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ADB Working Paper Series

**STATE-OWNED ENTERPRISES AND
CLUSTER-BASED INDUSTRIALIZATION:
EVIDENCE FROM BANGLADESH**

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Abstract

This paper assesses the role of the Bangladesh Small and Cottage Industries Corporation (BSCIC) in the cluster-based development of SMEs over time using firm-level survey data, as well as critically examining the institutional impact on the industrialization process in Bangladesh. The role of BSCIC estates in industrialization is assessed mainly through several factors: (i) industrial output; (ii) employment; (iii) technological acquisition; and (iv) contribution to the tertiary economy. Analysis suggests that BSCIC contributes to 12.4% of total SME manufacturing firms, 21% of total SME employment, and 18.7% of total manufacturing production indicating relatively better performance of BSCIC estates/clusters. The results show that despite being associated with negative practices such as bureaucratic inefficiencies and corruption in estate management, the role of BSCIC as a state-owned enterprise (SOE) in promoting industrialization is largely positive. New entry and specialization are observed, though the rate is very low. On the other hand, estates established in the most recent phases of development have accumulated a more technology-intense production process leading to higher labor productivity. This paper highlights the necessity of reform in BSCIC's estate management in order to better utilize plots as well as to bring efficiencies in their activities to achieve the intended objective of industrialization.

Keywords: state-owned enterprises, BSCIC, industrial zones, Bangladesh

JEL Classification: L6, O2

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1. INTRODUCTION

Like other developing countries, despite various problems, state-owned enterprises (SOEs) play an important role in the economic development of Bangladesh through creating employment and providing value added services to the economy. A total of 146 SOEs are now operational in Bangladesh, among them 46 are non-financial SOEs. However, inefficient management and corruption largely affect the intended outcome of SOEs in Bangladesh. Though the operating profit on total assets of SOEs was 2.87% in FY2016–17, the net profit on operating revenue was 6.21% in the same year (MoF 2018). Compared to private-owned enterprises, the financial performance of SOEs in Bangladesh is not satisfactory, because some are incurring losses over a long period of time and some SOEs are not profit making but providing social services (Haroon 2019). This is also evident in cases of SOEs of other Asian countries (Taghizadeh-Hesary et al. 2019; Phi et al. 2019). Given the fact, this paper takes one SOE into consideration to assess its performances, and within that context, provides some insights into the reforms that are necessary to improve the performance of SOEs in Bangladesh.

In particular, this paper critically assesses the role of the Bangladesh Small and Cottage Industries Corporation (BSCIC) an SOE, which is responsible for developing, managing, and maintaining industrial estates (clusters/industrial enclaves) for the development of micro (including cottage), small and medium-sized enterprises (MSMEs). Like many other developing countries, since the early 1960s, Bangladesh, then East Pakistan, started constructing industrial estates for smaller enterprises. Over time, two other types of industrial zones, Export Processing Zones and Special Economic Zones, have been created and managed by two other organizations, BEPZA and BEZA for larger industries. The objective of this paper is to assess the role of BSCIC estates, the oldest estates, in industrialization in Bangladesh. BSCIC was established with the objective to harness the small and cottage industry potential of the rural agrarian base of the country in terms of market, product, raw materials, and labor through creating new small entrepreneurs. In general, BSCIC industrial estates provide land facilities; service assistance and guidance; infrastructure facilities; and to some extent financial assistance. Currently, there are 74 BSCIC industrial estates located across the country and two more new estates are being built.¹

It is therefore relevant to highlight some aspects of cluster-based industrialization here. Industrial clusters generate various benefits to enterprises. According to Marshall (1920), the advantages of industrial clusters or agglomeration economies are: (1) information or knowledge spillovers or imitation; (2) the division and specialization of labor among firms producing parts, components, and final products; and (3) the development of skilled labor markets. In addition, the cluster also provides a network of customers that facilitates the firms' growth. The agglomeration economies literature suggests that the formation of a cluster initially in its quantitative phase facilitates industrial development through Smithian growth—growth based on the expanded division of labor and transactions, and later through Schumpeterian growth—growth based on technological progress. Therefore, the role of the industrial cluster can be analyzed through the Smithian and Schumpeterian growth framework. These aspects of

¹ The United Nations Industrial Development Organization (UNIDO) defines an industrial estate as a “planned cluster of industrial enterprises offering standard factory buildings erected in advance of demand and a variety of services and facilities to the occupants” (UNIDO 1967). Industrial estates have been defined as an area or a site utilized for the development of a planned cluster of industrial enterprises which provide utility services and technical facilities, with the objective to strengthen and develop these industries as a part of a broad program of industrialization and social development (Bredo 1960; UN 1961; Alexander 1963).

cluster-based industrialization, to some extent, are investigated in this paper to examine the role of BSCIC estates in industrialization in Bangladesh.

The development of BSCIC industrial estates has progressed in phases. The establishment of estates was achieved in six phases, but with overlaps. The first phase was completed during 1960–1980, the second phase during 1981–1991, the third phase 1993–1999, fourth phase 1985–1998, fifth phase 1989–2007, and the sixth phase was completed during 1993–2007. Based on a survey of 500 firms from 25 selected estates, our analysis suggests that first phase and last phase firms perform more efficiently than others. Consistent with the Heckscher-Ohlin theorem, the products of the firms in the initial clusters tended to be more labor-intensive items, while firms in the sixth phase tended to produce more technology driven products as indicated by capital-output ratios. It is clear that firms in the estates established during 2000–2007 are more capital-intensive and less labor-intensive compared to other estates. However, the survey reveals that about one-fourth of plots remain vacant mainly due to faulty and corrupt practices of entrepreneur selection, locational disadvantages, outdated rules and regulations, centralized decision-making process, etc. It is therefore necessary to initiate some reforms in order to bring efficiencies in BSCIC activities for enhancing the intended objectives of industrialization.

