commitment from the local government actors toward fostering the growth of women-owned enterprises				x	x		x
Selection bias caused by local actors in the implementation of stimulus package	x			x	x	x	

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Prospects and Barriers in Entrepreneurship Development in Greater Sylhet of Bangladesh- A Framework

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Abstract

Successful entrepreneurship development of a country plays important roles in its socio-economic development. Every country sets and follows different strategic and operational measures for entrepreneurship development on the basis of its socio-economic strengths and weaknesses, economic priorities and infrastructural conditions. This research aims to build the scenario about entrepreneurship development in greater Sylhet and thereby to develop a framework for national perspective. Data have been collected from 90 existing entrepreneurs, from 140 prospective entrepreneurs and 60 organizations involved in financial and non-financial support systems. This article discusses the identified prospects and barriers in the entrepreneurial development system of the region addressing the underlying gaps existed in the development path. Finally, it presents the developed framework for entrepreneurship development. The research findings and the developed framework will hopefully be obliging for the policy makers, potential entrepreneurs, researchers, financial and non-financial support organizations and other associated stake holders involved in entrepreneurship development.

Keywords: Entrepreneurship Development, Women Entrepreneurs, Prospective Entrepreneurs, SMEs, Institutional Support, Barriers, Framework

1.0 Introduction

Entrepreneurship is a dynamic process for creating incremental wealth by individuals who assume the major risks in terms of equity, time, and or career commitment of providing value for some product or service which may or may not be new or unique (Hisrich D.R. et al, 2007). The background of entrepreneurs is strongly linked to the personal characteristics of individuals and other socio-economic factors (Schmitt, E. 2004). According to institutional theory, the institutional support (financial and non-financial) system of a country plays greater role in creation of entrepreneurs. In reality, regulative (rules and regulations set by government), normative (social behavior, norms and values of a society) and cognitive (internal issues of a person and their environmental interaction) factors play important roles in entrepreneurship development of a country (Bricklin, D. 2001; Scott, S. 2000; Timmons, J. A. 2004). Entrepreneurship is considered as the economic driving engine of a country as it plays a vital role in socio-economic growth and development especially in creating job opportunities (Chowdhury, F. N. 2017). Successful entrepreneurship development of a developing country is vital for its industrialization and socio-economic development. In this connection, most of the developing countries invest considerably in entrepreneurship development and take necessary steps to promote entrepreneurship among their potential people (Chowdhury, M. S. 2007; Rattanawiboonsom, V. and Ali, M.M. 2017). Without women entrepreneurship development, successful economic growth is not possible. Unfortunately, Bangladesh has one of the lowest women business owners in number. First industrial policy of Bangladesh was developed and activated in 1972. As a result, private sector started to grow, even though the rate was slow. To promote small and medium enterprises (SMEs), different policy and programs have been taken by the Government over time; some were successful and some failed in implementation phase. In recent years, the Government has reformulated industrial policy focusing SME development engaging special beneficiary measures for potential entrepreneurs. This has been reflected in Industrial Development Policy-2016 and SME Development Policy 2019 of Bangladesh (Ministry of Industries, 2022). In the industrial policy-2016, a special priority is given to the sustainable economic growth through the generation of productive employment to create new entrepreneurs mainstreaming women in the industrialization process and international market linkage. In favor of entrepreneurship development, Government has taken some remarkable regulatory measures in connection with financing and providing institutional supports, especially to the female and young entrepreneurs. Many government and non-government organizations have been providing supports to the existing entrepreneurs and new entrants in selected sectors (Bari, M. K. et. al. 2019 and Moazzem, K.G. 2008). Although these organizations are playing significant roles in industrial development, poverty alleviation and employment generation of the country, they could however not make the huge impact on entrepreneurship development as expected. Bangladesh has good startup opportunities for business compared to other countries in South Asia, but the skills, knowledge and

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experience to start a business among the people is relatively lower (Bari, M. K. et. al. 2019; Chowdhury, M. S. 2007). The successful entrepreneurship development of a country largely depends on its entrepreneurial environment and entrepreneurial processes. However, the exact progress of entrepreneurship development in Bangladesh in connection with its policy and practice has not been delineated through any comprehensive study. Again, the existing scenario about entrepreneurship development in regional or country perspective is not available in the literature. Finally, specific lapses and gaps in the overall development process have not been addressed under a framework to follow, which is what this study aimed for. This research aimed at building current scenario about entrepreneurship development in greater Sylhet as the division has greater opportunity for start-up. Based on the identified pros and cons of the development process, a framework was supposed to be developed to replicate in decision-making. This paper presented the key findings about the existing development scenario and outlined the developed framework.

2.0 Literature Review

Entrepreneurship is a major contributing factor to economic growth in terms of creating a stable and sustainable employment for individuals at the micro level and significantly increasing the country's GDP. Entrepreneurship is the process of creating a new innovative idea to form new businesses in manufacturing or service which consequently provides creating wealth, prosperity, increasing productivity, alleviating poverty and unemployment (Rattanawiboonsom, V. and Ali, M. M.2017**)**. Innovativeness, calculated risk-taking and proactiveness of individuals are three key dimensions of entrepreneurship (Sexton, D. L. and Morris, M. H., 1996). Entrepreneurship can be classified in different types as small businesses, medium businesses, large company, scalable start-up, social entrepreneurship, innovative entrepreneurship, hustler entrepreneurship, imitator entrepreneurship, researcher entrepreneurship and buyer entrepreneurship. There is a close relationship between entrepreneurship, economic growth and poverty reduction of a country (Chowdhury, M. S. 2007). Gnyawali and Fogel (1994) develop a five-dimensional framework of an entrepreneurial environment that includes government policies and procedures, socioeconomic conditions, entrepreneurial and business skills, financial support to businesses, and non-financial support to businesses. Prahalad (2005) articulates that, in most developing countries, entrepreneurship development is restrained significantly by the inability and inconsistencies in enforcing laws, bureaucratic interpretation of rules, lack of firm political commitment, lack of accountability, hooliganism and political musclemanship, lack of rule of law, lack of control of corruption. To flourish the development of entrepreneurship, a country needs to ensure attractive investment policies, organizational environments, educational systems and sustainable infrastructural development. Financial support schemes, technology creation and transfer policies, training institutions, market development opportunities and the rule of external development institutions also need to be focused on sustainable development of entrepreneurship. Education and training are effective tools for developing the characteristics of entrepreneurship. In developed countries, studying entrepreneurship in college level takes place to create the learner's abilities and enhance their entrepreneurial mindset. Engineering graduates could become high tech entrepreneurs as they are supposed to possess deep knowledge in their technical fields as well as various skills in problem-solving, communication, networking, information technology, and teamwork (Täks, Met. al. 2014). In the present world, women's participation in entrepreneurship is increasing remarkably. Woman entrepreneurship development increases the participation of woman and their ownership of economic development (Mathew, V. 2010). Entrepreneurship usually takes place in SME sector and successful development depends on the success in SME sector in practice. There are some internal and external barriers against the development of SME sector in developing country like Bangladesh. Major problems in the country lie in proper financing of SMEs (Haider, M. B. and Akhter, T. 2014). Recent measures by the government have been improving the scenario. Through appropriate entrepreneurial development approach, SMEs can overcome many of the internal and external barriers (Narain, S. 2003). Government of Bangladesh has changed its investment policy remarkably in the last decades in favor of industrialization and SME development (Nadira, S.A. et al. 2017; Manzoor, S. H. and Chowdhury, M. E. 2017). However, there are still some weaknesses in policy implementation. There is a common belief that bureaucratic hindrance, poor infrastructural support and inadequate or unfavorable institutional support discourage industrial investment. Inadequacies in nationwide entrepreneurial capability, the weak structure of industry-academic research collaboration, lack of start-up facilities may hinder entrepreneurship development. It is instructive to focus on the success factors of developed nations. Cole (2004) identifies the success factors behind Japanese development including ease of funding by financial institutions, strong adherence to company culture, democratic environment in decision making, mutual respect and trust between employers and employees, strong adherence to planning and quality control, Government-business relationship and networking. From other nations, we may find similar factors. The embedded issue is that a nation needs to build up an entrepreneurial ecosystem, which is considered as dynamic institutionally, well-established interaction between attitudes, abilities and aspirations by individuals, which drives the allocation of resources through the creation and operation of new venture. To ensure sustainable employment and economic development, Bangladesh

Government focuses on entrepreneurship development through Micro, Small and Medium Enterprise (MSME) development as a good solution. Considerable relaxation in government control, innovative assistance like provision for bonded warehouse facilities, transfer of many of the regulatory functions to the BGMEA and relaxed enforcement of the provisions of the Factories Act, Labour Laws, etc. helps RMG sector to succeed in Bangladesh. According to Economic Census 2013, the number of female-headed establishments is 0.56 million (7.21 percent) whereas it was 0.10 million (2.80 percent) in 2001 and 2003. In Bangladesh, Small and Medium Enterprises (SMEs) account for the majority of firms (87 percent) providing 80 percent of total employment and contributing 15 percent to gross domestic product (GDP) of the country (Narain, S. 2003). From the study of literature, it can be summarized that entrepreneurship development depends on several factors, of which some are common and some vary from country to country. The ultimate success in private entrepreneurship development depends on people's mindset along with some other socio-economic factors. A lot of remarkable achievements have taken place in industrialization in Bangladesh during the last decade because of remarkable infrastructural development, policy reformation, the creation of special economic zones and export processing zones, attractive measures for foreign and local investment. Most of the initiatives are indeed playing their roles in boosting up medium to large industries, even though a lot more need to be done for manufacturing and service sectors. More importantly, sustainable entrepreneurship development through MSMEs engaging potential entrepreneurs needs to go a long way from the expected level to become a developed nation. This research has carried out a critical assessment study for generating overall scenario to understand the growth pattern of entrepreneurship development in greater Sylhet in connection with prospects, missing linkages and underlying barriers to expected growth.

3.0 Research Methodology

The research methodology is primarily exploratory in nature. Multi-method research approach combined with pilot study, in-depth case studies and survey have been carried out to develop richer context of the subject matter.

3.1 Data Collection

For this study, both primary and secondary data have been collected. A pilot study involving 10 entrepreneurs was performed to develop comprehensive understanding on the entrepreneurial process engaged in the studied organizations as well as to verify the developed questionnaires. With the help of developed questionnaire, 20 in-depth case studies were carried out applying

structured and semi-structured interviews with the entrepreneurs. Supplementary data were collected from 70 more entrepreneurs working in different clusters in Greater Sylhet through questionnaire survey. Altogether, data from 90 entrepreneurs have been analyzed and key findings are presented in this article. Based on another set of questionnaire, data have been collected from 140 prospective entrepreneurs to discover their mindset and overall perception about entrepreneurship development in the region, in the country at large. Relevant data have also been collected from government and Non-government financial (both Bank and Non-Bank) and non-financial institutions in terms of entrepreneurial environment and entrepreneurial development process. Data from 60 such organizations have been analyzed and presented in this article.

3.2 Data Analysis

The licensed SPSS Statistics 27 and Microsoft Excel 365 for windows have been used to analyze collected data. After the data collection process, data have been prepared for input in SPSS software and different statistical analyses (both descriptive and inferential) have been carried out.

4.0 Results and Discussion

4.1 Findings of the study from the existing entrepreneurs

Firstly, the scenario of the existing entrepreneurs in terms of their start-up, business enterprise, progress, barriers and institutional support mechanism has been built up. The demographic information on the studied sample is presented in Table-1.

Table 1: Demographic Information of the existing entrepreneurs as respondents

Age range		**Gender**		**Marital Status**	
18 to 29 Yrs	35	Male	43	Unmarried	31
30-39 yrs	25	Female	47	Married without children	26
40-49 Yrs	17			Married with children	31
Above 50 Yrs	13			Divorced with children	02
Family background				**Education**	
Family in business			47	Primary	03
No Family involvement in business			43	Secondary up to SSC	05
				HSC or Diploma	15
				Graduate	40
				Post Graduate	27
Field of Higher Study					
Engineering	16			**Education level**	**Male** **Female**
Business and Commerce	13			Primary to HSC	10 13
Science	05			Graduates and over	37 30
Social Science & Other	33			**Grand Total =90**	

Among the entrepreneurs, about 37% are engaged in manufacturing, 29% are in trading, 21% are in service and finally 13% are engaged in livestock farming and agro-processing industry. At gross level, 56% fall under the category of Micro entrepreneurship, while 31% and 13% fall under the category of small and medium enterprise category respectively. The stimulating factors of the entrepreneurs are depicted in Figure-1.

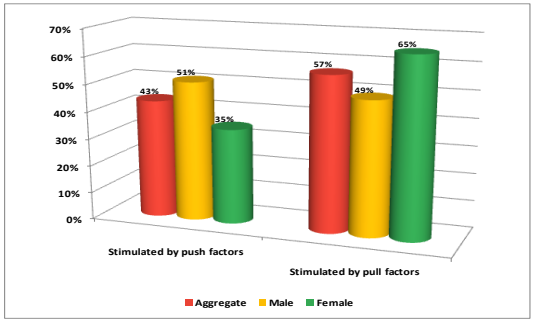

Figure-1: Scenario about push and pull factors behind entrepreneurship

It has been found that about 43% become entrepreneurs being stimulated by push factors (obliged to survive) and 57% are stimulated by pull factors (because of available opportunities to become). The majority of female became entrepreneurs stimulated by the available opportunities (family support, lower investment, online facilities, and easy access to local markets). Further analysis was carried out to identify whether there is any difference among the groups based on their family background; one has family background in business (FIB) and the other group has family not in business (FNB). It has been found that majority of the entrepreneurs who came from family with business background, are in fact the opportunity entrepreneurs. The study has revealed that societal recognition of entrepreneurs has not been achieved (Figure-2).

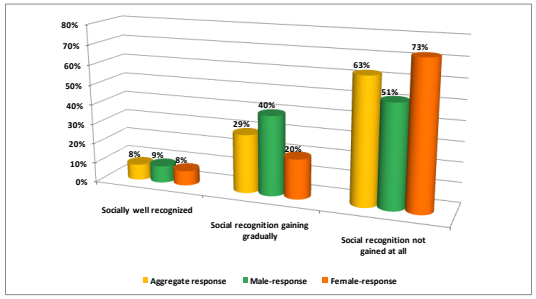

Figure-2: Percentile response on social recognition of entrepreneurship

A very small percentage (only 8%) of the respondents believes that the entrepreneurs have gained social recognition in the country. On the other hand, 63% strongly believes that entrepreneurs have gained no social recognition at all. The responses from both genders confirm the consistency of the findings (χ^2 = 0.00, df = 1 n = 90). No significant difference has also been found in case of family background of the entrepreneurs as well (χ^2 = 3.26, df = 1 n = 90). It can be inferred that some societal factors still appear as hindrance to the development of entrepreneurship in the region. The support for entrepreneurial development by the Government and other regulatory bodies have been found indeed inadequate and unfavorable. Figure-3 depicts the overall scenario.

