

7.1 Introduction

Indian textile industry, one of the country's oldest industries contributing 2.3% to the country's gross domestic product, employs 4.5 million people and generates 12% of the country's export earnings (GoI, 2019). India is the world's second-largest textile and apparel exporter (World Trade Statistical Review, 2021). To make India's development equitable and participatory, the Government has prioritized boosting textile manufacturing by constructing world-class manufacturing facilities, upgrading technology, and enhancing skills and traditional strengths (GoI, 2020-21). The government of India has planned to establish craft villages to provide consumers and tourists with traditional hand-woven products (MoT, 2021). In 2021 alone, 81 MUDRA (Micro Units Development & Refining Agency Limited) loans worth Rs. 45.00 crores were approved under the Weavers' Mudra Scheme (MoT, 2020-21). The current chapter is focusing on Haryana, a northern state of India. Haryana's merchandise exports totaled 12.06 billion US dollars in the fiscal year 2020 and 6.74 billion US dollars in the fiscal year 2021 (IBEF, 2021). The state has been at the forefront of industrial growth promotion, offering a variety of attractive incentives to encourage rapid industrialization (Haryana Enterprises & Employment Policy, 2020). Haryana contributes more than 36% of national exports for carpets and other textile floor coverings, 18% for woven apparel and clothing, 8% for knitted apparel and clothing, and 9% for other made-up textile articles (IBEF, 2021). The financial performance of the textile industry in Haryana can be evaluated using a variety of business statistics that indicate the industry's financial health.

Based on the existing literature (Tehrani, *et al.*, 2012; Lim, *et al.*, 2014), appropriate financial ratios as input and output variables and DEA (data envelopment analysis) technique have been applied to assess the financial performance of the textile industry in Haryana using a sample of selected public and private textile manufacturing companies of Haryana. DEA is a non-parametric technique (Charnes, *et al.*, 1978) and the best measure of performance

analysis which allows the use of multiple inputs and outputs in a set of peer decision-making units (DMUs) without imposing any functional form on data (Morita, *et al.*, 2004; Paço and Pérez, 2013) unlike Cobb–Douglas function and translog production function (Kumar and Gulati, 2008; Abulla and Kumar, 2020). Studies using either DEA or regression have focused on the financial ratios to examine financial performance. Although ratio analysis is effective for analysing single inputs and outputs, it is not much useful for multiple factors within a production unit (Darko-Mensah, 2019). DEA has been used to achieve the objective of this chapter as it allows for the analysis of multiple inputs and outputs within a production unit (Morita, *et al.*, 2004). It is discovered that input-oriented CCR and BCC techniques are the most used DEA techniques (Nassiri and Singh, 2010) because a firm using these techniques will have control over input variables to some extent to achieve the desired output level. The primary objective of any profit-making organisation is to maximise output while minimising costs. Thus, input-oriented CCR and BCC techniques associated with CRS and the VRS model of DEA and RTS have been used here to analyse the financial performance of the textile industry in Haryana using financial ratios as variables. Profitability and leverage are viewed as indicators of a business's performance output and activity, while liquidity ratios are used as input variables. Each industry has distinct working environments; policy recommendations intended for textile companies may not apply to another company and vice versa. This chapter proposes an innovative method for analyzing the financial performance of textile manufacturing companies in Haryana using quantitative indicators, which have not been previously explored. From a practical standpoint, the current chapter can assist shareholders in identifying efficient companies and constructing optimal portfolios accordingly. Managers of inefficient companies can also implement appropriate reforms suggested in the study to increase their efficiency.

The remainder of this chapter is structured as follows: Section 2 contains a data structure,

methodology, and novelty of the research. Section 3 summarises and discusses the findings. The concluding remarks and policy implications are presented in Section 4.

7.2 Research Methodology

7.2.1 Data collection

In the present study, financial variable data of textile manufacturing companies of Haryana was accessed from two different websites; MCA, New Delhi, and the Prowess database maintained by the CMIE. Prowess database provides the data related to Profit & Loss and balance sheet of all those companies which are listed on the BSE (Rajeev and Mazumdar, 2009), and the rest were accessed through MCA. The data relating to operational variables for Haryana's textile manufacturing companies was gathered by reviewing their annual reports (profit and loss and balance sheet) for five years i.e. 2015-16 to 2019-20. Initially, this study included 227 textile companies, and data on all textile manufacturing companies across Haryana were extracted from the MCA website for 192 companies. The financial data of 35 DMUs were accessed through the Prowess database making the number of companies 227. However, 139 of these companies were strucked-off and six were under liquidation. Thus, the remaining 82 DMUs were considered for analysis. After removing outliers, the final sample is left with 61 Textile Manufacturing Companies (DMUs).

7.2.2 Variable Selection

Six important input and output financial ratios have been selected and calculated separately for these 61 DMUs in the present study (Samo and Murad, 2019; Shahi *et al.*, 2020) (Table 7.1):

(a) Activity ratio

(1) Fixed asset turnover ratio (FATR); Net sales/Non-current assets

(2) Receivable accounts turnover ratio (RATR): Net Sales/Accounts Receivable (Current assets)