The paper is organized as follows. Section 2 provides an overview of BSCIC industrial estates. Section 3 provides an analysis of the role of BSCIC industrial estates through survey results. Section 4 analyzes the contribution of BSCIC estates to the national economy and section 5 provides conclusions and policy recommendations.

2. AN OVERVIEW OF THE BSCIC INDUSTRIAL ESTATE

2.1 BISCIC at a Glance

BSCIC is an SOE operating under the Ministry of Industries (Mol). It was created in 1957 in order to support small and cottage industries in the country. BSCIC, then called the East Pakistan Small and Cottage Industries Corporation (EPSCIC), was established by an Act of Parliament in 1957. BSCIC was established with a view to accelerating industrial growth through promoting the development of small and cottage industries in the country (BSCIC Act 1957). One of the core areas of BSCIC activities is the establishment and maintenance of industrial estates, which were established at different times in different locations throughout the country. The entrepreneurs in BSCIC estates receive various benefits including plot allocations with subsidized rates; initial tax exemption; infrastructure facilities; and various other related supports. To provide services to the entrepreneurs of small and cottage industries, BSCIC has a head office in Dhaka; four regional offices; sixty-four district offices (Industries Service Center); seventy-four² industrial estate offices; and fifteen Skill Development Centers at different locations in the country.

At the estate level, estate officers and other staff members have to perform numerous jobs and, thus, are overburdened. Their jobs include providing administrative support

² According to the BSCIC-MIS Report 2018 (February), BSCIC established two new industrial estates in Pabna (Pabna-2) in 2016 and Chittagong (Mirsharai) in 2017. In Pabna-2 industrial estate, BSCIC allotted 81 plots out of 100 industrial plots, of these construction of the building had started on 23 plots, but none of them had started production yet. On the other hand, BSCIC did not allot any industrial plots in Mirsharai industrial estate.

to the industrial unit owners; monitoring the water supply; maintaining the internal infrastructure; collecting enterprise level information (production, employment, investment, export value, etc.); providing monthly information to the head office; etc. The manpower appears to be inadequate considering the needs of the estates. In some estates, there are no assigned estate officers. As Table 1 shows, 60 officers and 264 staff were working in 72 industrial estates as opposed to the approved position of 101 officers and 372 staff indicating 35% and 28% vacancies in respective positions, which is expected to hamper the regular activities of estates.

Table 1: Manpower and Financial Situation of BSCIC

A. Manpower situation

Category	Sanctioned (number)	Existing (number)	Number of Vacant Positions Against Sanctioned Position
Officer	101	60	41 (35.0%)
Staff	372	264	108 (28.4%)
Total	473	324	149 (31.7%)

B. Revenue and expenditure items of the industrial estates of BSCIC

Items (Tk)	2010–11	2015–16
Total Revenues (A)	76,961,000	123,152,760
Total Expenditure (B)	102,114,400	210,902,955
Total deficit (C=A-B)	-25,153,400	-87,750,195
Revenues excluding land premium (D)	34,027,000	85,849,760
Expenditure excluding staff salaries, allowances, pension benefits (E)	45,036,200	114,139,900
Total deficit (F=D-E)	-11,009,200	-28,290,140

Source: BIDS Survey Data 2017; Budget documents, BSCIC.

The net financial position of BSCIC has been negative for quite a long time. Land premium is the main source of revenue followed by ownership transfer fees. Over 2010–2016, major growth is seen in the case of ownership transfer fees (68.9%); followed by fees for roads and infrastructure (34%); service charges (19.6%); land development tax (19.1%); and bank interest (10.5%). Overall, revenue has increased by 12.5% annually. The major expenditure items include salaries and allowances (43.1%), followed by spending on repair and maintenance (42%) and supply and services (13%). Overall expenditure grew by about 20% each year. In general, BSCIC runs a deficit on comparison of the revenue received and expenditures made, for which the government provides subsidies (Table 1).

2.2 BSCIC Estates at a Glance

In the mid-1960s, BSCIC had begun establishing their industrial estates. BSCIC have established 74 estates so far in 58 districts except six (Bandarban, Barguna, Chuadanga, Jhalokati, Magura, and Narail).³ A total of 18 estates had been established by the end of 1970. BSCIC's estate expansion process was expedited after achieving independence in 1971. The establishment of estates was done in six phases, but

³ Source: BSCIC-MIS Report 2017.

with overlaps. In the first phase (1960–1980), 20 industrial estates consisting of 3,532 industrial plots were built in different districts, out of which 3,404 plots (96.4%) had already been allotted. In the second phase (1981–1991), 9 industrial estates having 1,405 industrial plots were established in different parts of the country. In the third (1993–1999) and fourth phases (1985–1998), there were 3 and 21 industrial estates consisting of 459 and 2,707 industrial plots respectively. Lastly, in the fifth (1989–2007) and sixth (1993–2007) phases, 18 and 3 industrial estates consisting of 1,871 and 415 industrial plots were established respectively.