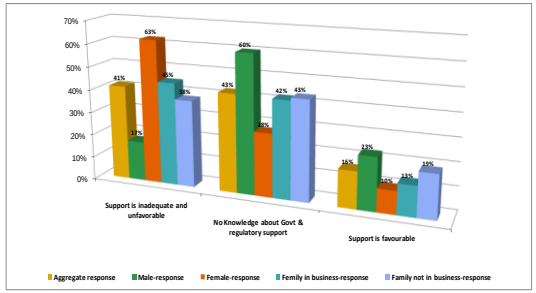

Figure-3: Scenario about the support provided by regulatory authorities

Surprisingly, 43% of the existing entrepreneurs have been found to be unfamiliar with the available support of the regulatory bodies and implementing authorities. Moreover, among those who are familiar with the support, about 41% confirm that the provided support is inadequate and many are aspects unfavorable for the development of entrepreneurship. Only 16% confirm that the support is favorable for the expected development. It has been found that only 16% of the entrepreneurs took loans from Bank and Non-bank Financial Institutions (NBFIs) to operate their business. This percentage is substantially low despite having taken many positive measures for entrepreneurial loans. It is found that 57% of the entrepreneurs among loan seekers did not get required financial support from Bank or NBFIs, even though they approached for the loans. Moreover, 52% confirm that the lack of support from non-financial institutions substantially hinders the development of their entrepreneurship. Policy makers as well as related stake holders need to address these issues seriously. In the context of relationship between the background factors of entrepreneurs and their success in business, only 25% are performing successfully with substantial business growth, 28% are not performing well, and the remaining is in a state of breakeven

condition (Figure-4). No significant difference has been found in terms of their family background (χ^2 = 0.05, df =1 n=90). However, significant difference has been found in terms of their educational background. The entrepreneurs possessing at least graduation level education are more successful than those having lower level of educational background (χ^2 = 4.5, df = 1 n = 90, p = 0.05).

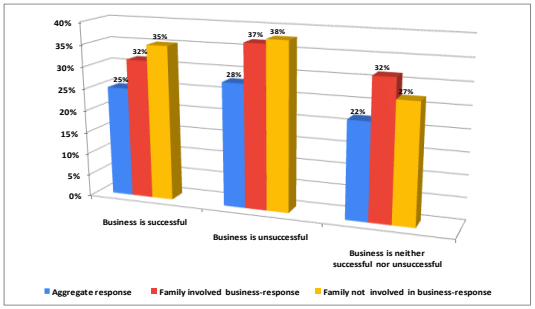

Figure-4: Overall scenario of the business entities about their success on business growth

Key findings regarding gender and their associated education level are presented in Table-2. It is found that male entrepreneurs (72%) are more successful in their business compared to the female entrepreneurs (28%) among all the successful entrepreneurs at significant level (χ^2 = 0.153, df = 1 n = 90). While considering the same level of education, we have found that the male entrepreneurs with graduation (52%) are more successful than the female graduates (15%). Similar scenario has been found for the lower education level (Primary to HSC) too. It can be concluded that the male entrepreneurs are more successful than the female ones in the studied group.

Table-2: Overall business performance in connection with gender and education

	Successful (%)	Unsuccessful (%)	Neutral (%)
Male-Graduates	52%	30%	18%
Female-Graduates	15%	48%	37%
Male-Primary to HSC	50%	38%	12%
Female-Primary to HSC	23%	31%	46%

We could infer that women entrepreneurs need more institutional supports to grow. Usually, the organizations in SME sector tend to take their decision about their business growth on profit margin instead of measuring actual productivity as they lack expertise on determining partial and or total productivity (Islam, 2008; Khan and Islam, 2016). The study has further explored the underlying

barriers or obstacles encountered by the entrepreneurs. Key findings are presented in Figure-5.

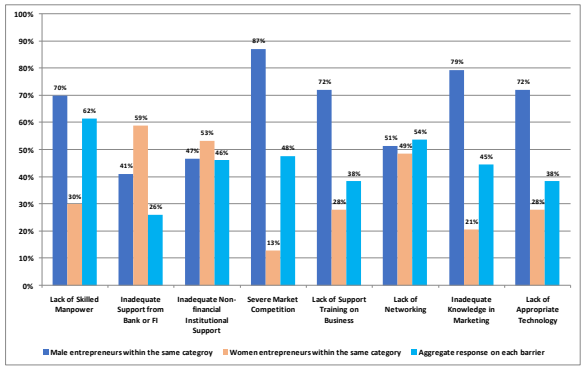

Figure 5: Percentile response on barriers against entrepreneurship development

From Figure 5, we can see that in aggreagte, 62% of the entrepreneurs identify that the lack of skilled labor is the topmost barrier, of which 70% respondents are male entrepreneurs. Fiffty four percent has identified the lack of networking as their personal barrier. In the context of their involvement in business, 47% entrepreneurs are engaged in manufacturing followed by trading (44%) and service (22%) sectors. A few are involved in agro-farming and agro-processing. In the manfacturing business, 64% have been found to be women. However, they are mainly engaged in tailoring and fashion items, which require low technology, relatively less expertise and capital. On the other hand, the male entrepreneurs are engaged in relatively complex manufacturing business (e.g. food processing, agro-processing, metal manufactuirng, construction mateials, computer related products, light engineering and so on) which require moderate to high technology, skilled workforce and considerable amount of capital. The study further explored the structure and source of start-up capital in the inception phase of entrepreneurship. We have found that the average start-up capital of a woman entrepreneur is much lower than that of a male entrepreneur. Figure-6 shows the overall findings. The males dominate the range between 1 Lac Tk. to 5 Lac Tk., while the female dominates the ranges between below 10000 Tk. to less than 1 Lac Tk. None of the women entrepreneurs had initial capital more than 5 Lac Tk. to start their entrepreneurship. While identifying the sources of their start-up capital, we have found that both male and female got the start-up capital form their respective family. Their own savings and funds from selling of personal properties are the secondary source of their start-up capital.

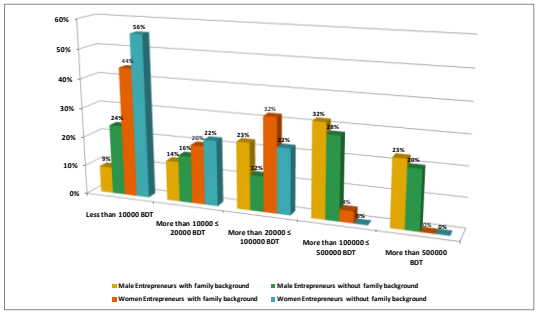

Figure-6: Scenario about start-up capital structure

4.2 Findings of the study from prospective entrepreneurs

This section presents the current scenario about the aspiration, perception and intention of prospective entrepreneurs (graduates and the graduating students are treated as prospective entrepreneurs for this study). Data were mainly collected from two reputed Universities (one Public and the other Private) situated in Sylhet. The majority of the respondents were from the Engineering background (particularly in the branch of Industrial and Production Engineering (IPE), MEE, CSE, EEE, Software Engg.) and Business and Commerce background. Respondents from other fields were also selected to identify whether any significant variation exists in their intention and perception about entrepreneurship. The study managed to collect data from 140 prospective entrepreneurs. The demographic information of the studied sample has been presented in Table-3. The appropriate respondents are considered on purpose as they are in a better position to have realistic perception about entrepreneurship development. They come from different parts of society and they are supposed to possess greater knowledge and exposure to the learning environment as well as to entrepreneurial environment. In the context of our socio-cultural aspects, the response from the studied sample is considered to be a good representation of prospective entrepreneurs.

Table 3: Demographic Information about the prospective entrepreneurs

Age		**Gender**		**Marital Status**		**Education**	
Below 29 Yrs	137	Male	108	Unmarried	134	Postgraduate	42
30-40 Yr	03	Female	32	Married	06	Undergraduate	98
Type of Institution						**Branch of Education**	
Public University		62				Engineering	63
Private University		63				Business & Commerce	53
Other institutions	15					Science	15
Family background						Social Science	09
Family in business				77			
No family involvement in business				63			
						Total= 140	

At first, the study identified their career choice immediately after graduation. The overall findings are depicted in Figure-7. We see that about 54% of the respondents in fact choose to have either a government or a private job. In comparison, 39% in aggregate want to become entrepreneur, of which only 16% are female. Influence of family background in business on career choice has been tested.

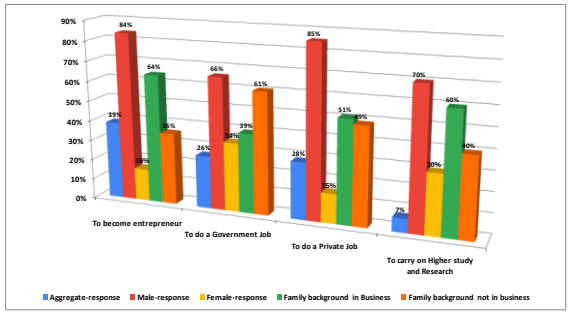

Figure-7: Career choice of the respondents immediately after graduation

Overall, 55% of the respondents have come from business family. Interestingly, we find no significant difference in connection with family background in the pattern of career choice. However, among the respondents, those who want to become entrepreneurs immediately after graduation, the majority (64%) came from business families. It indicates that family background plays a significant role behind the intention of a graduate for becoming an entrepreneur. Further analysis was carried out to find out relationship between field of study and career choice. Figure-8 depicts the overall scenario. It has been found that business graduates prefer Entrepreneurship (55%) followed by private job (26%), engineering graduates prefer private job (43%) followed by entrepreneurship (25%), science graduates prefer government job (56%) followed by private job (44%) and Social Science graduates prefer private job (37%) followed by government job (32%).

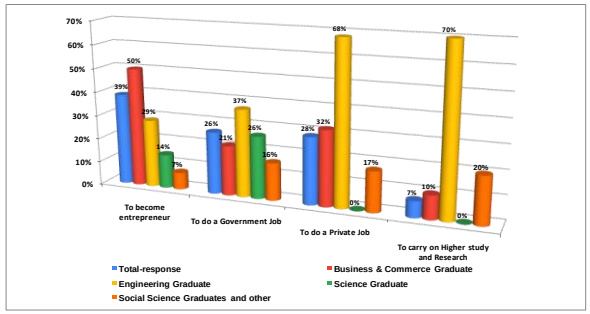

Figure-8: Response on Career Choice in connection with study fields

Within the similar choice, the business graduates intend to become entrepreneurs compared to other graduates at significant level (χ^2 = 14.80, df = 4, n = 140). It has been further discovered that 42% of all female graduates choose government job followed by entrepreneurship (29%). On the other hand, 41% of all male graduates prefer entrepreneurship followed by private job (31%) in their life if there is a favorable environment for entrepreneurship. The next attempt was made to build the scenario about their perception on social recognition about entrepreneurship. It has been identified that the majority of the respondents perceive that entrepreneurship has yet to gain social recognition in the country. The overall findings about their perception on social recognition about entrepreneurship are depicted in Figure-9. It is found that on average 61% believe that the entrepreneurs have not gained social recognition yet, of which some believe that the recognition may be gaining gradually. Only 39% of the prospective entrepreneurs believe that entrepreneurship has gained enough social recognition. Female respondents, who believe that social recognition has been gained, are mostly from business family. The findings are consistent to those found from existing entrepreneurs. Majority of the prospective entrepreneurs (61%) strongly believe that support in favor of entrepreneurship development from government regulatory bodies is indeed inadequate.

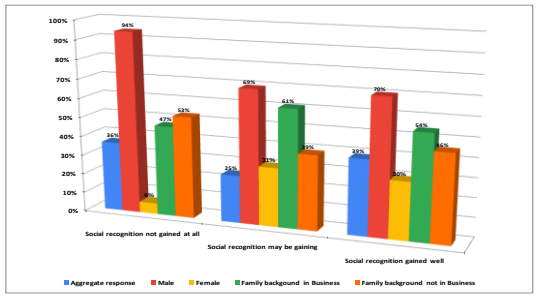

Figure-9: Percentile response over social recognition of entreprenurs

Seventy one percent believe that support from financial institutions is inadequate. Fifty percent express similar impression on adequacy of support from non-financial institutions. Family mindset on entrepreneurship is also found unsupportive in most cases. Regarding other barriers to entrepreneurship development, the perceptions of prospective entrepreneurs are presented in Figure-10. A crucial finding is that about 58% of the graduates perceive that they do not gain enough knowledge from their education in connection with entrepreneurship, even though majority (83%) of them are from Business & Commerce, and Engineering disciplines. The most important issue here is that

about 90% of the graduates do not have any knowledge and information regarding entrepreneurial loans and other available supportive facilities. This is more alarming in the case where 41% of the respondents who intend to become entrepreneur immediately after graduation are completely unaware about the available supports. We can infer that the prospective entrepreneurs are not very well familiar with entrepreneurial process and environment. If university graduates possess such limited knowledge and information regarding entrepreneurship, one can very well imagine the situation with other groups of the society.

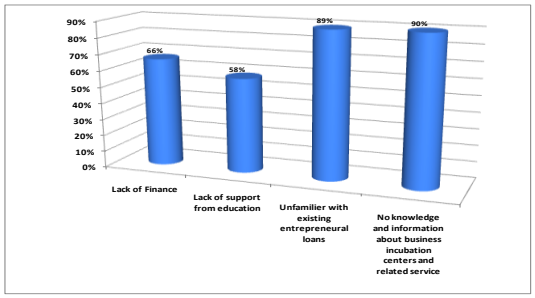

Figure-10: Categorical response on potential barriers against entrepreneurship development

The findings confirm that there is a huge gap between male and female choice in the context of becoming entrepreneur. Lack of family and societal support along with inadequate institutional support have been identified by the prospective female entrepreneurs as the main hindrances against entrepreneurship.

4.3 Overall findings about regulatory measure, financial and non-financial support system

While digging down into the available policy and regulatory measures in the country, the study has figured out a good scenario. The government has taken various steps to enhance industrialization and boost up entrepreneurship development. A reformed regulatory body named Bangladesh Investment Development Authority (BIDA) has been created by the government. The main objective of BIDA is to take the inflow of foreign direct investment to a new height linking the aspiration to become a middle income country by 2021 and high income country by 2041. BIDA has initiated one-stop service to make business easier in Bangladesh, especially for foreign investors. Concerning entrepreneurship development nationwide, it took a new initiative named 'Entrepreneurship and Skill Development Project' (ESDP). The underlying aim

was to train, connect, mentor and provide associated service and support to aspirant entrepreneurs from a single source. The project has a target to train 24000 young educated and unemployed men and women in 64 districts to become entrepreneurs. It has identified 60 new market opportunities for faster expansion of domestic investments. For the development of agro Industries and SME sector at large, Bangladesh Bank (BB) has taken special regulatory measures to ensure substantial support to growing concerns. According to the set policy, loan processing for SME and women entrepreneurs should be expedited and given special priority. The Directorate of Youth Development (DYD) under the Ministry of Youth and Sports has been working as a prime national training institute where unemployed youths (both male and female) receive training followed by microfinance (5000 Taka to 50000 Taka) to start a business relevant to the successfully accomplished trade training. The government has a visionary plan to train additional 1.5 crore youths for self-employment across the country and to make them expert on specific domain to be employed in established sector both home and abroad by 2023. For this, it has been implementing various programs. The DYD has been playing very important role in developing youths for self-employment with the aim of achieving SDG goals by 2030 and the targets set for 2041 (DYD, 2019). Bangladesh Government has taken another remarkable step to boost up SME sector by establishing the SME Foundation. Currently, the foundation is accomplishing programs in light of the Industrial Policy-2016 and SME policy-2019. It assists entrepreneurs (especially from outside Dhaka) by bridging entrepreneurs and financial institutions, and helping the entrepreneurs in preparing necessary documents and business plan. Special measures are taken for helping women entrepreneurs by providing financial and non-financial support as per provisions made by the government. There are some other government and private institutions that provide specific training on various trades, which are playing direct and indirect role in entrepreneurial development. Among some, Bangladesh Institute of Management (BIM), Bangladesh Small and Cottage Industries Corporation (BSCIC), Bangladesh Industrial Technical Assistance Center (BITAC), Bangladesh Manpower Training Bureau (BMTB), Micro-industries Development and Assistance, Services (MIDAS) are found renowned in this connection.