(b) Liquidity

(3) Current Ratio (CR): Current Assets/Current Liabilities

(c) Leverage

(4) Debt-equity ratio (DER): Total Debt/Equity

(d) Profitability

(5) Return on equity (ROE): Profit after tax/Shareholders equity

(6) Net profit margin (NPM): Profit after tax/Net Sales

Table 7.1: Financial Performance Evaluation criteria/Financial Variables			
Sr. n.	Performance Evaluation Criteria/Financial Variables	Researchers	Variable type/Indicator
1	Receivable account turnover ratio	Etemadi and Entezami, (2017), Lim <i>et al</i> (2012), Karimi and Barati (2016), Huang, Dai, and Guo, (2014)	Input (m)
2	Current Ratio	Karimi and Barati (2016), Lim <i>et al</i> (2012), Huang, Dai, and Guo, (2014)	Input (m)
3	Debt-equity Ratio	Samo and Murad, (2019), Etemadi andEntezami, (2017), Karimi and Barati (2016), Lim <i>et al</i> (2012)	Input (m)
4	Return on Equity Ratio	Balasubramanian <i>et al.</i> (2019), Etemadi and Entezami, (2017), Sahi <i>et al.</i> (2020), , Lim <i>et al</i> (2012)	Output (s)
5	Net Profit Margin Ratio	Sahi, Shiva and dia (2020), Balasubramanian <i>et al.</i> (2019), Etemadi andEntezami, (2017), Lim <i>et al</i> (2012)	Output (s)
6	Fixed Asset Turnover Ratio	Etemadi and Entezami, (2017), Lim <i>et al</i> (2012), Karimi and Barati (2016), Huang, Dai, and Guo, (2014)	Output (s)

The 61 DMUs' financial data was analysed using their current price. For the textile industry in Haryana, DEA and RTS were used on all selected DMUs to determine their efficiency. $N \geq$

$(m*s)$ and/or $N \geq 3*(m+s)$ in DEA (Cooper, *et al.*, 1990) are: $3*6 = 18 < 61$, and/or $3*(3*3) = 27 < 61$, respectively. Thus, both the rule of thumbs for sample selection is justified.

Table 7.2: Descriptive statistics of financial ratios

Year	Descriptive Statistics	Receivable accounts turnover ratio (RATR)	Current Ratio (CR)	Debt-equity ratio (DER)	Return on equity (ROE)	Net profit margin (NPM)	Fixed asset turnover ratio (FATR)
2015-16	Mean	2.61	1.98	10.09	0.29	0.04	16.07
	Min	0.01	0.02	-137.56	-0.65	-0.15	0.01
	max	8.37	19.38	122.12	1.01	0.99	130
	SD	1.66	2.82	35.45	0.45	0.14	28.39
	Skewness	1.14	4.59	0.14	0.79	5.86	2.46
	Kurtosis	1.54	24.86	7.07	-0.85	38.92	5.82
	Median	2.34	1.23	4	0.02	0.02	3.97
2016-17	Mean	2.39	1.91	3.54	0.02	0.05	10.65
	Min	0.01	0.01	-6.01	-4.12	-0.45	1.01
	max	7.46	11.35	47.24	4.04	1.68	73.85
	SD	1.64	2.08	7.17	0.88	0.27	16.4
	Skewness	1	3.08	4.06	-1.1	4.51	2.28
	Kurtosis	1.2	10.16	22.38	17.49	25.43	4.36
	Median	2.13	1.3	1.53	0.03	0.01	3.97
2017-18	Mean	2.29	2.5	4.75	0.17	0.01	10.9
	Min	0.01	0.16	-57.38	-0.06	-0.98	0.01
	max	10.64	23.26	169.2	3.81	0.25	91.7
	SD	1.74	4.11	23.3	0.5	0.14	19.44
	Skewness	2.09	4.26	5.6	6.38	-5.96	2.6
	Kurtosis	7.51	18.94	41.98	45.15	41.09	6.22
	Median	1.8	1.36	1.01	0.02	0.02	3.67
2018-19	Mean	2.57	1.91	6.85	0.08	-0.13	24.4
	Min	0.01	0.12	-52.02	-0.33	-4.39	0.01
	max	12.38	9.52	201.14	0.71	0.23	647.01

	SD	2.19	1.97	29.94	0.15	0.69	84.99
	Skewness	2	2.72	5.02	0.91	-5.29	6.66
	Kurtosis	5.88	7.58	30.3	5.31	28.83	48.23
	Median	2.05	1.25	0.89	0.05	0.02	4.11
2019-20	Mean	2.17	1.56	3.92	0.05	-0.12	8.6
	Min	0.01	0.01	-16.9	-1.98	-5.17	0.01
	max	16.11	10.26	102.21	0.78	0.24	100.88
	SD	2.53	1.72	14.61	0.3	0.74	19.7
	Skewness	3.21	3.72	5.58	-4.89	-5.91	3.66
	Kurtosis	14.62	16.38	35.15	34.68	37.57	13.06
	Median	1.98	1.17	0.31	0.02	0.02	2.99

Source: Author's calculation

7.3 Results and Discussion

Table 7.2 displays the descriptive statistics of above mentioned six financial ratios (3 input variables and 3 output variables) of 61 textile manufacturing companies (DMUs) in Haryana for five years (2015-16 to 2019-20). Table 7.2 presents the means, Median, range, SD, skewness, kurtosis as descriptive statistics of chosen financial variables (Financial Ratios). The variation can be understood using the year-wise average standard deviation of DMUs. SD of RATR in 2019-20 is largest (2.53), which shows the maximum variance in the data and results will be more fluctuating whereas the SD in the year 2016-17 is minimal (1.64) which demonstrates that there is less variance and fluctuation in the data. Hence, it will produce more stable outcomes. Similarly, the highest SD of CR is 4.11 in 2017-18 which exhibits the highest volatility whereas the lowest fluctuation is 1.97 in 2018-19 and so on. As far as NPM is concerned, it is highest in 2019-20 and the lowest (0.14) in 2015-16 and 2017-18.