Four specialized estates were established in addition to the general estates. These are Jamdani Palli and hosiery in Narayanganj, leather in Savar, and electronics in Mirpur, Dhaka. Dhaka and Chittagong division has a higher concentration of estates (24 and 17), which is followed by Rajshahi (9), Rangpur (8), Khulna (7), Sylhet (5), and Barisal (4).

BSCIC has established 74 estates and construction of two more estates is ongoing. The total land area occupied by the 74 industrial estates is 1,969.2 acres with 10,389 plots of different sizes. In these plots, 5,822 industrial units were established leaving 22% plots unutilized (vacant or waiting to start production). Among the 5,822 units, 4,547 units are in production. On average each firm occupies more than one plot, i.e. 1.73 plots. The percentage of export-oriented enterprises remained almost the same at about 21% over the years. Employment per estate has increased from 6,805 in 2012–13 to 7,626 in 2016–17 with an annual increase of about 3%. However, employment per enterprise has increased slightly over the five years, from 120 to 124. Total production value and export value, however, have increased annually by 11% and 5% respectively during the period, indicating higher productivity of enterprises. The data shows that about 4.4% of units close annually (Table 2).

The majority of industrial estates were established with an area between 15 and 50 acres. Currently, a total of 0.56 million people are working at BSCIC's estates and industrial units in total, which contributes about 15.13% of total SME employment (micro and cottage industries have a total labor force of 3.5 million). The total amount of entrepreneur's investment in these established industrial estates was Tk201,780 million. About Tk458,800 million worth of products is annually produced with Tk249,310 million of products being exported which is about 9.3% of the country's total exports. Four special estates, Jamdani Palli (women's wear with special features, called Jamdani saree), hosiery in Narayanganj, tannery in Savar, and electronics in Mirpur Dhaka support these specialized sectors.

BSCIC industrial estates were established in different phases, but with overlaps, namely 1960–1980 (1st phase); 1981–1991 (2nd phase); 1993–1999 (3rd phase); 1985–1998 (4th phase); 1989–2007 (5th phase); and 1993–2007 (6th phase). The highest number of estates were established during the first (20), fourth (21), and fifth phases (18). The number of industrial plots was relatively higher in those phases. In all the phases, almost all of the industrial plots were allotted (96.8%), ranging from a maximum of 99.9% in the second phase to a minimum of 90.4% in the fifth phase. The number of units in construction was relatively greater in the fifth and sixth phases (375 vs. 204) than in the earlier phases.

Table 2: BSCIC Industrial Estates at a Glance

Items	2012–13	2016–17	CAGR (%)
Total land area (in acres)	1,969.2	1,969.2	–
No. of industrial plots	10,339	10,389	0.1
No. of allotted industrial plots	9,837	10,053	0.5
No. of established industrial units in the allotted plots	5,745	5,822	0.3
Average number of plots per industrial unit	1.71	1.73	–
No. of industrial units in production	4,205	4,547	2.0
% of units in production among established units	73.2	78.1	1.6
No. of industrial units under construction/ready for construction	1,255	936	–7.1
No. of failing/closed industrial units	285	339	4.4
No. of industrial units ready for allotting	502	336	–9.5
No. of export oriented industrial units	865	946	2.3
% of export units among total units in production	20.6	20.8	–
Number of employed persons in the industrial estates	503,551	564,319	2.9
Employment per estate	6,805	7,626	2.9
Employment per firm	120	124	0.9
Total production value (in million BDT)	360,974	552,623	11.2
Total export value (in million BDT)	208,899	255,285	5.1
Government revenue (in million BDT)	23,120	29,501	6.3
Number of industrial estates	74	74	–

CAGR = Compound Annual Growth Rate.

Source: MIS-BSCIC, various years, 2012–2013 and 2016–2017.

On average, the occupancy rate⁴ is 96.8%, which is much higher compared to Thailand (89%)⁵ and Viet Nam (73%).⁶ The occupancy rate varies significantly by division, all divisions having an occupancy of rate more than 90% except Barisal (82.2%). On the other hand, Dhaka and Rajshahi divisions have an occupancy rate of more than 99%.

Although the occupancy rate is very high in the BSCIC estates compared to the industrial estates of some middle-income countries, the plot utilization rate⁷ is somewhat lower, with an average of 78.1%. Estates established in the fourth phase are high performing, having a utilization rate of more than 87.5%, while the industrial estates established in the fifth and sixth phases are lower performing, having a utilization rate of around 58% and 27% (or 70% excluding the tannery estate) respectively. The plot utilization rate varies significantly across divisions from 50% in Barisal to 95% in Rajshahi. Even though the occupancy rate is around 82% in Barisal, the plot utilization rate is much lower, around 38%. The low utilization rate is a culmination of several factors including weaknesses in the enforceability of existing rules and regulations, problems in selecting appropriate entrepreneurs, and infrastructure bottlenecks (gas and electricity). It is now an important challenge for BSCIC to lay out a proper strategy to increase the plot utilization rate in the context of the scarcity of land in the country.

⁴ Occupancy rate is defined as the ratio of the number of plots allotted over the total number of industrial plots.