Education system of the country is found to be relatively weak with respect to entrepreneurship development, which is confirmatory to the findings of the study carried out by Azim and Akbar (2010). It has been found that a limited number of non-financial support institutions are available in greater Sylhet; some are functioning well and some are not. The professional bodies like different Chambers of Commerce and Industries are doing very little for the development

of entrepreneurship. Many government and private Banks provide loans to business enterprises. However, most of them basically offer loans to established business entities or for the growth of entrepreneurs who are operating successfully for more than two years and have good track records on Bank transactions. Very limited opportunities are there for new entrants with good prospects. The Government has enacted a regulation named 'Entrepreneurship Support Fund (ESF) Regulation-2018' to promote potential entrepreneurs. The main target of ESF is to create new entrepreneurs among the unemployed and competent youths on risky but potential sector such as 'Food processing and manufacture' and 'Agro based Industry'. It has another target area on ICT sector for its extension in business and entrepreneurship. These all are good measures indeed for entrepreneurship development. However, the terms and conditions, collateral and guarantee issues, required list of documents and other set conditions at implementation stage may hold many potential entrepreneurs back from seeking loans. Inappropriate business plan sometimes becomes obstacles to allocate loans, stated by many bank mangers. According to the research findings, interest rates and some hidden rules and regulations of many Banks practically discourage existing entrepreneurs who want to grow their business with bank loans. Provision of loans to new entrants (prospective ones) is a rare phenomenon. As a whole, financial system in the Bank and non-Bank FIs is not favorable to the prospective entrepreneurs or new entrants in practice. In a nutshell, financial institutions need a lot more to reform their policy and implementation strategy for creating favorable support to both existing and potentials entrepreneurs.

5.0 Framework For Entrepreneurship Development

We know that the entrepreneurial process generally comprises four phases: *Identification and evaluation of opportunity for entrepreneurship, Development of business plan, Determination of required resources* and *Management of the resulting enterprise* (For examples: HBS Working Knowledge, 2016; Timmons, J. A. 2004; Joan, M. 2016). The success in different phases of entrepreneurial process largely depends on the creativity and innovativeness of an entrepreneur, effective business plan, availability and attainment of various resources and availability of institutional support along with entrepreneurs' background and networking capability (Scott, S. 2004). The entrepreneurial process has not been found smooth and effective in the studied region. Based on the analysis of research findings a framework has been developed by the authors that is illustrated in Figure-11. Certain gaps in the development process have been identified that can be replicated or verified in other parts of the country, and the country at large. Two major gaps exist within the Entrepreneurship Development

System (EDS). One gap lies in between EDS and the Background of the entrepreneurs, which is governed by cognitive, normative and social factors. Finally, the study has identified a gap between EDS and Actual Entrepreneurship Development.

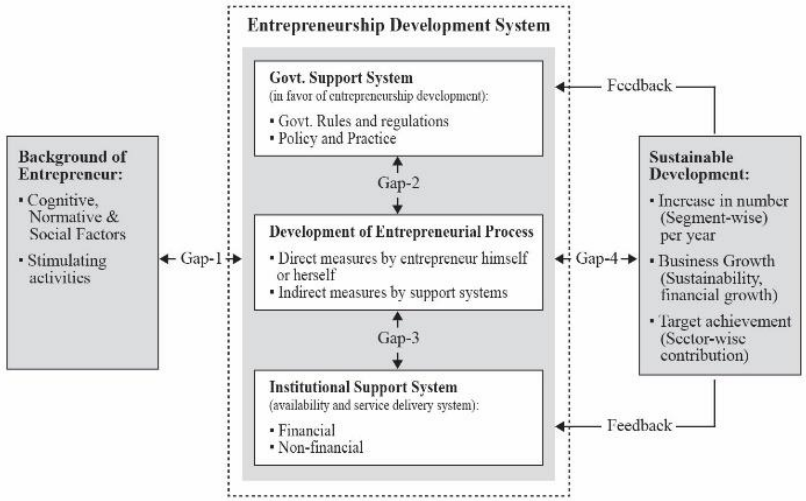

Figure 11: Framework for Entrepreneurship Development through SMEs in Bangladesh

Source: Authors' own development

Gap-1: Gap between entrepreneurs' background and EDS

Four specific root causes are found responsible for creating Gap-1. These include: *i) noncompliant mindset of family, society at large, about entrepreneurship ii) unfavorable education system for entrepreneurship iii) perplexed mindset of potential graduates on career plan iv) gender issue as a considerable resistance for potential female graduates* and *v) limited provisions for entrepreneurial opportunity and guidance for venture creation in connection with potentials*. The identified root causes need to be properly addressed by the relevant stakeholders to reduce the gap.

Gap-2: Gap between Entrepreneurial Process and Government Support System

Entrepreneurship development in urban and rural areas is different in nature. High-tech enterprises tend to grow fast in the urban area. On the other hand, low tech and agro-based entrepreneurship usually grows fast in the rural area. State policy, infrastructural supports, financial and non-financial supports and development of skill workforce should be aligned to specific needs and potentials. It has been identified that the support from government and regulatory authority is in fact inadequate and unfavorable in many cases for setting up and running an enterprise. This surely creates a gap between expected and actual growth in entrepreneurship development. Four specific root causes have been identified as key factors behind this gap. These are: *i) complexity in access to finance and resource mobilization ii) complicacy in establishing business under legal framework for local investors iii) improper implementation of set policy and regulatory measures in practice* and finally *iv) missing feedback loop between policy formulation and actual potentials in connection with regional perspectives*. The identified root causes need to be properly addressed by the government to ensure entrepreneurial environment for enabling the entrepreneurs to establish and run their enterprises smoothly.

Gap-3: Gap between Entrepreneurial Process and Institutional Support System

The study has revealed that despite having many options, the entrepreneurs engaged in MSMEs are not in fact receiving enough financial support on demand from banks and other NBFIs. Many potential entrepreneurs are out of the non-financial supports in practice. In consequence, many entrepreneurs start well but fail to grow. Specific causal factors behind the Gap-3 include: *i) inadequacy and sometimes unavailability of financial and non-financial supports to potential entrepreneurs ii) reactive mechanisms of support systems in place of needed proactive approaches iii) unattractive and sometimes unaffordable support of training and other service to wider community* and *iv) unavailability of relevant information about support systems to the potential and prospective entrepreneurs*. Relevant stakeholders involved in financial and non-financial support systems have many rooms for development.

Gap-4: Gap between EDS and Actual Entrepreneurship Development

Government has been spending millions of money to improve the scenario, but the actual growth of entrepreneurship in target sectors (MSME) is not reflected well in practice. The development pattern appears to be scattered; not perfectly aligned to policy or target sectors or subsectors appropriate for regional development. While we want to have entrepreneurship development in specific subsectors, but are financing the unplanned or other sectors in practice. At the implementation phase, support institutions sometimes drift away from actual proposes. A statement made by a Branch Manager of a Private Bank can be quoted here "We are getting credits under refinancing scheme from BB for

providing loans for manufacturing SME, but we are unfortunately disbursing loans to trading entities". This is not an isolated case; we have found many relevant cases in this regard. Further study is required to underpin the issue before making a conclusive comment though. However, the study has identified specific root causes behind the Gap-4 that include *i) missing linkage between entrepreneurship development process and the National Innovation System (education-industry-society) of Bangladesh ii) erroneous assessment of contribution (true vs expected) of sub-sectors in connection with sustainability and progress potentials (national and global perspectives)* and finally *iii) inadequate research and development facilities in technology (product or service with brain-ware, human-ware, software, know-how) creation, transfer and exploitation appropriate for SMEs*.

6.0 Recommendations

Despite having some good measures by the government and other institutions, the country is far away from the expected level of entrepreneurship development. Reasons behind some lapses and gaps in the development process have been discussed in the previous section. Integrated approach involving all stakeholders is inevitable to reduce the gaps on way to achieve remarkable progress. Some specific recommendations are made in this regard. Media approval on entrepreneurship needs further development in reporting on entrepreneurial spirit of the country highlighting global perspectives, national opportunities, and success stories. It can also play a greater role in developing positive mindset of the society about entrepreneurship. Educational institutions (college to university) should offer entrepreneurial modules, programs and support training. Positive mindset among the students about entrepreneurship can be developed not only in higher studies but also at the college level. Traditional thinking about higher education as to create job seekers need to be changed remarkably in favor of entrepreneurial development. In a nutshell, the Media (electronic and print), educational institutions, family and the society at large can play more positive role concerning entrepreneurship development. We need to materialize the opportunity of considerably minimal gender disparity exists in the country for creating women entrepreneurship providing them enough financial and non-financial supports and encouraging them to be involved in challenging subsectors of manufacturing and service industries. Aligned to the plan and policy, young engineering graduates need to be attracted to start small business in high-tech entrepreneurship and in the potential subsectors. It is necessary to develop meaningful industry-academia linkage for developing opportunity of spin-off companies for promoting research as well as for solving industrial problems in collaboration. Entrepreneurial courses need to be incorporated in college level education. The offered modules for Business Programs at the tertiary level need to be refurbished with practical applications rather than generic knowledge creation. At least one module concerning entrepreneurship need to be integrated in graduate programs of all engineering disciplines. The government needs to invest more in the public universities for developing business incubation centers and encourage the potential graduates and teachers for generating spin-off opportunity based on applied research. Financial support for both new entrants (prospective with good business plan) and existing entrepreneurs need to be accessible, affordable, and adequate for establishment and growth respectively. Many entrepreneurs encounter problems in acquiring loans from Banks and Non-Bank Financial Institutions as most of the available loan schemes are asset base and tangible collateral base. Usually, an entrepreneur at the initial stage frequently does not possess the necessary track record, assets and some other ingredients to obtain a commercial loan. The study reveals that there are many lapses and gaps in the implementation phase, and the information about the available measures by relevant institutions is not well circulated to the wider community. The policy needs to be formulated addressing actual progress and prospects identified by scientific study rather than using generic information collected by corporate bodies. The authors believe that properly addressing the root causes behind the identified gaps and tracking down the development path, the relevant stakeholders can enhance entrepreneurship development in the region and across the country at large.

7.0 Conclusions

Every country sets and follows different strategic and operational measures for entrepreneurship development on the basis of its socio-economic strengths and weaknesses, economic priorities and infrastructural conditions. Entrepreneurial mindset of the society and social structure in a particular region plays important roles behind entrepreneurial process and development. The main goal of the research was to build the overall scenario regarding entrepreneurship development in greater Sylhet and thereby to develop a framework. A good linkage between service providers and service takers in developing mutual trust and quality of service has been found missing. Arrangement of financial capital has been found to be a real challenge. Another challenge has been found for starting a business in a formal sector in Bangladesh. Plenty of formalities and documents create a very difficult situation for an entrepreneur to establish a business. Although the required registration and certification vary according to type of business, an entrepreneur needs to have about 11 types of certificates from different offices to run a business legally in Bangladesh. A lot of time and effort is spent running from one office to another. Very recently, BIDA has

committed to serve the purpose from one stop. At the moment, the service is available to foreign investors. Local entrepreneurs would hopefully avail this service opportunity in the near future. The media can play a great role in preparing the society conducive for entrepreneurship development. Gender disparity in access of financial support still exists. Women entrepreneurship development is confined to a limited number of sub-sectors. A few are involved in agro-based process industries. Very few entrepreneurs are involved in tourism industry, even though there is a huge potential of this sector in this region. The authors believe that the scenario presented in this article and the developed framework have exposed many avenues to be addressed, studied and developed by policy makers, researchers, entrepreneurs, business developers, academicians and other relevant stakeholders. A holistic approach could be generated to develop sector-wise entrepreneurship development. In conclusion, the outcomes of this research will significantly be contributory to the development of entrepreneurship in Bangladesh.

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Are Small and Medium Enterprises (SMEs) in Bangladesh Adapting ICT in Good Pace? – Challenges and Way Forward

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Abstract

With a population of 165 million, Bangladesh has one of the biggest consumer markets of the world, and Small and Medium Enterprises (SMEs) of Bangladesh are an integral part of the economy that directly create approximately 7.86 million jobs. Despite the thriving economy, SMEs in Bangladesh have experienced slow ICT adoption in its different sectors. This study aims to find the current scenario and critical issues of ICT adoption in Bangladeshi SMEs. Key informant interviews and focus group discussions have been used in primary data collection. The study chose an appropriate number of industries from major SME sectors, and identified the ICT adoption levels among the common types of business processes in those industries, for example, manufacturing, order management, accounts management, human resource management, marketing and sales. There have been different trends of ICT adoption observed amongst the sectors. The study identifies several factors and challenges for ICT adoption in SMEs of Bangladesh. Expansion of business, management of finances, and the demand of digital marketing acted as the push factors for SMEs to adopt ICT tools. Cash on return opportunities, competition, and the opportunity of streamlining processes through ICT tools are the pull factors for SMEs to adopt ICT tools. The findings of the study have provided reasons for the inability to adapt ICT in business among the business owners. Lack of basic ICT knowledge among the entrepreneurs, unskilled labour, lack of coordination between academia and industry, lack of trust in local ICT service providers, etc. are the few prominent causes of lagging behind in ICT adoption by SMEs in Bangladesh. Many of the policies impacting SMEs have been observed to be generalized and disconnected with the greater vision of a thriving SME ecosystem, which is one of the crucial problems identified in this study. On top of that, implementation of the policies and governmental activities have been found to be inadequate compared to the complexity of the SME sector, and the processes that have been digitized are deemed too difficult for the SMEs to adopt. The study has formulated some recommendations such as reforming VAT policies to incentivize ICT adoption among SMEs, identifying the ICT service requirements among different industry sectors and ensuring availability of those services in the local market, establishing customized training modules for the SMEs along with ensuring affordable services for their management systems.

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1.0 Introduction

Technological progression of industries happens in phases, old and the new technologies used in the first industrial revolution (1750-1840) paved the way for the second industrial revolution (1830-1915). Then with the power of computing technology and nuclear energy paved the path to the third industrial revolution (1969-2010s). In the recent decades, fusion of advances in artificial intelligence, robotics, the internet of things, quantum computing, and genetic engineering are blurring the boundaries between the digital, physical, and biological worlds. Thus, the world is undergoing the process of the fourth industrial revolution.

Bangladesh, a fast-developing country, does not have all aspects of the fourth industrial revolution. To fully adopt the components of fourth industrial revolution, majority of the Bangladeshi businesses and industries first need to be adopted technological components of the third industrial revolution like- ICT tools, internet-based services, etc. In the last two decades due to rapid expansion of ICT and internet infrastructure, Bangladesh has observed a varied degree of digitization in the business processes across all industries. Digitization/integration of value chains, digitization of products and service offerings, digital business models and customer access through digital platforms are the three main components of this stage in digitization. However, this progress is not equally distributed. Some progressive business entities are using IT products and solutions such as Enterprise Resource Planning (ERP), Vehicle Tracking System (VTS), Supply Chain Management (SCM), E-commerce system, advanced accounting tools like Tally in their everyday work. On the other hand, most of the SMEs are yet to adapt ICT tools into their day-to-day business.