7.3.1 Financial performance of textile manufacturing companies in Haryana for the year 2015-16

Tables 7.3 demonstrate the OTE, PTE, SE, and RTS of 61 DMUs in Haryana for the year 2015-16 while Table 7.4 outlines the frequency distribution of OTE, PTE, and SE in the same

year. The mean OTE score is 0.18, which indicates that the OTIE is 82%. The 82 percent reduction in input size indicates that the textile units are capable of growing their outputs simultaneously in 2015-16. The primary reason for such inefficiency could be that an insufficient scale size or input configuration was chosen, along with the size of financial operations. Six companies operate at OTE with score one are Shivansh Textiles Pvt. Ltd., Vee Fabrics Pvt. Ltd., J.D.R.D. Embroidery Pvt. Ltd., Nik Fasteners Pvt. Ltd., Prosource Textiles Pvt. Ltd., UNMA Textiles Pvt. Ltd. This collection of companies argues in favour of the CRS conical hull. The same set of companies operates at PTE and SE, which comes under the VRS assumption. The VRS conical hull encloses data points more closely than the CRS conical hull. These findings indicate that a particular company that operates at OTE also operates at PTE and SE with CRS. As per Table 7.4, no company achieved a score of 0.6 to 1 (one). The maximum forty-six companies (75.41 percent) are operating below the 0.20 score, require a significant change in their financial operations, or require the introduction of advanced technology. Two companies between the score 0.4 and 0.6 (3.28%) while 11.48% (7 companies) of companies have a low efficiency (0.2 to 0.4), which also requires a significant increase in input size to enhance the efficiency.

Thirteen companies (i.e. 21.31%) out of the 61 DMUs have achieved a PTE score of 1 and so have obtained the designation of locally technical efficient and managerially efficient. PTE scores estimate the degree of Pure Technical Inefficiency (PTIE) in DMUs. PTE mean value is 0.33 in 2015-16, which indicates that the amount of PTIE in these companies is 67 percent. The findings reveal that approximately this 67% of OTIE (82 percent) is associated with the underperformance of the management only (Kumar and Gulati, (2008) rest degree of OTIE may be due to inappropriate input scale size. In table 7.4, there are 61 DMUs out of which 6 are relatively efficient about local technical efficiency and also keep an OTE score of 1 i.e. they are globally as well as locally technical efficient. The remaining 7 DMUs are locally

efficient but globally inefficient. The OTIE in these seven companies is a result of their inability to operate at their MPSS. Additionally, 47 DMUs (i.e. 77.05 percent) have a PTIE greater than 20%, while only one DMUs (1.64 percent) have a PTIE less than or equal to 20%.

Additionally, the $SE = 1$ indicates MPSS that is ideal scale size of a unit is in effect. conversely, $SE \neq 1$ means that the company is functioning at its sub-optimal scale size. The mean SE score in the current analysis is 0.55, indicating that the average level of SIE in DMUs is approximately 45% of companies that are technically efficient on a global scale (OTE score = 1) are also technically efficient on a local scale (PTE score = 1), and so the ratio of both efficiencies is one (1) is efficient at SE. As a result, there is no need for further improvement for DMUs with SE scores of 1 and enterprises functioning at MPSS. The same set of DMUs that are efficient in the CCR model with OTE equal to one must be efficient in the BCC model with SE score equal to one. Additionally, as shown in Table 7.4, just eight (13.11 percent) companies have a SE score of 1 and are functioning at MPSS. Thus, it demonstrates that the remaining 55 (90.16 percent) companies have some degree of SIE, though of varying degrees. Henceforth, it was discovered that five (8.20 percent) of 61 companies have a SE score greater than 0.8 and operate close to MPSS, while twelve companies (19.67 percent) have a score between 0.60 and 0.80. If these enterprises lessen their inputs by approximately 10% to 20%, the majority of them can approach MPSS. As shown in Table 7.3, if a company has an OTE score of 1, it must also be efficient in terms of PTE and SE, with a λ score of 1.

Table 7.3: Financial Efficiency scores and RTS Analysis of Textile manufacturing Units in Haryana in 2015-16 (DMU = 61)

Name of the Company	DMUs	O TE	PTE	SE	RTS	$\sum \lambda$
Aggarsain Spinners Ltd.	C1	0.0399	0.0889	0.4495	DRS	10.69
Ashnoor Textile Mills Ltd.	C2	0.0308	0.1931	0.1593	DRS	4
Benetton India Pvt. Ltd.	C3	0.0332	0.0592	0.5614	DRS	4.23
Meyer Apparel Ltd.	C4	0.0185	0.0283	0.652	DRS	1.69
Gupta Exim (India) Pvt. Ltd.	C5	0.0183	0.0194	0.9393	DRS	1.13
H P Cotton Textile Mills Ltd.	C6	0.0331	0.1517	0.2179	DRS	4
Haryana Texprints (Overseas) Ltd.	C7	0.052	0.0828	0.6286	DRS	6.11
Hisar Spinning Mills Ltd.	C8	0.0259	0.1624	0.1592	DRS	6
Indo Cotspin Ltd.	C9	0.0178	0.0736	0.2421	DRS	2.14
Jasch Industries Ltd.	C10	0.0405	0.2732	0.1484	DRS	6
Orient Craft Ltd.	C11	0.0162	0.0595	0.2725	DRS	2.02
Partap Spintex Pvt. Ltd.	C12	0.0207	0.0244	0.8466	DRS	1.55
Shivani Textiles Ltd.	C13	0.0093	0.0092	1	DRS	1.01
Pasupati Spinning &Wvg. Mills Ltd.	C14	0.0246	0.0348	0.7075	DRS	2.49
Voith Paper Fabrics India Ltd.	C15	0.3621	1	0.3621	DRS	21
R L F Ltd.	C16	0.001	0.0714	0.0136	IRS	0.01
Richa Industries Ltd.	C17	0.0295	0.0592	0.4982	DRS	3.56
Sanganeriya Spinning Mills Ltd.	C18	0.0124	0.0168	0.7371	DRS	2.04
Uniroyal Industries Ltd.	C19	0.0224	0.0953	0.235	DRS	3
United Leasing &Inds. Ltd.	C20	0.4516	1	0.4516	DRS	14
United Textiles Ltd.	C21	0.0091	0.0093	0.978	DRS	1.03
Tex Corp Pvt. Ltd.	C22	0.0071	0.0070	1	DRS	1.01
Biba Apparels Pvt. Ltd.	C23	0.0675	0.5542	0.1218	DRS	11
Numero Uno Clothing Ltd.	C24	0.0221	0.04	0.5513	DRS	2.16
Unicharm India Pvt. Ltd.	C25	0.0037	0.005	0.7437	IRS	0.74
Jindal Spinning Mills Ltd.	C26	0.0348	0.0668	0.52	DRS	4.74
Shivansh Textiles Pvt. Ltd.	C27	1	1	1	CRS	1
Chaos design Private Ltd.	C28	0.0429	0.1679	0.2555	DRS	4.73
Click Clothing Company Private Ltd.	C29	0.0207	0.0353	0.5861	DRS	2.21
DAG Design Concept Fashion Private Ltd.	C30	0.3386	0.7113	0.476	DRS	38.34
Drips Apparels Private Ltd.	C31	0.1333	0.9904	0.1346	DRS	8
Delphique Fabrics Private Ltd.	C32	0.0401	0.0794	0.5049	DRS	5.55