⁵ Kongcheep, S. 2017. Thailand Industrial Estate Market; <http://www.colliers.com/-/media/files/apac/thailand/market-reports/thailand-industrial-estate-1h2017-en.pdf>

⁶ <https://www.talkvietnam.com/2017/08/industrial-park-occupancy-rate-reaches-73/>.

⁷ Utilization rate is defined as the ratio of the number of plots in production over the total number of allotted plots.

A very low occupancy rate is observed in estates of hilly districts, such as only about 50% in Khagrachari and in Panchagar industrial estates. More than one-fourth of the industrial plots remained unallotted in Sharupkhati, Rangamati, Sunamganj, and Bhola. The low occupancy rate is due to a shortage of demand for plots from potential entrepreneurs in these geographically disadvantaged locations, though the estates were established with a view to implementing the government's "one district one estate" policy, which is in question now. Khagrachari, Rangamati, and Bhola are not only experiencing low occupancy rates but also experiencing very low utilization of the allotted plots. Therefore, if BSCIC authorities could organize an awareness campaign and provide financial and other incentives, it may attract potential entrepreneurs to these estates. Moreover, the existing entrepreneurs also need special training on how to improve their products and organize fairs to seek their potential markets.

The existence of failing industries in BSCIC estates is also evident. Overall, about 5.9% of the established industrial units are now failing/closed. The percentage of failed units out of the total was highest among the estates established in the third phase (12.7%). Barisal Division has the highest percentage of failed industrial units, which is about 9%.

BSCIC industrial estates were established in order to encourage the expansion of a thriving private sector, promote small enterprises, and increase export-oriented activities. Though BSCIC has made a noteworthy contribution towards promoting smaller industries and creating employment, the contribution of BSCIC would be more significant if it could improve and expedite the plot utilization rate and help reduce the number of failing industrial units. Therefore, better implementation of the plot allotment policy and enforcement of existing rules/regulations against the non-utilization of plots might improve the situation.

3. IMPACT OF BSCIC INDUSTRIAL ESTATES: EMPLOYMENT, INVESTMENT, AND EFFICIENCY

The BSCIC industrial estates are geographically concentrated in four existing divisions, implemented in different phases of the time period, with variations in size⁸ and number of industrial plots. The results are drawn from a randomly selected 500 firms from 25 industrial estates conducted in mid-2017, covering about one-third of the total BSCIC industrial estate. In addition, the findings are triangulated with qualitative findings generated from Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) with industry owners, managers, officers, employees and local community people. We also rely on the MIS reports of BSCIC for information on the estates.

3.1 Investment

The rate of investment is an important indicator that demonstrates the efficiency level of firms' investments. We asked the estate officers to provide information regarding investment, production, revenue, etc. Investments for estate development and industrial units in the current year (2016) are reported to be Tk60,114.1 and Tk971,019.8 million respectively. During 1990–2017, the annual growth in investment by industrial units is estimated to be 9.12% and the total investment has grown annually by an estimated 7.53% during the same time period. The service charge was estimated to have increased by 12.21% from Tk1.1 million to Tk27.7 million annually. Revenue from the ownership

⁸ The industrial estates are categorized into three groups, according to the number of industrial plots: small having less than 100 industrial plots; medium-sized having between 100 and 199 industrial plots, and large, those with more than 200 industrial plots.

transfer fee grew relatively more than revenue from land development (17.2% vs. 10.3%) during this time period. However, the annual growth in total production was almost negligible (Table 3).

The return on investment (RoI) for BSCIC estates are also estimated. The RoI is a performance measure used to evaluate the efficiency of investments. The total investment is estimated by adding both BSCIC's fixed investment for estate development and investments made by entrepreneurs. The RoI for BSCIC estates is estimated to be more than 1 indicating that the estates generate a positive return on investments (Table 3).

Table 3: Investment, Production, and Return on Investment (RoI), 1990–2017

Indicators	2000	2010	2015	2017
Investment for estate development [A]	472.0	420.1	808.7	1059.4
Investment by industrial units [B]	21,039.3	48,206.9	59,948.3	74,903.5
Total investment [A+B]	21,511.3	48,626.9	60,757.0	75,962.9
Total production [C]	27,353.3	64,714.2	114,163.2	105,769.8
Service charge [D]	5.2	48.1	140.0	196.5
Revenue from land development [E]	1.9	15.4	18.4	52.9
Revenue from the ownership transfer fee [F]	3.8	40.1	128.6	202.0
Value of production and other income [C+D+E+F]	27,364.2	64,817.8	114,450.2	106,221.2
Return on investment for estates (RoI)	1.3	1.3	1.9	1.4
Reporting estates	22	47	51	59

Note: Author's estimation. RoI = (total value of industrial production in estates + other revenues)/investment.

Source: BIDS Survey data 2017.

In regard to firm performances, total fixed assets, comprised of land and buildings, are estimated on average to be Tk12.9, Tk18.1, and Tk52.3 million for micro/cottage, small, and medium-sized firms in 2017 (Table 4). The overall percentage change of total fixed asset values from the starting year for small firms was higher (310.6%) relative to micro and medium-sized firms (211% vs. 297.9%). The total capital invested for micro, small, and medium-sized firms was estimated to be Tk9.54, Tk17.17, and Tk44.27 million, respectively (Table 4).