Small and Medium Enterprises of Bangladesh are the integral part of the economy. As more companies are entering the sector with the help of technological advancement and expansion, the nascent industry is becoming versatile. The SMEs in Bangladesh are providing millions of jobs, i.e. in 2019, around 6,600,685 people were working in small enterprises, 706,112 people in medium enterprises, and 558,870 people were involved with micro enterprises in

Bangladesh. Therefore, approximately 7.86 million jobs were directly being created by the small and medium enterprises (Abdin, 2019). Currently, SME's share in GDP is approximately 25% (Rahman, 2020) which is assumed to be increased to 32% by 2024 (Asian Development Bank, 2021). Despite the thriving economy, SMEs in Bangladesh have experienced slow ICT adoption in its different sectors. The business sector of Bangladesh has a digital adoption index of 0.35/1, which indicates that the business sector in Bangladesh is lagging behind in digitization (Digital Adoption Index, 2016). Also, on the bright side, Bangladesh has also been recognized as one of the "break-out" economies that is rapidly digitizing its economy (Chakravorti, 2020).

Therefore, it is required to have a clear picture about the current scenario of ICT adoption among SMEs. It is also important to identify the challenges of SMEs' ICT adoption in Bangladesh. Both of the issues have been addressed in this study. The study is also focused on the success factors for efficient adoption of ICT in SMEs, the impact of the ICT adoption of SMEs and their coping mechanisms, and recommended actions for way forward. In the study, ICT adoption was measured according to ICT-based tools usage in various business operations of the organization, for example, order management, accounting management, human resource management, marketing and sales.

It is found from the study that both service and manufacturing SMEs are expanding their businesses rapidly using innovative technologies, but many of SMEs in Bangladesh, especially in the light engineering sector, are unable to fully utilize the ICT infrastructure for several reasons, such as high cost of internet services, lack of uninterrupted electricity supply, lack of trained human capital pool, lack of broadband internet services, and lack of trusted ICT service providers in the rural areas. Many of the agricultural-based businesses are located outside Dhaka, mainly in rural areas. These businesses are facing challenges to use the ICT services available in Bangladesh. Thus, the economy is being deprived from the benefits of having full-fledged SMEs with good ICT infrastructure.

The rest of the article is structured as Section 2 describes the available ICT tools and services for SMEs and relevant research on SMEs in Bangladesh. The research methodology follows to conduct the study is briefly described in Section 3. Section 4 presents the major findings of the study in detail. Prospective recommendations to overcome the challenges and to increase the ICT adoption in SMEs in Bangladesh are presented in Section 5. Section 6 concludes the article.

2. Literature Review

2.1 Availability of ICT Services

2.1.1 Government Initiatives

Bangladesh ranked 147 of 176 on the ICT Development Index 2017 maintained by International Telecommunication Union (ITU), indicating medium to low adoption of ICT in the country (ITU, 2017). Although the global ranking of Bangladesh is low, the ICT sector is one of the fastest growing sectors of its economy. The sector has been declared as the thrust sector by the government. The Information and Communication Technology Division is a government organization for the development and promotion of ICT in Bangladesh. Several broad ICT initiatives taken by the Bangladesh Government are as follows.

- Government sites for taxation and paperwork
- Union Information and Service Centre (UISC) for bringing opportunities for rural under-privileged communities to better access ICT tools and services
- A2i Program
- Automated educational and financial programs, such as Ekshop (https://www.ekshop.gov.bd/)
- Online platforms focusing on the SME sectors of Bangladesh, for example, BSCIC online marketplace (https://bscicemarket.gov.bd/) and e-joyeeta (https://e-joyeeta.com/).

The followings are the few specific Government initiatives in order to digitize the businesses in Bangladesh that, in turn, promote the business organizations in ICT adoption.

Service	Details
EFD (Electronic Fiscal Device)	The device was introduced by NBR in 2020. It works in such a way that if EFD is installed in a shop/business location or at their POS, these businesses do not have to file VAT return docs. Moreover, NBR is trying to come out of the device-centric approach and adopt a cloud-centric approach for this solution. Businesses can adopt this solution with any device of their choice, and the government will provide support to integrate the software with their devices.
Ekshop	Introduced by A2i, Ekshop is a backend aggregator for buyers and sellers of Bangladesh. It also provides cross-border business facilitations for foreign platforms like- Etsy and Amazon. Ekshop

Service	Details
	website provides capacity building training under the feature called Academy[1]. The training is particularly focused on SMEs. Ekshop provides a platform-as-a-service (PAAS) model to 14 different government bodies who are directly working with different industries and sectors. For example, Joyeeta Foundation, Shamabay adhidaptar, Bangladesh Small and Cottage Industries Corporation (BSCIC), etc. They are also providing an e-commerce platform under this modality to female-led SMEs from the Joyeeta Foundation, where thousands of users are using this platform regularly. BSCIC[2] is also doing similar things with Platform as a Service.
UBID (Unique Business Identity)	The Government of Bangladesh, with the help of A2i, is implementing UBID or Unique Business ID solutions for business with a view to overcoming the identification challenges. Once UBID is there, banks and non-bank financial institutes will recognize these SMEs and provide financial services. Government will later connect UBID with EFD, trade license, BIN, TIN, and other government and financial platforms.
CLTP (Central Logistics Tracking Platform)	The Government of Bangladesh, with the help of A2i, is working on implementing CLTP (Central logistics tracking platform). This initiative is inspired by Royal Mail (UK) or Deutsche Mail (Germany). Once the CLTP system is in place, it will become a national database of all types of vehicles to track and build an efficient logistics ecosystem of Bangladesh.
CGRS (Central Grievance Redress System)	The central grievance redress system is a platform for citizens through which they can send a formal complaint to the government of Bangladesh expressing dissatisfaction with any public service providers.
Other Services	Other solutions that the government is working on right now are, ● Ekpay: A payment solution (https://ekpay.gov.bd) ● Ekshopdelivery: A delivery solution (https://ekshopdelivery.com/) ● BPO Delivery: A delivery solution by Bangladesh Post Office (https://bpodelivery.com/)

However, many of the above-mentioned government initiatives are not properly communicated to the respective SME sectors. Therefore, we found that either many of the SME owners are not aware of the concerned ICT services or the offered ICT service does not fulfil the specific requirements of the SME owners. It shows a clear gap between the respective ICT-service initiative and the actual needs in the respective SME sectors.

[1] https://academy.ekshop.gov.bd/

[2] https://bscicemarket.gov.bd/

2.1.2 Bangladeshi Private Sector Initiatives

ICT enterprises in Bangladesh are providing solutions to SME owners in different capacities. Initially most of them wanted to have solutions related to website development and digital marketing, but recently the demand for customized solutions increased. Particularly, some startups which are building solutions based on customized specific needs of the businesses have emerged in recent years.

Several Bangladeshi tech-solutions are catering to the SME sector of the country. Few are mentioned below.

Featured Solutions	Type of Solution/ Business process	Key Features	Google Play Store Downloads (July 2022)
TallyKhata	Accounting Solution	Tallykhata is the number one app for keeping business accounts.	More than 5 Million
SME Vai	ERP Solution	SME VAI is the one stop business solution for SMEs covering: accounting, marketing & legal services.	Not publicly available
Marcopolo.ai	Digital Marketing Solution	General and social media marketing solutions for SMEs.	Not publicly available. Although they claim to serve more than 5000 businesses globally.
ShopUp	Fullstack B2B Solution	Inventory management, credit and last mile delivery	Not publicly available.
sManager/Sheba	Operations/ERP	Manager is a mobile app with which all the work of any business can be managed digitally.	More than 1 Million
TruckLagbe	Logistics/Freight Solutions	TruckLagbe is the largest online truck booking platform in Bangladesh to hire pickup trucks, trucks, covered vans or lorries for business or personal use through an app.	More than 500 Thousand
Sindabad.com	Raw Material Providers	Sindabad.com is the first and largest B2B e-commerce company in Bangladesh.	More than 10 Thousand
Halkhata	Accounting Solution	4.6 starred app for keeping business accounts	More than 50 Thousand
Bondhu	Digital Marketing Solution	Bondhu is a digital marketplace for SMEs to sell their products, bookkeeping, and order management	More than 100 Thousand
Betonbook	Accounting Solution	Betonbook is full stack solution for staff attendance, work and pay management	More than 100 Thousand

One of the major challenges for the above-mentioned private sector ICT-service providers is delivering proper customer service support to the remote SME owners and employees who have insufficient ICT knowledge.

2.2 Relevant Research

According to the study of Lightcastle Partners (Lightcastle Analytics Wing, 2021), the growth trajectory of Bangladesh over the past decade has been outstanding with a consistent economic growth led by Ready-Made Garment (RMG) export, stable foreign exchange reserves, steady remittance flow, public sector investment, and private sector consumption. Despite the outstanding growth, some sectors are not performing as they were expected, such as MSMEs and Agriculture.

Miraz and Habib (2016) reveals that the ICT adoption in SMEs depends on the owner's decision. The findings of the study clearly specifies that the ICT adoption is directly connected to the scope of the firm. In another study, Karim & Gide (2019) emphasizes that electronic banking is able to provide faster and reliable financial services to the customers for which they are happy; the service can develop new competitive advantages for SMEs along with improving their relationships with customers. Arefin and Rahman (2020) conducted a study that indicates that the world's businesses are adopting technologies for sustainability through increasing profitability, competitiveness, efficiency, and effectiveness by offering unique products; and the ICT tools are now available and affordable by the local SMEs compared to recent past. A very recent study conducted by Hossain and Chowdhury (2022) shows a positive impact of the use of mobile financial services (MFS) on the production, sales, and profit of Micro, Small and Medium Enterprises (MSMEs) during Covid-19 pandemic, although majority of the MSMEs have not yet adapted MFS in their business operations. Therefore, the study suggests more incentives and supportive policies to motivate MSMEs to use digital transactions.

Azam and Quaddus (2009) emphasize that perceived compatibility, uncertainty, perceived complexity and Internet usage experience of the SMEs are important for the adoption intention of e-commerce by SMEs. Hoque et al. (2016) states that awareness about benefits, top management support, government support, and financial support are the most crucial determinants of the ICT adoption in rural SMEs of Bangladesh. Islam and Nasira (2017) show that Bangladesh can be technologically upgraded focusing on the positive relationship with new technologies introduction. Findings of this study also show the positive relationship between technology adoption and success for SMEs. The findings of Rahman and Kabir (2020) indicate that ERP solutions can significantly improve the supply chain management systems for SMEs in Bangladesh, because most of the small and medium enterprises are suffering from poor communication problems. The study conducted by Haque and Ahlan (2018) concludes that Information and Communication Technology can boost the performance of general people and improve the overall human capital for poverty alleviation in a society.

Therefore, it is evident that the adoption of ICT in SMEs positively impacts on the growth and profitability of the organization. However, there are challenges and factors that control the level of ICT adoption among the SMEs. The major objectives of this study are to find new insights on these issues.

3. Methodology

The study was based on both primary and secondary research to identify the level of ICT adoption, barriers, and opportunities from a grass-roots level. Number of SMEs in Bangladesh, sectoral overviews, statistical data, and ICT products used in Bangladesh were primarily collected from secondary sources like reports, public databases, articles, and others. Later, to identify the key challenges faced by the SME entrepreneurs and gain deep insights on the related issues, the researchers conducted Key Informant Interviews (KII) and Focused Group Discussions (FGD) with the SME entrepreneurs along with other stakeholders, i.e. National Board of Revenue (NBR), Access to Information (A2i), Ministry of Industries, ICT Division of Bangladesh, ICT entrepreneurs; and industry experts.

The study team divided the respondent SMEs into four groups: manufacturing, agro and processed food, service, and other niche SME sectors (i.e. jewellery, hosiery etc.). SMEs from several industries including light engineering, electric goods, plastics, designer goods, furniture goods, leathers goods, agro and processed food, health services, logistics/transport services, jewellery, and hosiery, participated in the study. The researchers have tried to be uniform in selection of interviewees from all selected sectors, and have been successful to some extent. Data was collected from several locations in Bangladesh to understand the SME clusters, the ICT adoption in those clusters, and derive the implications. Although majority of the interviewees were from Dhaka, several KIIs have been conducted in Jessore, Chittagong, Gazipur and Kishoregonj. Details of the data collection methods are described below.

Desk Research: Comprehensive desk research was conducted to collect data about the different SME sectors and information regarding policies. As the research materials, journals, policy papers, Bangladesh Government reports, and newspapers were used.

Key Informant Interviews: Key Informant Interviews (KIIs) were arranged with the major stakeholder of the SME industry, i.e., SME owners, association representatives from different SME sectors, ICT entrepreneurs who serves the SME, and relevant representatives from the national policy makers and government bodies. The research team included both male and female participation in the KIIs. However, the number of female participations was comparatively low, since the overall SME industry is mostly dominated by the male entrepreneurs. The study team tried to reach more female owned companies, which resulted in finding female respondents in Jessore, Dhaka, and Chittagong.

A total of 33 KIIs were conducted with SME business owners, of which 11 were female entrepreneur and the rest 22 were male SME owners. Nine (8 males and 1 female) KIIs were arranged with the head of different associations relevant to the SME sectors. Nine Interviews were conducted with the personnel representing National Board of Revenue (NBR), Access to Information (A2i), ICT Division of Bangladesh, Ministry of Industry, and several ICT entrepreneurs serving the SME sectors.

Focus Group Discussion: Four focus group discussions (FGDs) with SME entrepreneurs and stakeholders from several industries were conducted using Zoom. FGDs were started after executing half of the KIIs. Therefore, we had sufficient data at hand that triggered more insightful information from the FGDs. The first FGD was focused on the issues of light engineering sectors participated by 3 SME entrepreneurs. Five participants (2 male and 3 female) from the leather goods sector attended in the second FGD. The other two FGDs were participated by SME owners from agro and processed food, and electric and designer goods industry. Four participants (3 male and 1 female) contributed in each of the FGDs. The participants of the FGDs were from different location of the country, i.e., Dhaka, Bogura, Kishoreganj, Mymensingh, and Jessore. Since the FGDs were conducted using Zoom, it was difficult to on board more participants in the FGDs due to the lack of digital literacy among the SME owners.

A detailed sector wise division of the interviews done with the SMEs is given in the Annex. List of the KIIs and FGDs are also provided in Annex for detail.
As the study scope is qualitative in nature, there is a very little scope of quantitative data analysis. Rather, mostly, the effort was given on gathering deep insights from different industries, pattern and trend recognition on ICT adoption among them and learnings from other countries. Majority of the data collected for this study was analysed by using interview transcripts from entrepreneurs and trade facilitation bodies, synthesizing and validating findings from the literature review (academic and industrial reports), Bangladesh government database, industry experts and available public reports, etc.

Although all the major SME sectors were included in the study, the SME market being very fragmented with a variety of products offered, it was difficult in reaching all the actors of the sectors. The study team could not talk to the SME owners from remote clusters. Moreover, it was difficult to understand beforehand if the entrepreneur could give valuable insight. On top of that, arranging online interviews were difficult due to the lack of digital literacy among many of the SME owners.

4. Findings

4.1 Current ICT Adoption in SMEs in Bangladesh

Even as small companies, SMEs have several segments in their businesses, such as accounting, human resource management, sales and marketing, production and so on. From the primary research, it was found that SMEs use ICT tools in their business segments. To understand the current ICT adoption in SMEs in Bangladesh, state-of-the-art tools that are used globally among SMEs (see Table 1) are identified first.