Dida Brothers Company Private Ltd.	C33	0.1476	1	0.1476	DRS	10.92
J.D. Textiles Private Ltd.	C34	0.3227	1	0.3227	DRS	33.96
Jai Handloom Private Ltd.	C35	0.0334	0.0492	0.6792	DRS	3.16
Jindal Cotspin Private Ltd.	C36	0.0439	0.0894	0.4912	DRS	5.74
Panipat Texo Fabs Private Ltd.	C37	0.0278	0.0685	0.4059	DRS	3.93
Radico Fashions Private Limited	C38	0.3072	0.5533	0.5553	DRS	58.06
RGL Fashion Private Ltd.	C39	0.0787	0.1595	0.4934	DRS	15.04
Santosh Woolen Pvt. Ltd.	C40	0.0328	0.2033	0.1612	DRS	4.81
Sarla Handicrafts Pvt. Ltd.	C41	0.0509	0.103	0.4943	DRS	3.16
Shivansh Textile Private Ltd.	C42	0.0241	0.0293	0.8216	DRS	1.67
Shree Shiv Shakti Synthetics Pvt. Ltd.	C43	0.5883	1	0.5883	DRS	61.06
Shubh & Sanchay Texofab Pvt. Ltd.	C44	0.0435	0.0844	0.5153	DRS	2
Sufiana Design Pvt. Ltd.	C45	0.0506	0.0763	0.6628	DRS	4.79
Typio YFM Design Pvt. Ltd.	C46	0.1002	0.3082	0.3251	DRS	12.03
Angel Fabrics Pvt. Ltd.	C47	0.0058	0.0076	0.7552	IRS	0.71
Anika Syncotex Pvt. Ltd.	C48	0.0392	0.0432	0.9076	DRS	1.4
Shiv Sharan Handlooms Pvt. Ltd.	C49	0.0555	0.105	0.5288	DRS	4.05
Vee Fabrics Pvt. Ltd.	C50	1	1	1	CRS	1
J.D.R.D. Embroidery Pvt. Ltd.	C51	1	1	1	CRS	1
Maharaja Texo Fab Pvt. Ltd.	C52	0.0165	0.0231	0.7153	DRS	2.34
Nik Fasteners Pvt. Ltd.	C53	1	1	1	CRS	1
Prosource Textiles Pvt. Ltd.	C54	1	1	1	CRS	1
UNMA Textiles Pvt. Ltd.	C55	1	1	1	CRS	1
Peacock Fabrics Pvt. Ltd.	C56	0.0116	0.0145	0.7993	DRS	1.66
PCC Interlinings Pvt. Ltd.	C57	0.2527	1	0.2527	DRS	43.69
Kanta fabrics Pvt. Ltd.	C58	0.0511	0.075	0.6813	DRS	4.65
Govind Textiles Pvt. Ltd.	C59	0.2137	0.4948	0.4319	DRS	44.51
Aan Handloom Pvt. Ltd.	C60	0.3572	0.578	0.618	DRS	37.86
Neelmani Textile Pvt. Ltd.	C61	0.0281	1	0.0281	DRS	3.54
Average		0.18	0.33	0.55		

Source: Author's calculation

Sr.N.	Different ranges of efficiency scores	OTE		PTE		SE	
		DMU's	Percentage	DMU's	Percentage	DMU's	Percentage
1	0.00<= Score <0.2	46	75.41%	39	63.93%	9	14.75%
2	0.2<= Score <0.4	7	11.48%	3	4.92%	9	14.75%
3	0.4<= Score <0.6	2	3.28%	4	6.56%	18	29.51%
4	0.6<= Score <0.8	0	0.00%	1	1.64%	12	19.67%
5	0.8<= Score <1	0	0.00%	1	1.64%	5	8.20%
6	Score =1	6	9.84%	13	21.31%	8	13.11%
	Total	61	100.00%	61	100.00%	61	100.00%

Source: Author's calculation

7.3.2 Financial performance of textile manufacturing companies in Haryana for the year 2016-17

Table 7.5 describes the OTE, PTE, SE, and RTS scores and analyses of 61 DMUs in Haryana for the academic year 2016-17, whereas Table 7.6 summarises the OTE, PTE, and SE frequency distributions for the same year. The average OTE score is 0.17 (the lowest value for the five-year study period), indicating that the OTIE is 83%. The 83 percent reduction in input size shows that textile units are capable of simultaneously increasing their outputs in 2016-17. At OTE, just four enterprises operate: R L F Limited, Nik Fasteners Private Limited, Prosource Textstyles Private Limited, and UNMA Textiles Private Limited. According to the above argument, each company must operate at optimum efficiency in all three efficiency metrics, namely OTE, PTE, and SE. Only one company received a score of 0.8 to 1, suggesting that it is operating at a very low-efficiency level and that the main input should be changed. Maximum 47 enterprises (77.05 percent) operate below the 0.20 score, require significant operational changes, or require the adoption of modern technology. Three companies with an efficiency of between 0.4 and 0.6 (4.92%) and one company with an efficiency of between 0.6 and 0.8 (1.64%) are moderately efficient (0.6 to 0.8), while 8.20

percent of companies (6 companies) have a low efficiency (0.2 to 0.4), which also requires a significant increase in input size.