Table 4: Asset-turnover Ratio (Firm and Establishment Wise)

	Average Value of Output (V) (2016)	Fixed Asset (million BDT) (F) (Current)	Fixed-asset Turnover Ratio ^a (V/F)
Firm-wise			
Micro	30.14	12.85	2.35
Small	58.61	18.11	3.24
Medium-sized	215.08	52.31	4.11
Establishment period wise			
1960–1980	90.29	28.98	3.12
1981–1992	98.86	26.20	3.77
1993–1999	32.03	11.96	2.68
2000–2007	47.19	11.34	4.16
Total	67.63	20.38	3.32

^a The fixed asset-turnover ratio is an efficiency metric that measures the ability of a business to use its fixed assets to generate output. It is calculated by dividing average value of output by the average fixed assets for a given period.

Source: BIDS Survey 2017.

The fixed asset-turnover ratio for micro/cottage, small, and medium-sized firms is estimated to be 2.4, 3.2, and 4.1, respectively. Firms in the estates established before 2000 (1960–1999) have estimated ratios ranging from 2.7–3.7, while the highest turnover ratio (4.16) was observed among the firms in the estates established recently (2000–07). The ratios indicate that comparatively, medium-sized firms and estates established during 2000–07 are effectively utilizing their fixed assets (Table 4).

3.2 Production, Sales, and Profit of Units

From 2012 to 2016, total output for all firms, on average, has increased. The annual average production in the last five years was estimated to be Tk24.6, Tk52.5, and Tk193.6 million for micro, small, and medium-sized enterprises respectively (Table 5). Over the last five years, micro/cottage industries are estimated to have a higher annual output growth (9.2%) relative to small and medium-sized firms (3.93% vs. 3.26%). Estates established after 2000 have an estimated higher production growth rate (6.74%) over the past five years relative to estates established in earlier periods (Table 5). The estimated output growth of BSCIC estates is slightly lower than the national SME output growth level, which was 7.2% during 2006–2012 (SMI 2006/2012).

Table 5: Average Production (Output), Sales, and Profit during 2012–2016

Industry Type	Average Annual Production (Last 5 Years) by industry (in million Tk) (2012–2016)	Production (CAGR) ^a (%)	Average Annual Sales (Last 5 Years)	CAGR (%)	Average Annual Profit Rate (Last 5 Years)	CAGR (%)
Micro/Cottage	24.6	9.20	23.01	9.59	15.63	-1.47
Small	52.5	3.93	49.47	4.37	11.44	-1.19
Medium-sized	193.6	3.26	189.83	3.26	13.94	0.04
Total	60.1	3.41	57.31	3.65	12.77	-0.96
1960–1980	79.98	3.88	77.03	3.98	11.06	-1.06
1981–1992	85.92	4.76	82.79	4.71	15.47	-1.34
1993–1999	30.65	3.56	28.30	6.31	12.79	-0.91
2000–2007	40.52	6.74	37.86	5.85	12.25	-0.92
Total	60.07	3.41	57.31	3.65	12.77	-0.96
N	499		499		499	

^a The compound annual growth rate (CAGR) is used to measure the mean annual growth rate of an investment over a specified period of time.

Source: BIDS Survey 2017.

Sales revenue: For the period of 2012–16, the average annual sales reported were Tk23, Tk49.5, and Tk189.8 million for micro, small, and medium-sized industries respectively. Over the last 5 years, micro/cottage industries were estimated to have a higher annual growth of sales (9.59%) relative to small and medium-sized firms (4.37% vs. 3.26%). Estates established after 1992 are estimated to have a higher annual sales growth rate relative to earlier established estates (Table 5).

Profit: During 2012–2016, micro and medium-sized firms, on average, have reported a slightly larger profit (15.6% vs. 13.94%) relative to smaller firms (11.4%) (Table 5). However, medium-sized firms are estimated to have a positive annual compound growth of profit (0.04%) relative to that of small and micro/cottage firms (-1.47% vs.

–1.19%). The CAGR of reported profit for all estates showed a declining trend in the past five years.

3.3 Efficiency Indicators: Output-Labor, ROI, and Capital-Labor Ratios

3.3.1 Output-Labor Ratio in the Estates

Various Firm level efficiency indicators are measured in Table 6. A higher output-labor ratio is an indicator of higher labor productivity, i.e. more efficient use of labor, while the opposite indicates otherwise. During 2016, output produced per unit of labor for micro/cottage and medium-sized firms is estimated to be relatively higher (1.57 million vs. 1.86 million) than the average output-labor ratio of all firms (1.52 million). Estates established during 1981–92 and 2000–07 are estimated to have higher labor productivity (2.03 vs. 1.97) relative to all other established estates. Labor productivity was estimated to be the highest for agro food (4.03), followed by packaging/printing (2.95), and the food industry (2.25). The Return on Investment (ROI) is used as a profitability measure that evaluates the performance or potential return from a business or investment. Medium-sized firms are estimated to have a relatively higher return on their investments (5.03) than small (2.55) and micro/cottage (2.65) firms. Capital to labor ratio is used to measure the capital intensity of a firm. During 2016, capital per unit of labor is estimated to be slightly higher for micro/cottage firms (0.5) than small and medium-sized firms (0.4). On the other hand, the capital-labor ratio was comparatively high among the firms located in recently established estates (2000–07). Food, chemical, and printing/packaging industries have a somewhat higher capital-labor ratio among all other sectors (Table 6).