Table 1: State of the Art ICT Tools used in Different Business Processes

Business Process	Types of State of Art ICT tools
Manufacturing	● CAD (Computer Aided Design) software used for development of designs, creating and grading patterns and lay planning. ● CAM (Computer Aided Manufacture) and CIM (Computer Integrated Manufacture) software used for manufacturing planning/optimization, synchronization of machines in the entire manufacturing process.
Financial/Accounting Management	● Globally basic accounting tools like- Excel, Tally, Quickbook, Xero, Freshbook, Wave, etc. ● EPOS (Electronic Point of Sale) software used to speed up sales transactions and keeps account on stock levels.
Operations and Order management	● ERP (Enterprise Resource Planning) software used for HR/payroll management, inventory management, stock level monitoring, order processing, etc. Example- Busy, Sage, Oracle, Microsoft 365, etc.
Sales and Marketing	● Social Media and E-commerce platforms for sales and marketing. ● Communication tools like WhatsApp, Google suit, Microsoft suit, Facebook Messenger, etc.

Many of the globally used ICT tools exist in Bangladesh for SME's operation. Table 2 lists the ICT tools used among Bangladeshi SMEs and industries.

Table 2: ICT Tools Usage across Bangladeshi SMEs/Industries

Business Process	ICT Tools	Industry
Manufacturing	CAD, CAM	Light Engineering and Electrical & Electronics industries
	CAM and CIM	Agro and Processed Food Industry
Finance/Accounting Management	Excel	All industries mentioned in the study
	Tally Khata	Designer Goods, Leather Goods, E&E
Operations/ Order Management	Busy	Plastics Industry
	e-commerce Platforms	Designer Goods, Leather Goods, Plastics, E&E
	ERP Solutions	Health
	App platforms like- Shohoz and TruckLagbe	Logistics
Marketing & Sales	Website	All Industries mentioned in the Study
	Social Media and Digital Marketing	All industries mentioned in the study

4.1.1 Manufacturing

It has been found that limited or no usage of ICT tools has been noticed in manufacturing unit of the SMEs. The following information has been found from primary research:

- Plastics Industry SMEs have limited usage of ICT tools in production.
- Agro and processed food industry also uses ICT tools for production, recipe or product development. Usage of these ICT tools is limited, only some SMEs are using ICT tools for these purposes.

4.1.2 Operations/Order Management

According to primary research, all SMEs have to use some sort of order management processes for streamlining their orders and timely delivery. From the interviews, the following information has been found:

- Several industries such as light engineering, designer goods, leather goods, and electrical and electronics industries have limited usage of ICT tools in order management. Although several of them have websites, order management capacity is limited in those areas.
- Light engineering SMEs have zero usage of ICT tools in human resource (HR) management, inventory management, and production.
- Leather goods, Designer goods, Electrical and Electronics, and Furniture SMEs have limited usage of ICT tools in logistics and HR management.
- Plastics and furniture industries use proper ICT tools in order management, and most of the SMEs in these industries have robust e-commerce platforms or other systems for timely delivery of goods.
- Both of the selected industries in the Service sector use order management ICT tools in their operations. SMEs in the health industries mainly use Enterprise Resource Planning (ERP) software for their order management activities. SMEs in the logistics industries use Vehicle Tracking Systems for their order management activities.
- SMEs in the service sector use ICT tools for human resource management and logistics. Although use of ICT tools is very limited for both industries in these supporting activities, there is limited adoption of ICT tools in these departments. SMEs in this sector are using communication applications like WhatsApp for contact with employees.
- Agro and processed food industry has limited adoption of ICT in their order management activities. SMEs in this industry have websites, but only a few of them are equipped with standard order management software.

4.1.3 Financial/Accounting Management

Accounting is an integral part of any business, same goes for SMEs in Bangladesh. While several SMEs have been using accounting software such as Excel, Tally Khata, and Busy, there are some gaps in their level of ICT adoption.

- Leather goods, designer goods, light engineering, electrical and electronics industries have limited usage of ICT tools in their accounting processes. These industries have been lagging behind in ICT adoption as one of their most important segments, the finance department, is not using ICT tools.
- Plastics and Furniture industries are found to be adept in accounting software. Companies in the plastics industry are using applications like Busy for complex accounting management.
- Both Health and Logistics industries use accounting software for their companies. SMEs in these industries mainly use Excel or Tally Khata for accounting purposes such as salary book maintenance, income statements, and taxation.
- The ICT adoption in accounting management is also limited for the agro and processed food sector. SMEs in this sector are using Excel or Tally Khata for their accounting tasks.

4.1.4 Marketing and Sales

Although having a separate department for marketing and sales is not traditional for small companies in Bangladesh, the processes are practiced for business expansion and revenue generation. From the interviews, the following findings have been derived:

- Leather, designer goods, electrical and electronics, and furniture industries are using ICT tools in their marketing and sales activities in a limited manner, for example, through Facebook. They are using traditional methods on a larger scale compared to formal digital marketing methods.
- SMEs in the plastic industry are using digital marketing and sales in their business. Several SMEs in this sector are using websites and e-commerce platforms for sales purposes.
- ICT tools usage is limited in marketing and sales for the service sector SMEs. Both health and logistics industries have websites but the extent and marketing level of those websites are unknown. Some of the SMEs in this sector have e-commerce platform or dedicated marketing team for increasing sales among business clients.
- SMEs in the agro and processed food sector are using social media and digital marketing for their marketing and sales. However, the usage is limited in this case as well.

4.2 Analysis on Current ICT Adoption in SMEs in Bangladesh

Businesses do not digitize themselves overnight. Most of them go through a process of gradual digital transformation over years. Willcocks et al. (2000) propose a framework to understand how businesses gradually overcome their failings or gaps and gradually adopt higher levels of ICT tools (see Figure 1). According to the framework, initially SMEs start with basic levels of IT adoption with mobile phones (and smartphones). Once they overcome their anxiety gap and perceive the value of ICT adoption to be higher, then they jump into bit higher ICT adoption level and start to adopt tools like computer, software, IT enabled hardware, etc. Then once they overcome internal organizational incompetency, they start to adopt tools like-websites, internet, ecommerce, etc. Finally, after years of capability building they finally graduated into a high ICT adoption level.

Table 3: Defining Different Levels of ICT Adoption (Willcocks et al, 2000)

Levels of ICT Adoption	Color Code
Basic Level: Basic communication with mobile phones and smartphones.[3]	B
Low ICT adoption: Basic IT involving computers equipped with basic software and hardware	L
Medium ICT Adoption: Advanced communication level with emailing, internet browsing, video conferencing, file sharing, creating websites, ecommerce	M
High ICT Adoption: Computers equipped with advanced software, enterprise resource planning, inventory management, customer relationship management	H

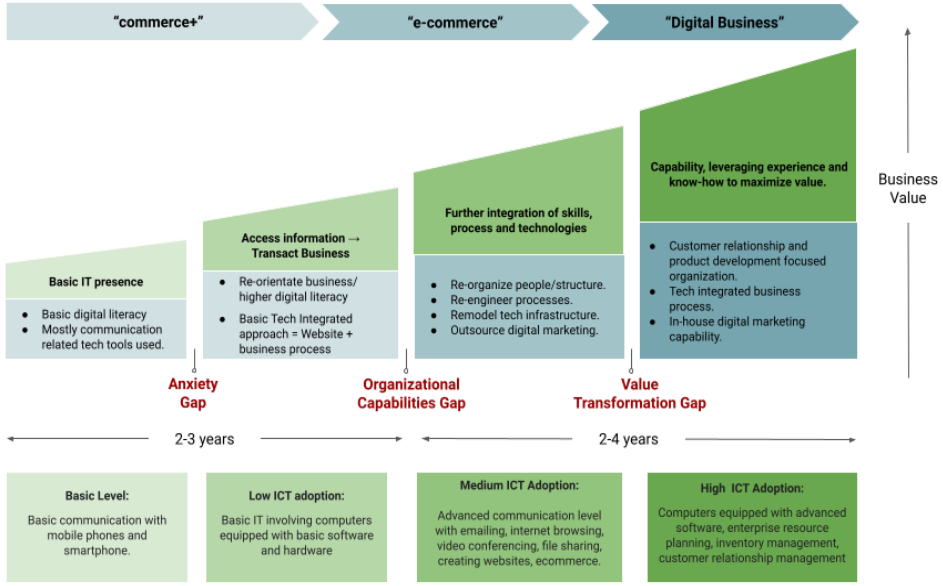


Figure 1: Moving to E-business Framework (Willcocks et al, 2000)

[3] In "Moving to E-business Framework" (Willcocks et al, 2000), they mentioned about mobile phones and Fax. But Fax was a previous generation communication equipment replaced by PCs, email communication system or particularly smartphones. So, we replaced it with smartphone. (48% of Bangladeshis have smartphone, source: The Daily Star)

Considering this framework, the researchers map different levels of ICT adoption of four major business processes in SMEs, i.e., Manufacturing, Order/Operations management, Accounting management, and Marketing & Sales. The definition of the levels (see Table 3) is mentioned in the Moving to E-business Framework (Willcocks et al, 2000). The researchers make use of these levels to map out the current ICT levels across SME sectors of Bangladesh (see Table 4).

Table 4: Heatmap of Observed ICT Levels in Bangladeshi SMEs [4]

Industry	Manufacturing	Operations/Order Management	Finance/ Accounting Management	Sales and Marketing
Light Engineering Industry	L	B	L	B
Leather Goods Industry	B	L	L	L
Electric Goods Industry	L	B	L	B
Designer Goods Industry	B	L	M	M
Furniture Goods Industry	B	L	L	M
Plastics Industry	L	M	M	M
Health Industry	(Not applicable)	M	M	L
Logistics Industry	(Not applicable)	M	M	L
Agro and Processed Food Industry	B	L	L	M

4.2.1 SWOT Analysis of Bangladeshi SMEs to Adopt ICT Tools

SWOT analysis is a strategic planning and management techniques used to identify the strengths, weaknesses, opportunities, and threats. Figure 2 shows a holistic picture of the SMEs in Bangladesh. At the inflection points towards the ICT adoption, Bangladesh has many strengths and weaknesses, and several threats the country's SMEs have to tackle to capture the opportunities. Strengths for the SMEs include the country's vast population and large number of internet users, along with that the government is also helping SMEs in ICT adoption through training and programs. Weaknesses of the SMEs include low digital literacy and their low perceived value of ICT tools. Majority of SMEs do not have the technical capacity it requires for a business to fully function in a digital environment. Increasing number of digital consumers, several new business opportunities, and low-cost solutions are some of the lucrative opportunities for Bangladeshi SMEs. But the SMEs do have to tackle several challenges including increase in unskilled labour and high competition.

[4] No SME sector showed high ICT adoption. Reasons for varied ICT adoption among SMEs for different business processes are discussed a bit later in this chapter.

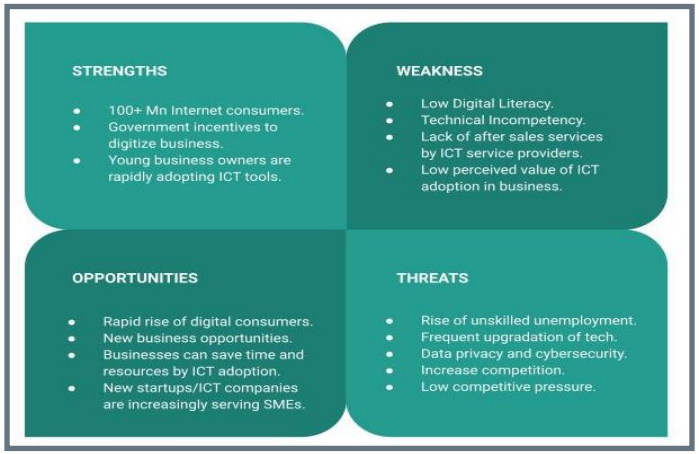


Figure 2: SWOT Analysis of SMEs in Bangladesh

4.2.2 Challenges of SME Sectors to Adopt ICT Tools

To explore the SMEs' future prospects, Table 5 shows key factors for Bangladeshi SMEs to adopt ICT tools and their key bottlenecks.

Table 5: Factors and Challenges of SME Sectors in ICT Adoption

Sector	Key Reasons to adopt ICT tools	Key Bottlenecks to adopt ICT tools
Leather Goods	• Leather goods industry works both closely with other businesses and end customers directly. So, they are heavily dependent on direct and indirect sales and marketing digital channels.	• Lack of technical capacity/digital divide to adopt ICT tools. The SMEs' manpower is dependent on artisanship and craftsmanship of traditional local less educated shoe-makers.
Light Engineering	• Government pushes to adopt ICT tools.	• VAT/tax issues push them away to adopt ICT tools like Excel or Tally. • Lack of technical capacity/digital divide to adopt ICT tools. Manpower in the light engineering sector is dependent on the skills of untrained, less educated masters and their apprentices. • Business centric clients do not give them incentive to adopt easy ICT tools like- social media, e-commerce, etc. • Heavy reliance on imported finished engineering goods and weak back

Sector	Key Reasons to adopt ICT tools	Key Bottlenecks to adopt ICT tools
		linkage support from local industries are hampering the growth of this sector.
Electric Goods	• Government pushes to adopt ICT tools.	• VAT/tax issues push them away to adopt ICT tools like Excel or Tally. • Lack of technical capacity/digital divide to adopt ICT tools. • Heavy reliance on Chinese, Pakistani, Indian made electronic goods, hindering the growth of local manufacturers.
Plastics	• Robust growth in the local consumer market is leading SME owners to adopt digital platforms like- social media, e-commerce, and logistics solutions. • Owners willingness to adopt ICT tools is high among most of the Plastics manufacturers. • Rapid expansion of business is pushing SME owners to adopt ICT tools to bring transparency and ensure effective use of resources.	• Lack of trusted local ICT service providers, after sales service.
Designer Goods	• Robust growth in the local consumer market is leading SME owners to adopt digital platforms like- social media, e-commerce, and logistics solutions. • Owners willingness to adopt ICT tools is high.	• Lack of technical capacity/digital divide to adopt ICT tools. Lack of easy to use solutions for POS, order management, etc.
Furniture Goods	• Robust growth in the local consumer market is leading SME owners to adopt digital platforms like- social media, e-commerce, and logistics solutions. • Increased contract manufacturing practice is pushing SME owners to focus on sales and marketing of their business.	• Lack of technical capacity/digital divide to adopt ICT tools. Manpower in the furniture sector is dependent on the skills of untrained, less educated masters and their apprentices.
Health Industry	• Necessity to have a database of a huge pool of patients pushed them to adopt ERP solutions.	• Lack of technical capacity/digital divide to adopt ICT tools in management.

Sector	Key Reasons to adopt ICT tools	Key Bottlenecks to adopt ICT tools
	• Robust competition and demand in the market pushes them to market their services and adopt digital platforms like- social media and websites.	
Logistics Industry	• High risk asset nature of heavy vehicles, pushes logistics SME owners to adopt vehicle tracking systems. • Push from local digital logistics platforms to adopt ICT tools.	• Lack of technical capacity/digital divide to adopt ICT tools
Agro and Processed food industry	• Heavy local demand paves the way to increased usage of social media, e-commerce and digital logistics platforms.	• Lack of technical capacity to adopt ICT enabled production systems and assure high quality in manufacturing.

The ICT adoption in SMEs has been observed to be low overall in the sectors chosen for this particular study. It has been measured according to tools usage in various business operations, for example, order management, accounting management, marketing and sales. Some companies have been observed to have ICT tools used in human resource management, production, inventory management, and logistics.

A large number of companies have limited use of ICT in accounting management as they were only using Microsoft Excel for all accounting activities. Also, a large number of companies use social media and websites for sales and marketing, along with order management. SMEs that are customer focused have a higher tendency to build websites or invest in social media to reach clients. On other hand, SMEs with business clientele focus on personal networks and connections to reach their clients. Some companies, especially in the service sector, are using vehicle tracking systems and enterprise resource planning software in their business operation.