In 2016-17, the mean SE score was 0.58, indicating that the average level of SIE in DMUs is at 42%. Companies that are technically efficient on a global scale (OTE score = 1) are also technically efficient on a local scale (PTE score = 1), and so the ratio of both efficiency is one (1). As a result, DMUs with SE scores of 1 and firms operating at MPSS do not require additional improvement. The same set of DMUs is efficient in all three modes of operation: OTE, PTE, and SE. Additionally, as indicated in Table 7.6, only four (6.56 percent) of the 61 enterprises in the study have a SE score of 1 and are operating at MPSS. Thus, it reveals that the remaining 57 (93.44 percent) companies have some level of SIE, albeit to a lesser extent. As a result, it was determined that eight (13.11 percent) of 61 companies have a SE score greater than 0.8 and are placed approximately MPSS, while the remaining nine have a score between 0.60 and 0.80.

Table 7.5: Financial Efficiency scores and RTS Analysis of Textile manufacturing Units in Haryana in 2016-17 (DMU = 61)

Name of the Company	DMUs	OTE	PTE	SE	RTS	$\sum \lambda$
Aggarsain Spinners Ltd.	C1	0.0399	0.093	0.4296	DRS	10.69
Ashnoor Textile Mills Ltd.	C2	0.0249	0.0438	0.5695	DRS	2.42
Benetton India Pvt. Ltd.	C3	0.0332	0.0774	0.4298	DRS	4.23
Meyer Apparel Ltd.	C4	0.0185	0.03	0.6164	DRS	1.69
Gupta Exim (India) Pvt. Ltd.	C5	0.0183	0.0204	0.8973	DRS	1.13
H P Cotton Textile Mills Ltd.	C6	0.0305	0.0605	0.5039	DRS	3.24
Haryana Texprints (Overseas) Ltd.	C7	0.052	0.1098	0.4737	DRS	6.11
Hisar Spinning Mills Ltd.	C8	0.0188	0.0302	0.6202	DRS	2.57
Indo Cotspin Ltd.	C9	0.0178	0.0357	0.4988	DRS	2.14
Jasch Industries Ltd.	C10	0.0297	0.0493	0.6028	DRS	2.68
Orient Craft Ltd.	C11	0.0162	0.0297	0.5458	DRS	2.02
Partap Spintex Pvt. Ltd.	C12	0.0207	0.0271	0.7641	DRS	1.55
Shivani Textiles Ltd.	C13	0.0883	0.1697	0.5201	DRS	2.87
Pasupati Spinning &Wvg. Mills Ltd.	C14	0.0246	0.0436	0.5647	DRS	2.49

Voith Paper Fabrics India Ltd.	C15	0.0339	0.0441	0.7693	IRS	0.36
R L F Ltd.	C16	1	1	1	CRS	1
Richa Industries Ltd.	C17	0.0295	0.0753	0.3917	DRS	3.56
Sanganeriya Spinning Mills Ltd.	C18	0.0124	0.0206	0.5996	DRS	2.04
Uniroyal Industries Ltd.	C19	0.014	0.015	0.9368	IRS	0.65
United Leasing &Inds. Ltd.	C20	0.2419	0.2456	0.9851	IRS	0.33
United Textiles Ltd.	C21	0.0108	0.013	0.8279	DRS	1.1
Tex Corp Pvt. Ltd.	C22	0.0069	0.0071	0.9666	IRS	0.9
Biba Apparels Pvt. Ltd.	C23	0.0271	0.0598	0.4535	DRS	3.54
Numero Uno Clothing Ltd.	C24	0.0221	0.0425	0.5195	DRS	2.16
Unicharm India Pvt. Ltd.	C25	0.0201	0.0562	0.3586	DRS	4.03
Jindal Spinning Mills Ltd.	C26	0.0348	0.0869	0.4001	DRS	4.74
Shivansh Textiles Pvt. Ltd.	C27	0.652	1	0.652	IRS	0.06
Chaos design Private Ltd.	C28	0.0429	0.0953	0.45	DRS	4.73
Click Clothing Company Private Ltd.	C29	0.0207	0.044	0.4707	DRS	2.21
DAG Design Concept Fashion Private Ltd.	C30	0.3386	0.8252	0.4103	DRS	38.34
Drips Apparels Private Ltd.	C31	0.9157	0.9912	0.9238	DRS	1.25
Delphique Fabrics Private Ltd.	C32	0.0401	0.1035	0.3876	DRS	5.55
Dida Brothers Company Private Ltd.	C33	0.1476	1	0.1476	DRS	10.92
J.D. Textiles Private Ltd.	C34	0.3227	1	0.3227	DRS	33.96
Jai Handloom Private Ltd.	C35	0.0334	0.0629	0.5316	DRS	3.16
Jindal Cotspin Private Ltd.	C36	0.0439	0.093	0.4721	DRS	5.74
Panipat Texo Fabs Private Ltd.	C37	0.0278	0.0581	0.4791	DRS	3.93
Radico Fashions Private Limited	C38	0.1788	0.4212	0.4245	DRS	33.78
RGL Fashion Private Ltd.	C39	0.0787	0.16	0.4918	DRS	15.04
Santosh Woolen Pvt. Ltd.	C40	0.0328	0.0968	0.3385	DRS	4.81
Sarla Handicrafts Pvt. Ltd.	C41	0.0509	0.0871	0.5845	DRS	3.16
Shivansh Textile Private Ltd.	C42	0.0241	0.0331	0.7267	DRS	1.67
Shree Shiv Shakti Synthetics Pvt. Ltd.	C43	0.4328	1	0.4328	DRS	44.92
Shubh&SanchayTexofab Pvt. Ltd.	C44	0.0398	0.0409	0.9726	DRS	1.06
Sufiana Design Pvt. Ltd.	C45	0.0506	0.0974	0.5192	DRS	4.79
TypioYfm Design Pvt. Ltd.	C46	0.1002	0.2583	0.3879	DRS	12.03
Angel Fabrics Pvt. Ltd.	C47	0.0058	0.0076	0.7552	IRS	0.71
Anika Syncotex Pvt. Ltd.	C48	0.0392	0.0455	0.8606	DRS	1.4