Table 6: Efficiency Indicators of Firms

	Capital (Plant and Machineries) (million BDT)	Investment (Last Year) (in million Tk)	Total Output (million BDT) (2016)	Profit (million BDT)
Industry Size				
Micro/cottage	9.54	1.64	30.14	4.35
Small	17.17	2.46	58.61	6.28
Medium-sized	44.27	5.90	215.08	29.70
Average	18.1	2.61	67.63	8.19
Period of Establishment				
1960–1980	25.5	2.81	90.29	9.39
1981–1992	19.1	2.39	98.86	15.00
1993–1999	9.10	0.48	32.03	3.76
2000–2007	19.0	6.57	47.19	5.29
Average	18.1	2.61	67.63	8.19
Sector				
Food industry	28.1	4.83	81.2	7.59
Textile industry	16.5	1.47	63.9	8.35
Forest industry/Wood furniture	2.0	0.08	11.2	2.46
Jute and jute related industry	23.6	0.65	39.3	6.22
Paper board/printing and packaging	20.6	0.67	107	12.46
Leather/Rubber/Plastics industry	5.4	0.36	19.8	2.14

continued on next page

Table 6 *continued*

	Capital (Plant and Machineries) (million BDT)	Investment (Last Year) (in million Tk)	Total Output (million BDT) (2016)	Profit (million BDT)
Chemical and pharmaceutical industry	22.0	4.38	55.7	7.06
Engineering industry	13.5	4.06	60.1	7.01
Metal workshop/Serviceing	4.8	0.33	39.5	5.40
Agro food	15.0	1.14	138	15.87
Others	3.1	0.65	22.5	2.92
Total	18.1	2.61	67.4	8.12
	Employee per Firm (Labor)	Return on Investment (RoI) ^a	Output-labor Ratio ^b	Capital-labor Ratio ^c
Industry Size				
Micro/cottage	19.14	2.65	1.57	0.50
Small	42.87	2.55	1.37	0.40
Medium-sized	115.62	5.03	1.86	0.38
Average	44.51	3.14	1.52	0.41
Period of Establishment				
1960–1980	65.3	3.34	1.38	0.39
1981–1992	48.58	6.27	2.03	0.39
1993–1999	30.94	7.84	1.04	0.29
2000–2007	24	0.81	1.97	0.79
Average	44.51	3.14	1.52	0.41
Sector				
Food industry	36.05	1.57	2.25	0.78
Textile industry	71.77	5.68	0.89	0.23
Forest industry/Wood furniture	11.47	30.74	0.98	0.18
Jute and jute related industry	72.53	9.57	0.54	0.33
Paper board/printing and packaging	36.33	18.60	2.95	0.57
Leather/Rubber/Plastics industry	29.49	5.96	0.67	0.18
Chemical and pharmaceutical industry	32.06	1.61	1.74	0.69
Engineering industry	47.84	1.73	1.26	0.28
Metal workshop/Serviceing	31.27	16.35	1.26	0.15
Agro food	31.97	13.92	4.32	0.47
Others	29.6	4.50	0.76	0.10
Total	44.51	3.11	1.51	0.41

^a ROI is calculated from the benefit received from an investment, or its gain (profit), divided by the investment's original cost.

^b Measured by dividing the total amount of output by the amount of labor.

^c Capital mainly refers to plant and machineries/technology that is used for production. It is measured by dividing the amount of capital (million taka) by the number of employees.

Source: BIDS Survey 2017.

3.3.2 Input-Output Ratio

Input-output ratio provides an indicator of the efficiency of a production firm. A higher input-output ratio is an indicator of a lower efficiency, while the opposite indicates better efficiency. Micro/cottage firms are estimated to have a somewhat higher input-output

ratio (0.94) than small and medium-sized firms (0.79 vs. 0.66) (Table 7). Estates established during 1960–80 and 2000–07 have somewhat higher input-output ratios (0.82 vs. 0.83) among all the established estates. Printing/packaging, leather/rubber/plastics, metal workshops, and agro food industries have a higher input-output ratio among all other sectors. On the other hand, the jute industry (0.57) and chemical and pharmaceutical industries (0.5) have input-output ratios indicating their efficiency in utilizing inputs.

Table 7: Input-output Ratios by Industry Size, Establishment Period, and Sector

	Total Input Cost (million Tk) (2016)	Total Output (million Tk)	Input-output Ratio	GVA ^a per Unit (million Tk) (2016)
Size of Industry				
Micro/cottage	28.24	30.14	0.94	2.96
Small	46.58	58.61	0.79	16.71
Medium-sized	141.68	215.08	0.66	95.33
Overall	51.96	67.63	0.77	21.2
Period of Establishment				
1960–1980	73.99	90.29	0.82	26.4
1981–1992	67.25	98.86	0.68	38.05
1993–1999	24.62	32.03	0.77	9.98
2000–2007	39.11	47.19	0.83	8.95
Total	51.96	67.63	0.77	21.2
Sectors				
Food industry	59.95	81.2	0.74	27.01
Textile industry	49.37	63.9	0.77	25.2
Forest industry/Wood furniture	8.48	11.2	0.76	4.32
Jute and jute related industry	22.54	39.3	0.57	26.33
Paper board/printing and packaging	98.61	107	0.92	16.53
Leather/Rubber/Plastics industry	16.30	19.8	0.82	6.3
Chemical and pharmaceutical industry	28.08	55.7	0.50	26.61
Engineering industry	47.42	60.1	0.79	15.6
Metal workshop/Serviceing	34.48	39.5	0.87	5.64
Agro food	119.15	138	0.86	24.05
Others	26.35	22.5	0.17	0.87
Overall	51.96	67.4	0.77	20.91

GVA = Turnover (or sales) minus cost of bought-in goods and services (excl. employee costs).