Some mature and medium sized companies in the plastics industry are using advanced ICT tools such as Busy and Tally Khata, but these tools are not used by many others. However, this is because the majority of the organizations in this sector are mostly micro and small organizations; and the size of the organization impacts on the ICT adoption for the respective organization. In the following section, we will present the facts regarding the ICT adoption among the SMEs and the critical analysis on the facts follows later.

4.2.3 ICT Adoption among Women-led SMEs

Female SME owners are not common across all the SME sectors in Bangladesh. In some particular sectors their presence was not observed, for example, light engineering, electrical and electronics goods manufacturers, and furniture. In other sectors their presence has been noticed in various degrees. They are highly active in small and micro-enterprises of designer goods, agro and processed food sectors.

Female SME owners engaged in designer goods, and agro and processed food sectors have been observed to be actively adopting ICT tools for sales and marketing. A huge number of them regularly use social media platforms to communicate with clients, ecommerce platforms to sell their goods, and e-logistics platforms to deliver goods to their clients. From the primary study, it has been found that female SME owners are more willing to participate in training and more interested to use ICT tools for their day-to-day business operations. In the manufacturing process neither male nor female owners are observed to have a higher ICT adoption tendency.

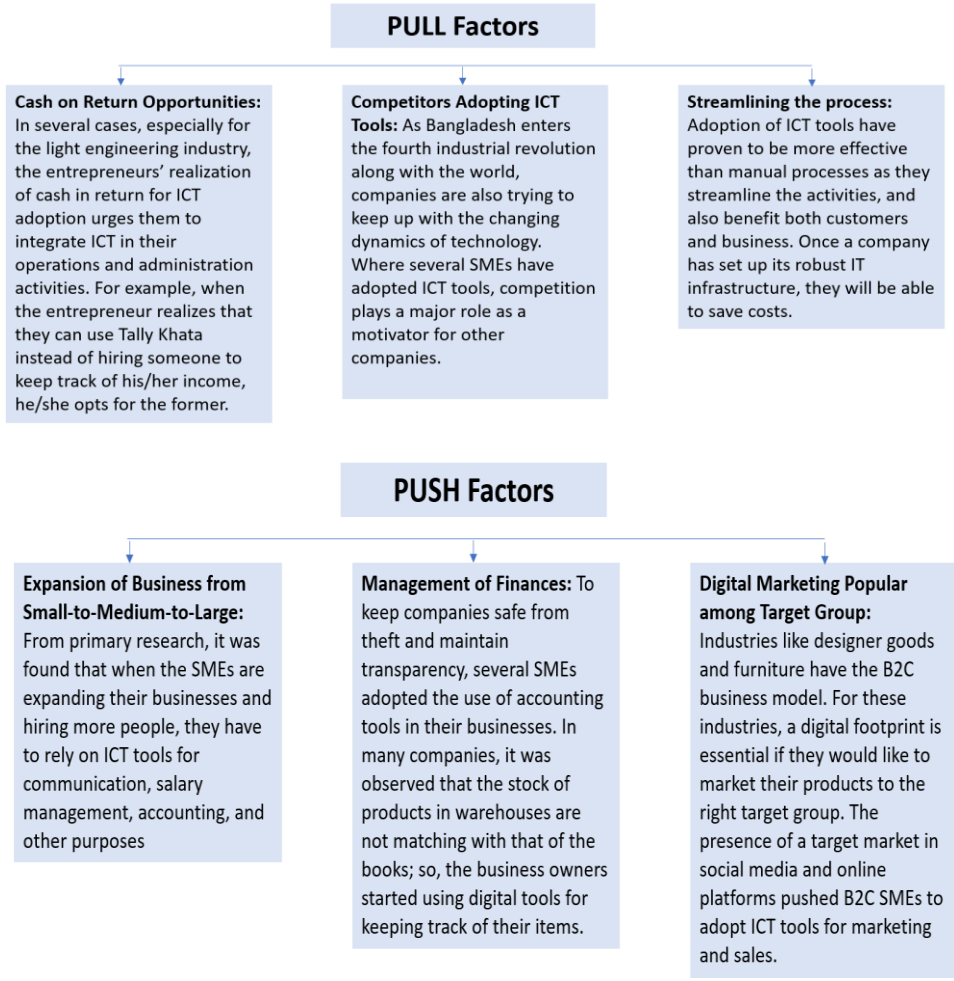
In case of medium and semi-large sized enterprises, the presence of female owners have not been noticed. Moreover, it has been observed that as the size and operational complexity of the enterprises grow so does the nature of ICT tools and complex ICT tools are mostly used by males.

4.3 Driving Factors of ICT Adoption in SMEs

There are several driving factors for SMEs in Bangladesh to adopt ICT in their businesses. ICT tools can provide different benefits across a wide range of inter and intra firm business operations and transactions. Certainly, these applications are able to contribute to improving information and knowledge management in the firm itself and reduce transaction cost along with increasing the speed and reliability for B2B and B2C transactions. Additionally, these tools are effective for improving external communication and services to the new customers. SMEs are driven by the following factors for ICT adoption.

4.3.1 Push-Factors

In this context, push factors are mostly the internal factors that provides thrusts or incentives to SMEs to adopt ICT tools. From the primary study, it is observed that push factors among Bangladeshi SMEs are created due to growth, managing the financial growth and sustaining or facilitating the growth through marketing.



4.3.2 Pull-Factors

On the other hand, pull factors are mostly external factors that attract the SMEs to adopt ICT tools. Among Bangladeshi SMEs they were mainly due to pressure from competitors and resource optimization or saving cash burn.

4.4 Existing National Policies Impacting ICT Adoption

Government, policy stakeholders, private sectors and development organizations are increasingly working to put necessary policies and guidelines to make the SME sector structured, and align with the development goal of Bangladesh to be a developed nation by 2041. SMEs grow with the help of multiple components in

the business-industrial and academic ecosystem. So, the policy support is also a multi-pronged issue.

The study team has found that a large number of the policies do not provide any specific directions for SMEs or business in general. Particularly, the educational policies lack any linkage of local TVET (technical and vocational education and training) centers to support the local business/SMEs, as lack of technical knowledge is a serious issue in SME development. Also, it is observed that national educational policy 2010 (Ministry of Education, 2010) provides some directions to have industry and academia collaboration. But it lacks any suggestion on industry demand-based education, as many Bangladeshi students face challenges that their education has little or no demand in the local market. Moreover, businesses regularly struggle to find necessary talents to hire.

Also, in the National Skill Development Policy 2011(National Skills Development Authority, 2014), it gives general directions for SMEs to provide capacity development training for the workers at the workplace. But from field observation, TVET centers or educational institutions do not cater to the local businesses' skills or workforce requirements. Connecting skills development policy and SME policy to mitigate that challenge would be very helpful for SME sectors in general.

In general, policies are not designed to provide incentives to SMEs to adopt ICT tools, infrastructure, technical manpower, etc. Also, without proper data and metrics to track ICT adoption in SMEs, Bangladesh cannot measure and strategize its ICT adoption policies for SMEs.

Below we have discussed several policies in Bangladesh related to ICT and SME or business development in general.

Table 6: Act and Policy Impacting ICT Adoption in SMEs of Bangladesh

Policy/Act/Law	Aspects Supporting ICT Adoption in SMEs	Weakness or Gaps in Supporting ICT Adoption in SMEs
Bangladesh National ICT Policy-2018 (Information and Communication Technology Division, 2018)	Section 4.3 of ICT policy states that, "*Updating the syllabus in line with workplace needs and enhancing collaboration between educational institutions and industries*."	This particular policy has no direction to provide ICT training based on industry needs, and lacks directions of the ICT training infrastructure based on the localized needs of the SME clusters. Moreover, it does not specifically address how to increase the collaboration.
	Section 6.5 of ICT policy states that, *"Creating the Necessary Environment to Encourage the Use of Information Technology in Trade"*.	In this specific case, if one wants to promote the usage of commercial off the shelf (COTS) software in SMEs, the specific action will be diverse. It is noted here that although COTS software is widely available, these are not used in many SMEs due to lack of digital literacy among the employees of SMEs and improper after-sales support by the local software companies.
National Digital Commerce Policy-2018 (WTO Cell, 2019)	Section 3.1.2 of National Digital Commerce Policy states that, *"In conducting digital commerce, companies shall comply with the existing rules and regulations of the country."*	However, there are no traditional rules and regulations for digital commerce in Bangladesh. This may indicate compliance of any rules and regulations when doing digital commerce. Therefore, confusion remains as to what will be followed by the businesses.
Digital Security Act-2018 (Legislative and Parliamentary Affairs Division, 2019)	Section 19 (e) (1) of Digital Security Act 2018 states that, *"If a person intentionally produces or markets spam, or attempts to do so, or sends unsolicited mail, for the purpose of marketing a product or service, without the consent of the sender or the customer, such person shall be liable for the act and it will be considered a crime."*	The law does not identify what sort of marketing emails are allowed for corporations and SMEs. In several cases, SMEs and organizations send email to their contacts without taking permission, whether this is a crime and on what ground is not identified.
SME Policy 2019 (Ministry of Industries, 2020)	Section 4.6.3.1 of SME Policy 2019 states that, *"Provide training to individual entrepreneurs on freelancing."*	However, SME entrepreneurs are not freelancers in general. Therefore, it is unclear as to what they will do with freelancing training.
National Industrial Policy 2016 (Ministry of Industries, 2016)	Section 5.2.3 of National Industrial Policy 2016 states that, *"Training for entrepreneurs will be continuous to enhance their capabilities as well as market connectivity and market expansion activities will continue."*	The policy is very broad and does not focus on what skills to acquire for the founders along with what kind of training will be provided for the entrepreneurs.

VAT and Income Tax Issues

VAT and tax are costly to bear for SMEs in Bangladesh. There are issues like double VAT charges where VAT is applied during purchase of raw materials and again on sales of finished goods. As VAT is added in two instances, the seller must ask for higher prices from customers, which in turn, reduces the demand for that certain product in the market (Khalily, Shariat-Ullah, & Tareq, 2019). This

particular policy also leads to lack of transparency among SMEs in accounting practices, and they tend to hinder the adoption of ICT tools related to accounting and finances in fear of being exposed to VAT-Tax officials with the actual production and sales.

The issue was raised to the representatives of the NBR and the Ministry of Industries. The NBR is working hard to correctly identify all the business transactions across industries. As per the opinion of the NBR representatives, if identification of all the transactions could be done accurately, the issue will be resolved. The SMEs can claim for tax rebate when such a situation (double taxation) has been raised. The NBR has already introduced EFD (Electronic Fiscal Device) for organizations, which is a device-centric solution to address the VAT issue for an organization. Moreover, NBR is trying to come out of the device-centric approach and adopt a cloud-centric approach as the solution which will be scalable for a large number of organizations efficiently. The representatives of the Ministry of Industries inform that they are aware of this issue and are negotiating with the NBR and the business leaders to come up with an acceptable solution. They hope to address this issue in the upcoming national industry policy.

5. Recommendations

From the study the authors have realized that there are three major broader bottlenecks, which are,

i. Issues related to VAT/tax policy,
ii. Access to affordable and inclusive public and private ICT solutions, and
iii. Lack of capacity in SMEs to adopt ICT tools.

We have formulated recommendations based on these broader issues.

5.1 VAT/Tax Issue Related Strategic Recommendations (VISR)

VISR 01: Provide Tax Incentives for ICT related Investment			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
SMEs pay VAT twice; during import and when making a sale. The VAT/TAX policies can be revised to provide incentives to SMEs who adopt ICT tools in their financial and other business-related	• ICT Division • Ministry of Industries • NBR	-SMEs will align their incentive with ICT investment. -Adoption of ICT tools in financing and accounting management to increase transparency. - Gradual adoption of ICT tools in other business management systems to increase efficiency.	All sectors
management systems.			
Description: Benefits from ICT investments spill over to the suppliers, competitors, and customers. A growing number of nations provide tax incentives for ICT investment. Bangladesh should provide incentives such as accelerated depreciation for ICT investments, tax rebate for employees training programs, tax incentives not only for ICT equipment but also for software to boost ICT adoption among SMEs.			
VISR 02: Provide Tax Incentives for hiring technical talent and training of existing employees.			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
SMEs lack technical talents and most of the time lacks incentive to hire relatively expensive technical talents. By this policy a bridge to connect academia and industry will be established.	• ICT Division • Ministry of Industries • NBR • Ministry of labor.	-SMEs will align their incentive with hiring technical talents or upgrading skills of their existing employees. -Adoption of this policy will help tertiary educated and vocational-technical graduates to land jobs in SMEs and help to reduce the unemployment rate.	All sectors
Description: Providing tax incentives for hiring technical talent and training of existing employees in SMEs can be mutually benefitting for both SMEs and the government. On one hand, it will encourage SMEs to invest in ICT tools as their expenses will be reduced and their organizational capacity will increase; on the other hand, the unemployment of highly educated technical talents will decrease. The method of VAT/TAX payment and incentives for this policy also needs to be streamlined and easy to understand. The present system is difficult to understand for many, including the SMEs.			

5.2 Development of Inclusive ICT Service Ecosystem Strategic Recommendation (DISESR)

DISESR 01: Increased Awareness and Access to Digital Government Services.			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
Government is spearheading some fundamental digital government services, but most SMEs need to be aware of them or have easy access to these digital services.	• ICT Division • a2i • Ministry of Industries	-SMEs will interact digitally to get government services and business credentials, i.e. trade license, TIN, which will expedite the business operations and forces SMEs to learn basic know-how regarding ICT -SMEs will feel comfortable to use ICT tools in their business operation	All sectors
Description: Digitization of loan schemes, VAT/TAX payment (through app), and other government services will make the administrative system easier for SMEs, and reduce their cost as well. Digitizing the systems will also encourage SMEs to learn the digital methods of completing these processes.			

DISESR 02: Knowing the nature of ICT services required for individual industry			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
Development of system requirement documents for different business operations in each industry.	● Industry associations ● BSCIC ● Ministry of Industries ● SMEF	-Increase the availability of the required ICT services, which in turn promote business growth - Increase ICT adoption	All sectors: Manufacturing, service, and Agro & Processed Food will be able to get customized software.
Description: SMEs in Bangladesh are very dynamic and they will not fit into any "one size fits all" model for ICT adoption. Needs of different industries for similar business operations vary significantly, and so ICT tools and services also need to be customized for each sector. So, the facilitating organizations need to understand industry-specific requirements of ICT tools to improve ICT adoption in SMEs.			

DISESR 03: Customized (based on individual sector's need) and inexpensive ICT solutions for SMEs			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
Development of low-cost customized accounting software, business management software, marketing tools, and training modules for employees	● Startups ● IT/ITES companies ● Local digital marketing service providers ● Ministry of Industries	-Customized software will help the SMEs in adoption of ICT tools -The employees will be trained easily with customized software	All sectors: Manufacturing, service, and Agro & Processed Food will be benefited from customized software.
Description: As the customized ICT tools are introduced for different industry SMEs, it is important that software are affordable, so that small entrepreneurs can afford them. The benefits of introducing affordable ICT solutions would be easy training for the employees, and quicker adoption of ICT for the SMEs.			

DISESR 04: Local IT entrepreneurs serving local SME clusters			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
Policy level support for local IT entrepreneurs and Tax benefits for both IT entrepreneurs and SMEs	● Startups ● IT/ITES companies ● ICT Division ● Ministry of Industries ● NBR	-Low cost of ICT products and services for SMEs -Money stays within the local economy	-All sectors
Description: When local SMEs take services from local ICT service providers, the money stays within the local economy, and the businesses will be allowed to flourish, making a sustainable system. The local ICT service providers will also be able to provide low cost services, which in turn benefits the SMEs further.			