Shiv Sharan Handlooms Pvt. Ltd.	C49	0.0555	0.097	0.572	DRS	4.05
Vee Fabrics Pvt. Ltd.	C50	0.4505	1	0.4505	IRS	0.09
J.D.R.D. Embroidery Pvt. Ltd.	C51	0.4081	1	0.4081	IRS	0.03
Maharaja Texo Fab Pvt. Ltd.	C52	0.0165	0.0288	0.5734	DRS	2.34
Nik Fasteners Pvt. Ltd.	C53	1	1	1	CRS	1
Prosource Texstyles Pvt. Ltd.	C54	1	1	1	CRS	1
UNMA Textiles Pvt. Ltd.	C55	1	1	1	CRS	1
Peacock Fabrics Pvt. Ltd.	C56	0.0116	0.0169	0.6873	DRS	1.66
PCC Interlinings Pvt. Ltd.	C57	0.2527	1	0.2527	DRS	43.69
Kanta fabrics Pvt. Ltd.	C58	0.0511	0.0936	0.5459	DRS	4.65
Govind Textiles Pvt. Ltd.	C59	0.0551	0.1596	0.3451	DRS	11.47
Aan Handloom Pvt. Ltd.	C60	0.3572	0.7616	0.469	DRS	37.86
Neelmani Textile Pvt. Ltd.	C61	0.0281	0.2824	0.0995	DRS	3.54
Average		0.17	0.29	0.58		

Source: Author's calculation

If these enterprises lessen their inputs by approximately 10% to 20%, the majority of them can approach MPSS. As shown in Table 7.5, if a company has an OTE score of 1, it must also be efficient in terms of PTE and SE, with a λ score of 1.

Table 7.6: Frequency Distribution of financial efficiency scores of OTE, PTE, and SE of Textile Manufacturing Companies in Haryana (2016-17)

Sr.N.	Different ranges of efficiency scores	OTE		PTE		SE	
		DMU's	Percentage	DMU's	Percentage	DMU's	Percentage
1	0.00<= Score <0.2	47	77.05%	43	70.49%	2	3.28%
2	0.2<= Score <0.4	5	8.20%	3	4.92%	8	13.11%
3	0.4<= Score <0.6	3	4.92%	1	1.64%	30	49.18%
4	0.6<= Score <0.8	1	1.64%	1	1.64%	9	14.75%
5	0.8<= Score <1	1	1.64%	2	3.28%	8	13.11%
6	Score =1	4	6.56%	11	18.03%	4	6.56%
Total		61	100.00%	61	100.00%	61	100.00%

Source: Author's calculation

7.3.3 Financial performance of textile manufacturing companies in Haryana for the year 2017-18

Table 7.7 includes the OTE, PTE, SE, and RTS scores and analyses the financial performance of 61 DMUs in Haryana for the year 2017-18, while Table 7.8 details the OTE, PTE, and SE frequency distributions for the same year. The average OTE score for all years is 0.50, indicating that the OTIE is 50%. The 50% reduction in input size means that Textile units can grow their outputs simultaneously in 2017-18. Only fifteen companies are located at OTE with score one: DAG Design Concept Fashion Private Ltd., J.D. Textiles Private Ltd., Panipat Texo Fabs Private Ltd., Radico Fashions Private Limited., RGL Fashion Private Ltd., Shree Shiv Shakti Synthetics Pvt. Ltd., TypioYfm Design Pvt. Ltd., Vee Fabrics Pvt. Ltd., J.D.R.D. Embroidery Pvt. Ltd., Nik Fasteners Pvt. Ltd., Prosource Textstyles Pvt. Ltd., UNMA Textiles Pvt. Ltd., Govind Textiles Pvt. Ltd., Aan Handloom Pvt. Ltd., Neelmani Textile Pvt. Ltd. Additionally, these firms perform at PTE and SE. Two companies achieved a score of 0.8 to 1 in 2017-18, indicating that they are operating at a very low-efficiency level and that significant changes in input size is required. The fourteen companies (22.95 percent) have a score of less than 0.20, require considerable changes, or require the introduction of modern technology. Eight companies (13.11%) between 0.4 and 0.6 and five companies (8.20 percent) between 0.6 to 0.8 is moderately efficient, while 27.87% of companies (17 companies; Maximum out of all the years) have low efficiency (0.2 to 0.4), which also requires a significant increase in the input size.

Seventeen companies (i.e. 27.87%) have achieved a PTE score of 1 and hence these are locally technical efficient and managerially efficient. PTE mean value is 0.65, which indicates that the amount of PTIE in these companies is 35 percent. In table 7.7, out of 61 DMUs, 15 are relatively efficient about local technical efficiency with an OTE score of 1 i.e. they are globally as well as locally technical efficient. The remaining 2 units are locally

efficient but globally inefficient. The OTIE in these seventeen companies is a result of their inability to operate at their most productive scale size (MPSS). Additionally, 44 DMUs (i.e. 72.13 percent) have a PTIE greater than 20%, while seven DMUs (11.48 percent) have a PTIE less than or equal to 20%.