Source: BIDS Survey 2017.

3.3.3 Gross Value Added

Gross value added (GVA) is an indicator that can measure the contribution to the economy of a specified investment in economic activity. GVA per unit was estimated to be the highest for medium-sized firms (Tk95.33 million) relative to small and micro/cottage firms (Tk16.71 million vs. Tk2.96 million) during 2016. Estates established during 1981–92 have the highest GVA (Tk38.05 million) among all other establishments. Sectors such as the food, textile, jute, chemical, and agro food industries have a relatively higher GVA than others (Table 7). The estimated GVA for small and medium-sized firms is comparable with the national estimate of GVA for SMEs (Survey of Manufacturing Industries [SMI] 2006/2012).

3.4 Production Capacity and Capacity Utilization

In the current year, the targeted average annual production amounts for micro/cottage, small, and medium-sized firms was Tk36.81, Tk69.03, and Tk199.97 million respectively (Table 8). The realized production capacity in the current year for all firms did not vary much (73.5%–79.8%). The percentage change in the average annual targeted output reported by medium-sized firms was estimated to be relatively lower (71.4%) than micro and small firms (137.6% vs. 110.2%). However, the percentage change in realized production capacity for medium-sized firms was the highest (13.08%) relative to small and cottage firms (2.73% vs. 2.88%).

Table 8: Capacity Utilization

	Targeted Average Yearly Production (million BDT)			Realized Production Capacity (%)		% Change	N
	Starting Year	Current Year	% Change	Starting Year	Current Year		
Micro/cottage	15.49	36.81	137.6	71.51	73.46	2.73	128
Small	32.84	69.03	110.2	75.3	77.47	2.88	319
Medium-sized	116.67	199.97	71.4	70.58	79.81	13.08	53
Average	37.28	74.66	100.3	73.83	76.69	3.87	500

Source: BIDS Survey 2017.

4. CONTRIBUTION OF BSCIC ESTATES TO THE NATIONAL ECONOMY

Currently, there are 76 industrial estates located in various districts in Bangladesh, with two being recently completed. Among the estates, four estates were established to promote special sectors like Jamdani and hosiery, tannery, and electronics. The 74 estates consist of 10,389 industrial plots. The estimated total production from BSCIC estates was Tk552,622 million in 2016–17, which was 11.7% of the country's total industrial production and 18.7% of the country's manufacturing production. BSCIC estates also export about 9.5% of total exports and 10% of manufacturing exports. BSCIC estates have so far created employment of 0.564 million people, which is 8.8% of total manufacturing employment and 21.4% of SME employment. Total gross value added (GVA) of BSCIC estates is estimated to be Tk105,554.2 million from the firm survey, which is 6.35% of SME GVA.

However, the estates would perform much better if all the allotted plots were used for production. As about 22% (1,613 industrial plots) of the industrial plots are not utilized, this has a significant negative implication on potential employment generation, output, and government revenue gains. A substantial rise in performance indicators would be expected if the utilization rate increased to 100%.

Table 9: Production, Export, and Employment of the BSCIC Industrial Estates, 2010–2017

Indicator	2010	2015–16	2016–17
Total national industrial GDP (Tk in millions)	2,293,721	4,067,108	4,738,710
Total national manufacturing production (Tk in millions)	1,285,730	2,544,831	2,951,110
Total national export (Tk in millions)	1,121,140	2,424,147	2,681,080
Total national industrial export (Tk in millions)	1,059,980	2,325,811	2,578,945
Total production from BSCIC estates (Tk in millions)	273,605	458,797.4	552,622.6
Total employment by manufacturing sector (in millions)	4.41	6.01	6.39
Total employment by SME sector (in millions)	1.4	2.47	2.63
Total employment by BSCIC estates (in millions)	0.445	0.563	0.564
% of BSCIC employment of the total manufacturing employment	10.1	9.4	8.8
% of BSCIC employment of the total SME employment	31.8	22.8	21.4
Total export from BSCIC (Tk in millions)	152,036	249,309.2	255,284.6
% of total industrial production	11.9	11.3	11.7
% of total manufacturing production	21.3	18.0	18.7
% of total export	13.6	10.3	9.5
% of total manufacturing export	14.3	10.7	9.9
SME manufacturing gross value added (GVA) million Tk	825,712	1,393,360	1,659,657
BSCIC manufacturing gross value added (GVA) million Tk	–	–	105,554.2
BSCIC GVA as % of SME GVA	–	–	6.35%

Sources: The calculation is based on various issues of the Statistical Yearbook, BBS (industrial GDP, manufacturing production); Bangladesh Bank (export statistics); Census of Manufacturing Industries (CMI) and Survey of Manufacturing Industries (SMI) for SME sector GVA and employment; MIS-BSCIC for production, export, and employment statistics. Gross value added (GVA) in 2010, 2015–16 and 2016–17 were calculated using the growth rate of GVA during 1995–96 and 2012. BSCIC GVA was estimated from firm survey.