DISESR 05: Introduction of certified ICT service providers for SMEs			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
Trust is an issue for several SMEs. Certification of ICT service providers will help in gaining trust of local SMEs.	● ICT Division ● BASIS ● Academic Institutes ● e-CAB	Willing SMEs who are now challenged with trusting the local ICT service providers will use ICT services when this recommended action is executed.	-All sectors
Description: Although SMEs will be benefited by taking services from the local IT service providers, there are certain trust barriers to this solution. Certifying the IT companies might allow them to gain the trust of local SMEs.			

DISESR 06: ICT fairs for connecting SME owners with ICT solution providers			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
-Physical ICT fairs -Can be included in SME fair	● SME Foundation Bangladesh ● ICT Division	IT fairs will educate several SME owners about IT products that could benefit them.	All sectors
Description: To further establish a relationship of trust and reliability between local IT companies and SMEs, an ICT fair focusing on the SMEs can be introduced. The SME fair is a yearly event in Bangladesh, IT companies may advertise their products in this fair as well.			

DISESR 07: Benchmark ICT Use among SMEs			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
-Track ICT adoption metrics among SMEs. - Track ICT usage among households.	● SME Foundation Bangladesh ● ICT Division ● BASIS	- Bangladesh government and relevant policy stakeholders can track the progress and take evidence-based decisions to formulate ICT adoption strategies both for SMEs and the general public.	All sectors
Description: Bangladesh cannot manage if it does not measure the ICT adoption among SMEs and households. The Bangladesh government with the help of SMEF, BASIS, and ICT Division shall measure ICT adoption among SME. They shall track some of the metrics like- number of companies with a website, quantity of ICT capital investment, number of technical manpower, etc. Bangladesh has already conducted one national ICT household survey in 2018-19 [5]. In the future, ICT household surveys shall include metrics like- amount of e-commerce purchase, use of online banking services, mobile financial services, usage of phone calls and internet data from telecom companies, etc. These shall be done regularly and the findings shall be triangulated with the SME ICT adoption survey in the near future.			

[5] https://a2i.gov.bd/wp-content/uploads/2020/04/Top-Line-Report_Bangladesh-National-ICT-Household-Survey.pdf

5.3 Capacity Development of SMEs in ICT related Strategic Recommendation (CDSISR)

CDSISR 01: Conduct behavioral change campaign/training & Training for ICT Capacity Development of SMEs.			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
SMEs lack understanding of the value provided by ICT adoption, and have issues with perceived ease of use of ICT tools. Before technical capacity development they require capacity development related to these behavioral issues.	● SMEF ● BSCIC ● Industry associations ● a2i/Muktopaath ● Bilateral and mult-lateral organizations, ● Donors or Foundations	● SMEs will understand the value of adopting ICT tools in their business processes. ● SMEs will overcome the fear of using ICT tools.	-The B2C industries will be impacted greatly for marketing and sales -The B2B industries will have better management and accounting processes
Description: Before providing capacity development training to SMEs, they require training to tackle some behavioral issues related to lack of understanding of value proposition by ICT tools and fear of using ICT tools. Then they shall be provided with technical training. SMEs require training in using basic ICT tools, along with accounting, management, and digital marketing tools. Their outcome from this training would be removal of bottlenecks in marketing and sales, along with improvement in business processes and accounting which would eventually result in higher profit for the companies. The chain reaction may start with the SME owners, and then the employees can be trained. Different approaches can also be adapted based on the company's business model.			

CDSISR 02: Development of vocational training centers to serve local SMEs or SME clusters			
Core Provisions	Possible Lead for Implementation	Ecosystem Outcome	Impacted Sectors
Vocational training centers based on local needs. (For example: teaching SME owners of Tangail how to search and design online)	● BTEB ● SME Foundation Bangladesh ● Industry associations	Different locations in Bangladesh specialize in different things, and focusing on this aspect will result in effective solutions.	All sectors
Description: Vocational training has always been a practical and fast approach for adoption of anything new. The training centers will improve the knowledge and expertise of SMEs in several locations of Bangladesh, and may even inspire others to open their own businesses.			

6. Conclusion

This study presents findings on the ICT adoption in SMEs of Bangladesh. The majority of the SMEs in Bangladesh have a low or basic level of ICT adoption. It was found that ICT adoption was more in the service sector compared to that of the manufacturing and agro and processed food sectors. Industries in the service sector are using ERP solutions and Vehicle Tracking Systems, whereas the majority of industries in manufacturing and Agro and Processed Food sectors are using Microsoft Excel for accounting management.

The study identifies several factors and challenges for ICT adoption in SMEs of Bangladesh. Expansion of business, management of finances, and the demand of digital marketing act as the push factors for several SMEs to adopt ICT tools in their business operations. Cash on return opportunities, competition, and the opportunity of streamlining processes through ICT tools are the pull factors for several SMEs to adopt ICT tools in their business activities. The study recommends building a self-sustainable environment for the SMEs in Bangladesh. To be self-reliant, the SMEs require capacity development training in various aspects. Along with training, they require ICT tools that are catering to their needs. The SMEs also need inexpensive ICT services, and this is found to be a great opportunity for the local ICT service providers, who are also small businesses, to provide ICT services to the SMEs. The study finds that there is a lack of trust between the SMEs and local ICT service providers and suggests the need for certification. Introducing certified ICT service providers will create a trustworthy environment and allow the SMEs to enter the digital world. Another finding of the study is the governmental bottlenecks for the SMEs, such as complicated VAT/TAX processing systems and the presence of high VAT/TAX for these small businesses. Revision of VAT/TAX policy is essential for smoothening the path towards digitization of SMEs in Bangladesh.

SMEs are the vital parts of the economic development of Bangladesh. Our economy is as good and robust as the state of our SMEs. Bangladesh will not be one of the key economies in the age of the fourth industrial revolution unless its industries adopt technological solutions. Technological tool adoption generally happens in two stages; first the industries adopt shallow and relatively cheap tech solutions like (IT/ICT tools), and then they adopt resource intensive deep technological solutions (AI, cyber-security, robotics, etc.). Unless Bangladeshi SMEs or industries adopt simple IT/ICT tools, they will not be able to be part of the fourth industrial revolution. Moreover, ICT adoption among industries happens in phases. First, they get accustomed to basic communication tools (mobile phones, email, website) and then gradually move up to complicated ICT solutions (ERP, CRM, advanced financial software, etc.). Unless significant numbers of SMEs adopt simple ICT tools, the SME sector as a whole will not graduate upwards in terms of ICT adoption.

Finally, policy stakeholders and ecosystem-enabling organizations need to understand that ICT adoption among SMEs will not happen unless these policies help to create a conducive environment of 360-degree development for SMEs. Policies and programs need to be supported from a human capital or capacity development perspective. In addition, cheap and scalable digital infrastructure, SME friendly Tax/VAT policies, implementation of regulations, etc. have to be ensured. ICT adoption is just one of the vital components of this complicated musical orchestra. Unless other components play their role, it will be a challenge for Bangladesh to see a beautiful symphony of SME development in the coming years.

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Case Study

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Leading through innovation: The role of BCSIR in facilitating Small and Medium Enterprises in Bangladesh

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Abstract

This paper explores and describes the innovative role of Bangladesh Council of Scientific and Industrial Research (BCSIR) in enabling technology-based Small and Medium Enterprises (SMEs) in Bangladesh. Using a descriptive research approach, this study finds that BCSIR has developed 1016 industrial production processes by its scientists from 1967 to 2021. Out of those, 372 processes have been patented while 396 processes have been leased out to entrepreneurs. So far, products of 120 lessees are now available in the market. BCSIR, representing the leading industrial research organization in Bangladesh, is relentlessly supporting small and medium entrepreneurships. As such more than 16,000 employees are engaged directly and indirectly in the industrial production and marketing processes, which have been invented by this pioneering organization. This paper sets a benchmark to (re)assess the technologies of BCSIR in view of upholding small and medium entrepreneurship in Bangladesh with necessary policy implications.

Keywords: technology-based entrepreneurship, industrial production, marketing process, SMEs, BCSIR.

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1. Introduction

Small and Medium Enterprises (SMEs) are increasingly considered as the nucleus for economic growth, both for the developing and developed worlds, by creating more and more job and income opportunities (Chege & Wang, 2019; Fiseha & Oyelana, 2015; Gherghina et al., 2020; Rotar et al., 2019). In Bangladesh, this sector is changing the face of the economy through employing nearly 24 million people (Hossain, 2021). The exponential growth has been evident as the sector created 1.5 million jobs between June 2009 to June 2014 (Khalily et al., 2020). SMEs are playing a crucial role for the country's accelerated industrialization, employment generation, and poverty reduction. On a rough estimate, they account for 45 percent of manufacturing value addition, 80 percent of industrial employment, 90 percent of total industrial units, and 25 percent of the labour force (Bangladesh Bank, 2008). Their collective contribution to the export earnings varies from 75 to 80 percent with a significant impact on the country's Gross Domestic Product (GDP) calculations (Khalily et al., 2020). The total number of SMEs in Bangladesh is estimated to be 79,754 establishments; of them, 93.6 percent are small and 6.4 percent are medium enterprises (Khalily et al., 2020).

Considering its relative importance to the economy, the government of Bangladesh has identified SMEs as the priority sector for transforming Bangladesh into a middle-income country. Subsequently, the Central Bank, Bangladesh Bank, has been found playing an instrumental role in designing and implementing SME sector development initiatives within its broader development financing agenda (Bangladesh Bank, 2008). One important insight highlighted in the policy document is the strength of SMEs to promote inclusive growth via bridging the urban-rural income gap since the establishments are located dispersedly throughout the country.

In search of the critical factors contributing towards the development and success of SMEs, several studies have been conducted considering diverse contexts (Akpan et al., 2020; Al-Mahrouq, 2010; Al-Mubaraki & Aruna, 2013; Al-Qershi et al., 2021; Chege & Wang, 2019; Chong et al., 2011; Lee, 1991; Ng & Kee, 2012; Subrahmanya et al., 2010; Zwolak, 2022). The empirical evidence reveals that organizational innovation, technological support, and entrepreneurial competence remain salient for SMEs success (Akpan et al., 2020; Al-Mubaraki & Aruna, 2013; Chong et al., 2011; Ng & Kee, 2012). Al-Mubaraki and Aruna (2013) found that the technology adoption in SMEs has a huge impact on their profit, growth, and market share. Subrahmanya et al. (2010) conducted a study in India and explored a positive relationship between innovation and the growth of

SMEs. Similarly, in a Polish SME context, Zwolak (2022) identified that patents have supplemented the share of process and product innovation by 10 percent, which in turn increased the number of enterprises significantly between the years 2015 to 2017. In a recent research, Akpan et al. (2020) reported that lack of adoption of state-of-the-art technologies has challenged and inhibited SMEs of the developing countries to gain sustained competitive advantage and to ensure survival during the outbreak of Coronavirus disease (COVID-19). Representing the developing economies, Bangladesh needs to facilitate continuous adoption of the modern technology in SMEs so as to create impacts on the economy. In this pursuit, Bangladesh Council of Scientific and Industrial Research (BCSIR) is playing a pivotal role by extending innovation support through technological enhancement in various processes of the enterprises.

There are two main available sources of technologies for industries. First, usually technologies for developing products are imported from abroad mostly from producing countries. Entrepreneurs prefer to import both the instruments and the technologies for production of goods on a turnkey basis. Second, the source of technologies is developed domestically by Research and Development (R&D) organizations. The majority of R&D organizations in Bangladesh, provide technologies for SMEs, are government funded including Bangladesh Atomic Energy Commission (BAEC), BCSIR, National Institute of Biotechnology, and others under the Ministry of Science and Technology. There are a few noteworthy agricultural research organizations, which are equally delved into developing new knowledge and techniques to support SMEs in Bangladesh such as Bangladesh Agricultural Research Institute, Soil Resources Development Institute, Bangladesh Jute Research Institute, Bangladesh Institute of Nuclear Agriculture, Bangladesh Rice Research Institute, and Bangladesh Sugarcane Research Institute. In addition, some public universities are involved in the development of technologies that could be used for small and medium scale industrialization.

The use of technologies in SMEs in Bangladesh mainly covers two aspects. First, developing innovative formulas to produce quality products. For instance, food processing and food product manufacturing industries need some formulae or recipe to prepare their products and to maintain their qualities. Second, exploring business opportunities and tapping marketing potentials via the use of smart technological platforms and/or devices such as mobile phone, Facebook, LinkedIn, and other social media (Dewan & Nazmin, 2007). The core focus of BCSIR is to provide innovative support by developing technology and formulas that eventually enrich the industrial production capabilities. Although a good number of researches were conducted emphasizing different issues of SMEs in

Bangladesh (Chowdhury & Salman, 2018; Dewan & Nazmin, 2007; Khalily et al., 2020), the role of innovation and technology however remains largely unexplored especially in reference to the R&D organizations. Ahmed (2014) discussed the role of BCSIR in developing appropriate technology for the SMEs in the country. However, classified technologies or industrial processes of BCSIR with in-depth analysis have not been reported yet.

Using a descriptive research method, this paper aims at unveiling different technologies invented by BCSIR with a view to backing up technology-based small and medium entrepreneurship in Bangladesh. The descriptive focus exclusively concentrates on the 'what' aspect in which a typical phenomenon is being observed and explained (Nassaji, 2015). This review article is developed following a 'literature mapping' technique where the frame of mapping includes keywords such as innovation, SMEs, technology in SMEs, development of SMEs in Bangladesh (Guerin et al., 2018). A good number of grey literature sources were utilized to collect data for this paper including newsletters, working papers, brochures, and manuals developed by the BCSIR. The collected data were analyzed by identifying patterns in the data and plotting the data through mind mapping techniques (Nassaji, 2015; Rowley & Slack, 2004).
In this paper, a brief description of BCSIR, as a technology supporter, has been presented first. Next section discusses the developed industrial production process of this organization. Afterward, the process of innovation and commercialization of technologies has been illustrated along with highlighting key features of the technologies of BCSIR. Finally, a conclusion is drawn from the perspective of providing policy feedback to develop technology-based enterprises in Bangladesh.

2. Bangladesh Council of Scientific and Industrial Research (BCSIR)

BCSIR is the largest multidisciplinary research organization in Bangladesh. It was established in 1955 bearing the name of 'East Regional Laboratories' under the Pakistan Council of Scientific and Industrial Research (PCSIR). Now the organization is in function under the Ministry of Science and Technology. It consists of 11 Research Laboratories/ Institutes (3 multidisciplinary, 7 mono-disciplinary laboratories and 1 pilot plant study centre).

2.1 Aims and Objectives of BCSIR

i. To initiate, promote, and guide scientific, industrial and technological research on problems connected with the establishment and development of industries and such other allied matters as the Government may refer to it.

ii. To adopt measures for the commercial utilization of discoveries and invention resulting from the research carried on by the council, universities or by any other research organization.

2.2 Major Activities of BCSIR

i. Conduct research and development (R&D) works for technology development and related knowledge generation.
ii. Development of industrial production process.
iii. Lease out the developed production process for industrialization.
iv. Analytical service for quality assessment of products imported from abroad, to be exported or to be consumed locally.
v. Supervision of students from universities to accomplish their MS, M.Phil and PhD level thesis.
vi. Provide fellowship to young researchers to develop science based human resources in the country.