Further, the mean SE score in 2017-18 is 0.71, indicating that the average level of SIE in DMUs is approximately 29%. The companies which are technically efficient on a global scale (OTE score = 1) are also technically efficient on a local scale (PTE score = 1). As a result, there is no need for further improvement for DMUs with SE scores of 1 and enterprises functioning at MPSS. The same set of DMUs is efficient at OTE, PTE, and SE. In addition to this Table 7.8, shows fifteen companies (24.59 percent) have a SE score of 1 and are functioning at MPSS. Thus, it demonstrates that the remaining 46 (75.41 percent) companies have some degree of SIE.

Table 7.7: Financial Efficiency scores and RTS Analysis of Textile manufacturing Units in Haryana in 2017-18 (DMU = 61)

Name of the Company	DMUs	OTE	PTE	SE	RTS	$\sum \lambda$
Aggarsain Spinners Ltd.	C1	0.0699	0.1171	0.5972	IRS	0.43
Ashnoor Textile Mills Ltd.	C2	0.5659	0.6203	0.9122	IRS	0.79
Benetton India Pvt. Ltd.	C3	0.1594	0.6051	0.2634	IRS	0.2
Meyer Apparel Ltd.	C4	0.0988	0.3324	0.2971	IRS	0.07
Gupta Exim (India) Pvt. Ltd.	C5	0.2266	0.8573	0.2643	IRS	0.16
H P Cotton Textile Mills Ltd.	C6	0.187	0.4686	0.399	IRS	0.29
Haryana Texprints (Overseas) Ltd.	C7	0.2231	0.5372	0.4154	IRS	0.37
Hisar Spinning Mills Ltd.	C8	0.3966	0.4322	0.9178	DRS	1.18
Indo Cotspin Ltd.	C9	0.1891	0.351	0.5387	IRS	0.33
Jasch Industries Ltd.	C10	0.5678	0.5809	0.9773	IRS	0.82
Orient Craft Ltd.	C11	0.2712	0.4839	0.5605	IRS	0.38
Partap Spintex Pvt. Ltd.	C12	0.2738	0.5121	0.5346	IRS	0.32
Shivani Textiles Ltd.	C13	0.2234	0.5922	0.3773	IRS	0.27
Pasupati Spinning &Wvg. Mills Ltd.	C14	0.211	0.5794	0.3641	IRS	0.26
Voith Paper Fabrics India Ltd.	C15	0.932	1	0.932	DRS	11.36

R L F Ltd.	C16	0.7901	0.8076	0.9783	DRS	1.51
Richa Industries Ltd.	C17	0.3082	0.8078	0.3816	IRS	0.27
Sanganeriya Spinning Mills Ltd.	C18	0.126	0.3532	0.3566	IRS	0.23
Uniroyal Industries Ltd.	C19	0.5918	0.6883	0.8598	IRS	0.64
United Leasing &Inds. Ltd.	C20	0.5046	1	0.5046	IRS	0.27
United Textiles Ltd.	C21	0.1942	0.4863	0.3993	IRS	0.25
Tex Corp Pvt. Ltd.	C22	0.1825	0.4714	0.3872	IRS	0.25
Biba Apparels Pvt. Ltd.	C23	0.3765	0.3771	0.9984	IRS	0.84
Numero Uno Clothing Ltd.	C24	0.2265	0.3379	0.6703	IRS	0.49
Unicharm India Pvt. Ltd.	C25	0.668	0.7129	0.9369	CRS	1.28
Jindal Spinning Mills Ltd.	C26	0.2543	0.4891	0.52	IRS	0.31
Shivansh Textiles Pvt. Ltd.	C27	0.0629	0.1535	0.4095	IRS	0.3
Chaos design Private Ltd.	C28	0.5316	0.5637	0.9431	IRS	0.78
Click Clothing Company Private Ltd.	C29	0.5322	0.7058	0.754	IRS	0.56
DAG Design Concept Fashion Private Ltd.	C30	1	1	1	CRS	1
Drips Apparels Private Ltd.	C31	0.8569	0.9394	0.9122	IRS	0.73
Delphique Fabrics Private Ltd.	C32	0.2511	0.4552	0.5516	IRS	0.38
Dida Brothers Company Private Ltd.	C33	0.6378	0.8848	0.7209	IRS	0.21
J.D. Textiles Private Ltd.	C34	1	1	1	CRS	1
Jai Handloom Private Ltd.	C35	0.2392	0.4242	0.5639	IRS	0.31
Jindal Cotspin Private Ltd.	C36	0.2168	0.338	0.6414	IRS	0.5
Panipat Texo Fabs Private Ltd.	C37	1	1	1	CRS	1
Radico Fashions Private Limited	C38	1	1	1	CRS	1
RGL Fashion Private Ltd.	C39	1	1	1	CRS	1
Santosh Woolen Pvt. Ltd.	C40	0.2085	0.4084	0.5104	IRS	0.32
Sarla Handicrafts Pvt. Ltd.	C41	0.4052	0.6534	0.6202	IRS	0.41
Shivansh Textile Private Ltd.	C42	0.2395	0.483	0.4958	IRS	0.29
Shree Shiv Shakti Synthetics Pvt. Ltd.	C43	1	1	1	CRS	1
Shubh&SanchayTexofab Pvt. Ltd.	C44	0.1015	0.2389	0.4247	IRS	0.29
Sufiana Design Pvt. Ltd.	C45	0.7676	0.903	0.85	IRS	0.62
TypioYfm Design Pvt. Ltd.	C46	1	1	1	CRS	1
Angel Fabrics Pvt. Ltd.	C47	0.0356	0.0366	0.9718	IRS	0.95
Anika Syncotex Pvt. Ltd.	C48	0.6881	0.8332	0.8259	IRS	0.3