BSCIC estates have accommodated 4,205 firms out of 33,881 SME manufacturing firms in Bangladesh (see Table 2 and Economic Census 2013). Thus, though BSCIC contributes to about 12.4% of total SME manufacturing units, its contribution to total SME employment (21%) and manufacturing production (18%) outpaces non-BSCIC firms' performances. In general, despite various odds, the role of BSCIC in terms of cluster-based industrialization is largely positive.

BSCIC has established 74 industrial estates so far with two estates yet to come into operation. The estates were established in six phases starting from 1960 and the latest phase being completed in 2017. A total of 1,969 acres of land was utilized for establishing 74 estates, of which 3.6% of the land was used for administrative and other purposes (mosques/banks/ green space, etc.) and 19% was used for roads and the drainage system. A total of 10,389 plots were developed in 74 estates, 96.8% of which were allotted to entrepreneurs. However, among the allotted plots, about 22% remained unutilized (the rate is 27% if unallotted plots are included). This huge number of unutilized plots is a serious concern for BSCIC. In general, the low plot utilization is a culmination of several factors including weaknesses in the enforceability of rules and regulations, locational disadvantages, problems in the selection process of entrepreneurs during plot allocation, infrastructure bottlenecks (gas/electricity connection), etc. Almost two plots are allotted to each of the enterprises. The estimated fixed asset turnover ratio for some estates is very low indicating inefficiencies on the part of entrepreneurs in properly utilizing the fixed assets including the allotted plots. Therefore, when analyzing the applications for plots, it is important to carefully examine the necessity of the amount of land in terms of the applicant's business plan.

5. CONCLUSIONS AND POLICY RECOMMENDATIONS

The analysis in this paper suggests that BSCIC has been playing an important role in promoting cluster-based SMEs development in Bangladesh. Despite various odds, the contribution of BSCIC to SME manufacturing employment and industrial output is positive. Technological acquisition in the production process has been taking place at a faster pace in BSCIC estates.

However, BSCIC estates are plagued by poor infrastructure facilities. They lack inside road facilities, boundary walls, drainage systems, and street lights within the BSCIC estates. There are staffing shortages in the estates as well as poor maintenance of estate facilities due to poor allocation of funds from the government for the O&M of estates. Frequent power outages in the absence of dedicated grid connectivity and the inadequate or lack of gas supply are prime concerns of enterprises. The infrastructure bottlenecks in BSCIC estates greatly impede the SMEs in achieving the benefits of industrial clusters.

Nonetheless, BSCIC estates have important spillover impacts on the local tertiary sector of the economy. Various backward and forward linkage industries, markets and growth centers, shops, educational institutions, health clinics, and drug stores, etc. were developed after the establishment of the estate. A significant increase in housing and land prices is observed as a result of estate development.

Thus, a better provision of infrastructure facilities, the selection of good and motivated entrepreneurs, and structural reforms at BSCIC would be conducive to cluster-based industrialization in the country. A few of the reforms, such as the inclusion of experts and business representatives on the entrepreneur scrutiny committee, updating old rules and regulations to cancel the allotment of unutilized plots, a provision to spend a major portion of the service charges received from enterprises on the local estate, leaving the responsibility for the O&M of the estate to firm owners, etc. could make the estate management more vibrant and efficient.

The following are the key policy challenges that BSCIC has been facing over a long time which hamper its activities to a great extent. Therefore, addressing these challenges should be the key reform agenda for the government to improve the performances of BSCIC as well as the SME-cluster-based industrialization.

- (i) Financial viability: BSCIC has been facing a dearth of funds to manage its estates and other activities. On top of this, it does not have financial independence, depending on the central government for funding even for the maintenance activities of estates. Therefore, the financial viability of BSCIC is an important challenge for its smooth operation.
- (ii) Governance: The governance structure of BSCIC is highly bureaucratic and there is a coordination gap between BSCIC core staff and government appointed top officials. Moreover, decision-making processes in most cases are too bureaucratic, which prevents BSCIC from becoming competitive and responsive. Ensuring good governance at every stage of operation is an important concern for increasing the efficiency of its staff. A provision for the recruitment of technical professionals at various stages is crucial for enhancing efficiencies in the industrialization efforts of BSCIC.

- (iii) Incentive framework: An incentive framework is almost absent in BSCIC operation. Managing industrial estates and promoting enterprises through facilitating their activities needs better motivation and incentives. A good framework of incentives comparable to the private sector might improve governance problems.
- (iv) Centralized decision-making process: Though BSCIC has branch offices at division and district levels, entrepreneurs still have to deal with the head office for crucial decisions, which is time consuming. Therefore, the delegation of roles and responsibilities to branch offices might expedite the decision-making process.
- (v) A good framework of accountability and performance evaluation: A framework of accountability and performance evaluation of BSCIC activities needs to be devised in order to bring dynamism to the activities of BSCIC. Further, political interference must be kept to a minimum in estate development and management.

Skills development programs: Though BSCIC has been implementing various short-duration skills development programs, these are not proved to be very effective. Various government skill development programs can be implemented targeting cluster-based firms, which will also lessen the transaction costs of training programs in clusters. Moreover, if technical and managerial training programs are implemented for the firms within cluster, it will be more effective for the firms. Managing firms in a professional way within cluster is very important because it gives a signal to outside-cluster stakeholders, for example, financial institution who will be willing to provide access to finance to firms.

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