2.3 Major Research Areas of BCSIR

i. Food and Feed Product Technology, Food Science, Nutrition and Quality Control
ii. Plant Science, Aromatic and Medicinal Plants
iii. Biological Science and Pharmacy
iv. Biotechnology and Tissue culture
v. Renewable Energy & Biogas Technology
vi. Environmental Pollution
vii. Pulp and Paper, Fiber and polymer
viii. Leather Research and Development
ix. Pilot Plant and Techno-economic Study
x. Glass, Ceramic and Housing materials
xi. Industrial Physics, Electronics and Instruments
xii. Production of various chemicals for industrial use

3. Developed Industrial Production Process of BCSIR

Data of scientific innovations of BCSIR were taken from official records of the organization. Records of 1016 scientific processes developed by scientists of this organization were analyzed. Records are from July 1967 to December 2021.

BCSIR has developed a huge variety of industrial production processes, and majority of them are appropriate for using by SMEs. Technologies for production of food or food related products are dominating in number. Being a country of very large population, Bangladesh has a huge market of food and food related

products. To start a new business with comparatively low investment, manpower and risk, and locally available raw materials, processes from BCSIR could be a very good choice. In addition, technologies for cosmetics and toiletries, aromatic and herbal products, leather and leather products have a good demand among the small and medium enterprises, and BCSIR has a good number of technologies for them. Some of these products are exported abroad after meeting local demand. BCSIR has a great bulk of technologies for processing and producing valuable products from fibre, coconut, several agricultural waste or residues, fuel and energy. The organization also has processes for production of some valuable products from green and processed jute fibre and jute sticks. As demand for glass, ceramic and other house building materials are increasing dramatically demand for technologies for production of such products is also increasing although a great portion of them are being imported from abroad. Cultivation techniques of different threatened and nearly extinct plants are available here including processing and preservation of different agricultural products. Lastly, a large number of technologies of BCSIR are for production of raw materials for other industries and for domestic use. Figure 1 summarizes the number of developed processes by BCSIR, which are used by the SMEs.

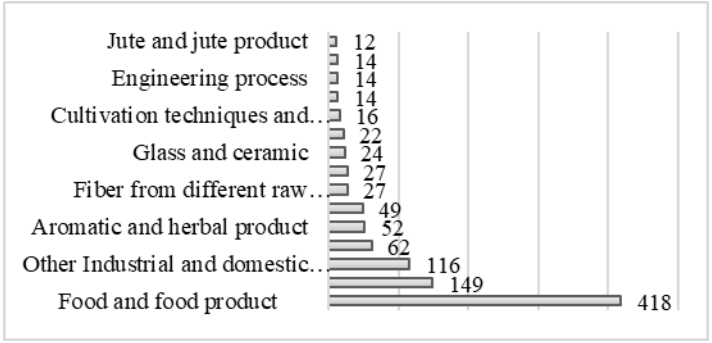

Figure 1. Numerical data of developed processes of BCSIR.

The majority of the technologies developed by the scientists of BCSIR are for production of food and food related products. Most of them are for fruit processing and preservation. For example, mango, jackfruits are seasonal, nutritious and highly demanding to all ages of people. To make these seasonal fruits and vegetables easily available throughout the year while keeping their nutritious value intact, BCSIR invented technologies, which are ready to be handed over for use in industries. Besides, industrial production processes for production of bakery products, food products for diabetic patients are also available. Baby foods, weaning foods and some other specialized foods require comparatively

sophisticated technologies to be prepared. Scientists of this organization have also developed some processes to produce these types of foods for specialized citizens of the country. Apart from human consumption, BCSIR has some technologies, which are for production of poultry and livestock feed. All these technologies are based on locally available raw materials and require comparatively low skilled manpower. Therefore, entrepreneurs from all levels can start their business with these foods and associated food product technologies. Figure 2 exhibits food and food related processes, which have been invented by BCSIR.

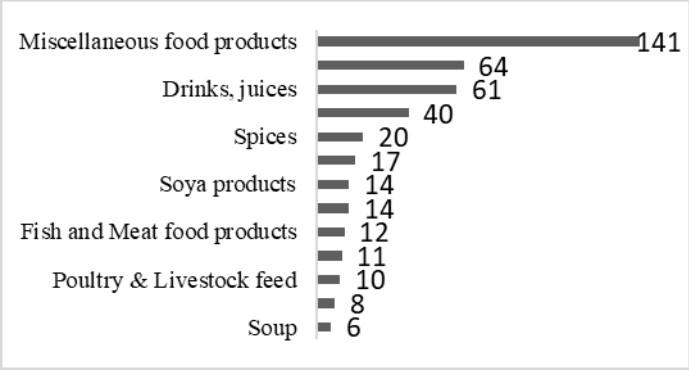

Figure 2. Statistical data of food and food related processes of BCSIR.

From a huge pool of technologies developed by BCSIR, Table 1 categorizes some specific industrial production processes, mostly suitable for small and medium enterprises.

Table 1. List of industrial production processes of BCSIR for SMEs.

Type of process	Name of product (Number of process)
Soya product	Soya flour (3), Soya bread (1), Soya milk (2), Soya dadhi (1), Soya sauce (2), Soya spread (1), Soya tofu (1), Soya nugget (1), Mixed food from soyabean (2)
Baby food, weaning food and cereal food	Weaning food (4), Baby food (2), Cereal food (1)
Oil and oil seed product	Rice bran oil (3), Essential oil (2), Patchauli oil (1), Butter and ghee seed oil (2)
Food for diabetic patients	Sweetmeat (5), Ata (1), Bread (2), Biscuit (1), Jam (1), Jelly (1), Squash (2), Others (1)
Bakery product	Biscuit (18), Bread (11), Cracker (1), Baking powder (1), Baking yeast (1), Baking flour cake (5), Handmade bread (2)
Fish and meat product	Fish product (4), Meat product (5)
Leather and leather	Leather tanning (3), Leather processing chemicals or agents (13), Leather product (10)
Pulp, paper and board	Pulp & paper (9), Board (5)
Cosmetics and toiletries	Tooth powder-toothpaste (8), Mouth wash (2), Hail oil (3), Heel cream (2), Cream (9), Powder (3), Shaving cream (4), Soup (4), Cleaner (12), Detergent (4), Nail polish (3), Hand wash (2), Lip-stick (3), Shampoo (1), Hair dye (1), Gel (1)
Herbal product	Essential oils (20), Herbal product (8), Anti-mosquito product (11)
Fuel and energy related processes	Biogass technology (9), Cooker and stove technology (20), Fuel related other technology (20)
Glass and ceramic related processes	Ceramic and glass decorating colour (8), Pigment for ceramics (6), Brick (5), Building materials (2), Glass and ceramic related other products (10)
Wood, Bamboo preservation	Wood preservation (3), Bamboo preservation (3), Varnish (9)
Fibre from different raw materials	Fibre dying materials (12), Fibre from pineapple leaves and steam (6), Fibre from other raw materials (8)
Cultivation technique and other agro processes	Tissue culture (2), Year-round banana and jackfruit (2), Cultivation techniques of Spirulina, Cassava (3), Pesticides (2), Fertilizer (3), Plant growth regulator (2), Jute and jute product (12)
Chemicals for industrial use	Inorganic chemicals (27), Organic chemicals (35), Inorganic Mixed chemicals (9), Organic Mixed chemicals (3), Organic solvent (6), Organic Acid (7), Mixed chemicals (20), Pigments (3), Dye (2)
Other industrial and domestic products	Glue & Adhesive (14), Correcting fluid (6), Shoe polish/cream (7), Ink and pencil (14), Candle (3), Apparatus (Water filter, domestic oven, digital counter) (8), Miscellaneous (40)

In total, 1016 industrial production processes have been developed by scientists of BCSIR from 1967 to 2021. Among the developed processes, 372 are patented. Of them, 396 processes have been leased out to entrepreneurs. About 120 entrepreneurs have taken the process to do their business. Products of 120 lessees are available in the market. The number of beneficiaries of BCSIR technologies, particularly employees, who are engaged directly and indirectly in the industrial production and marketing processes are more than 16,000.

4. Process of Innovation and Commercialization of Technologies from BCSIR

Initially, the scientists on the basis of national needs and contemporary demand of industries conduct research. Every R&D project is scrutinized by an expert committee and approved by the Board of BCSIR for 2-3 years. Some of the R&D projects end up with some technology or industrial production process as a final result. Successfully developed processes are submitted to the Research Development Division (RDD) headed by Member (Development) of BCSIR. Before transferring these technologies to the entrepreneurs, they have to go through a verification committee consisting of experts from universities,

representatives from the Ministry of Industry, Ministry of Science and Technology, and other relevant agencies. Before getting accepted, an industrial production process of BCSIR has to follow specific steps (see Figure 3).

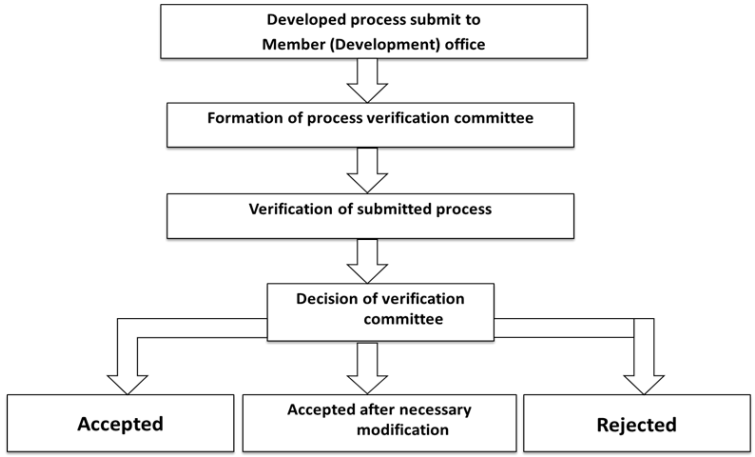

Figure 3. Schematic representation of acceptance procedure of an industrial production process of BCSIR.

Once the verification committee accepts the process or formula, it is considered ready for commercialization to industrialists for the production of products. An entrepreneur can get the industrial production process developed by BCSIR through a number of steps. At first, the authority of BCSIR invites the potential entrepreneurs to take part in an open bid for the technologies through newspaper advertisements. In a meeting, the participating bidders bid for fixing the premium money for the advertised technologies. Next, an expert team visits the factory and other facilities to assess the production feasibility of the entrepreneur. If the business entity is considered fit to get the process based on the visiting team's report, it is asked to pay the premium money for the technology or the process. The process ends with signing an agreement between BCSIR and the enterprise. The industries are followed up from time to time to ensure the quality of the products produced with the technologies of BCSIR. Figure 4 schematically describes this process of commercialization of BCSIR's industrial production processes.

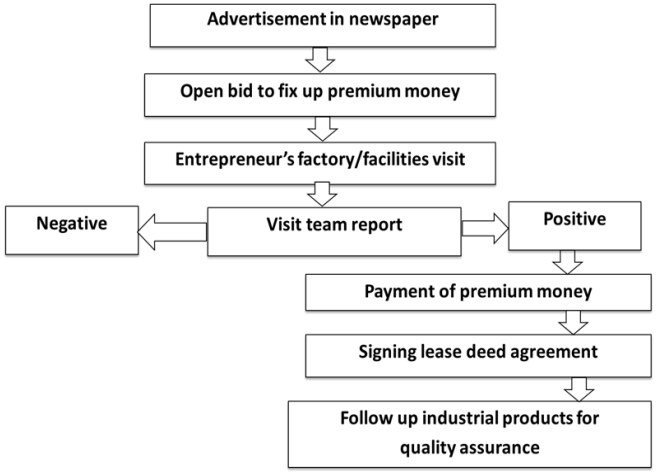

Figure 4. Schematic representation of commercialization process of an industrial production process of BCSIR.

The ultimate target of BCSIR is to handover its technologies and industrial processes to entrepreneurs for their commercial application in product development. Apart from technical and technological factors, there are some business and commercial factors as well, such as marketing network, product storage and delivery system, etc. A strong harmonization between R&D organizations and practitioners such as BCSIR and entrepreneurs are essential for an effective and functioning business model to make techno-based entrepreneurship successful.

5. Features of Technologies of BCSIR

Nature of processes developed by BCSIR is very suitable for starting a business with minimum capital, skill, and risk. Accordingly, a large number of processes are targeted for SMEs. Some of the core features of the technologies of BCSIR are as follows:

i. versatile nature of product,
ii. process for all type of industries (cottage to large industry),
iii. a good number of them are patented (372 processes),
iv. most of the processes are based on locally available raw materials,
v. incubation support to establish industries are easily available from scientists of BCSIR,
vi. premium money of the processes is very nominal,
vii. comparatively less skilled manpower is needed.

Moreover, piloting the industrial production process to conduct techno-economic feasibility study, BCSIR has a pilot plant and process developing centre from where entrepreneurs can secure support for start-up and running stages of their enterprises.

6. Conclusion and Policy Implications

In order to boost up the national economic growth, the significance of SMEs is well acknowledged. In this review article, literature (re)confirms such significance in differing contexts. In this age of technological revolution, innovative technologies have been identified as a critical success factor for the planned development of SMEs. The latest National SME Policy 2019 of Bangladesh also encourages technology transfer in this sector along with human capital development and smooth access to finance. In this vein, BCSIR is playing an instrumental role by developing new technologies for industrial production processes, which are being used by the SMEs. Being a leading research organization, BCSIR has the capacity to cater need-based technologies for entrepreneurs. All the processes of BCSIR have been developed through a series of scientific experiments, and therefore these are tested technologies appropriate for the development of SMEs in the country. This paper prepares a profile of various innovative production processes invented by BCSIR and suitable for SMEs. In addition, the commercialization process is also highlighted in this study.

Majority of the technologies invented by BCSIR are befitting with starting a new business and running them with very low capital and locally available raw materials. Initial technical support to the entrepreneurs in SMEs is available at BCSIR. The concerned team of scientists also provides training to technicians and related staff. There might be some limitations of these technologies in view of their soundness in producing products that could be minimized by the scientists of BCSIR in consultation with entrepreneurs and consumers. However, to mitigate the risks of investing in technology-based entrepreneurship, quality of technology is not the only factor. Other factors enable the effectiveness of SMEs including initial capital of investors, availability of skilled manpower, availability and quality of raw materials, and management of the enterprises. Within the broader national policy framework, these issues must be duly addressed to harness benefits from this emerging sector.

With specific reference to BCSIR, a few issues require attention from the policymakers. The commercialization mechanism of the invented processes in the setup of BCSIR is not well developed. A particular need for a marketing and promotion department is noteworthy. There are entrepreneurs who have a negative mental image formed towards the local technologies. To get rid of this, awareness campaigns and allocation of budget in this regard are much needed. On a final note, joint efforts of BCSIR and SMEs are necessary for establishing technology-based small and medium enterprises throughout the country, which could contribute to the development of the national economy collectively.

Acknowledgement

We express our gratitude to all the scientists who have developed the technologies and industrial production processes presented in this study. We are equally thankful to the officials of the Research Development Division of BCSIR for providing us with the relevant data to complete our study.

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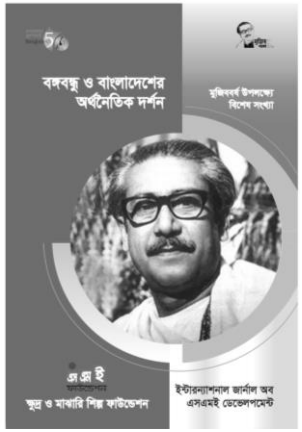

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