Shiv Sharan Handlooms Pvt. Ltd.	C49	0.1127	0.5337	0.2112	IRS	0.08
Vee Fabrics Pvt. Ltd.	C50	1	1	1	CRS	1
J.D.R.D. Embroidery Pvt. Ltd.	C51	1	1	1	CRS	1
Maharaja Texo Fab Pvt. Ltd.	C52	0.1286	0.2864	0.4489	IRS	0.32
Nik Fasteners Pvt. Ltd.	C53	1	1	1	CRS	1
Prosource Textstyles Pvt. Ltd.	C54	1	1	1	CRS	1
UNMA Textiles Pvt. Ltd.	C55	1	1	1	CRS	1
Peacock Fabrics Pvt. Ltd.	C56	0.0892	0.2364	0.3775	IRS	0.25
PCC Interlinings Pvt. Ltd.	C57	0.5248	0.54	0.972	IRS	0.89
Kanta fabrics Pvt. Ltd.	C58	0.253	0.5065	0.4996	IRS	0.37
Govind Textiles Pvt. Ltd.	C59	1	1	1	CRS	1
Aan Handloom Pvt. Ltd.	C60	1	1	1	CRS	1
Neelmani Textile Pvt. Ltd.	C61	1	1	1	DRS	2
Average		0.50	0.65	0.71		

Source: Author's calculation

Hereafter, it was discovered that fourteen company is nearby MPSS because of SE score greater than 0.8 and only five companies have a score between 0.60 and 0.80. If this company lessens its inputs by approximately 20%, it can approach MPSS. Table 7.7 shows that, if a company has an OTE score of 1, it must also be efficient in terms of PTE and SE, with a λ score of 1.

Table 7.8: Frequency Distribution of financial efficiency scores of OTE, PTE, and SE of Textile Manufacturing Companies in Haryana (2017-18)

Sr.N.	Different ranges of efficiency scores	OTE		PTE		SE	
		DMU's	Percentage	DMU's	Percentage	DMU's	Percentage
1	0.00<= Score <0.2	14	22.95%	3	4.92%	0	0.00%
2	0.2<= Score <0.4	17	27.87%	9	14.75%	12	19.67%
3	0.4<= Score <0.6	8	13.11%	19	31.15%	15	24.59%
4	0.6<= Score <0.8	5	8.20%	6	9.84%	5	8.20%
5	0.8<= Score <1	2	3.28%	7	11.48%	14	22.95%
6	Score =1	15	24.59%	17	27.87%	15	24.59%
Total		61	100.00%	61	100.00%	61	100.00%

Source: Author's calculation

7.3.4 Financial performance of textile manufacturing companies in Haryana for the year 2018-19

Tables 7.9 demonstrate the OTE, PTE, SE scores, and RTS analysis of 61 DMUs in Haryana for the year 2018-19 while Table 7.10 outlines the frequency distribution of OTE, PTE, and SE of the same year. The average OTE score in 2018-19 is 0.48, which is the best efficiency of the textile industry out of the five-year study period indicating that the OTIE is 52%. The 52 percent reduction in input size indicates that the Textile units are capable of growing their outputs simultaneously in 2018-19. Twelve companies operate at OTE score of one: Aggarsain Spinners Ltd., Voith Paper Fabrics India Ltd., Drips Apparels Private Ltd., Radico Fashions Private Limited, RGL Fashion Private Ltd., TypioYfm Design Pvt. Ltd., Angel Fabrics Pvt. Ltd., Anika Syncotex Pvt. Ltd., J.D.R.D. Embroidery Pvt. Ltd., Prosource Texstyles Pvt. Ltd., Govind Textiles Pvt. Ltd., Neelmani Textile Pvt. Ltd. This set of companies is also efficient at PTE and SE. Only two companies achieved a score of 0.8 to 1 in 2018-19 indicating the proximity of efficiency score one. Thirteen companies (21.31%) are operating below the 0.20 score and eighteen companies (29.51 percent) are operating at a low score of 0.20 to 0.40, require a significant change in operations, or require the innovation of technology. Ten companies (16.39%) between 0.4 and 0.6 and six companies (9.84 percent) are moderately efficient (0.6 to 0.8).

Fifteen companies (24.59%) have achieved a PTE score of 1 and hence these are locally technical efficient as well as managerially efficient. PTE mean value is 0.72 (The highest PTE score out of all the years of the study period), which indicates that the amount of PTIE in these companies is 28 percent. In table 7.9, twelve companies are relatively efficient about local technical efficiency with an OTE score of 1 i.e. they are globally as well as locally technical efficient. The remaining 3 companies are locally efficient but globally inefficient. The OTIE in these fourteen companies is a result of their inability to operate at their most productive scale size (MPSS). Additionally, 37 DMUs (60.66 percent) have a PTIE greater

than 20%, while nine DMUs (14.75 percent) have a PTIE less than or equal to 20% whereas no DMUs are operating at a very low score (0.00 to 0.20).

The mean SE score in 2018-19 is 0.62 (The highest PTE score out of five years of the study period), indicating that the average level of SIE in DMUs is approximately 38 percent.

Companies that are technically efficient on a global scale (OTE score = 1) are also technically efficient on the local scale (PTE score = 1). As a result, there is no need for further improvement for DMUs with SE scores of 1 and enterprises functioning at MPSS.

The same set of DMUs is efficient at OTE, PTE, and SE.

Table 7.9: Financial Efficiency scores and RTS Analysis of Textile manufacturing Units in Haryana in 2018-19 (DMU = 61)

Name of the Company	DMUs	OTE	PTE	SE	RTS	$\sum \lambda$
Aggarsain Spinners Ltd.	C1	1	1	1	CRS	1
Ashnoor Textile Mills Ltd.	C2	0.4988	0.7231	0.6898	IRS	0.47
Benetton India Pvt. Ltd.	C3	0.2768	0.8084	0.3423	IRS	0.17
Meyer Apparel Ltd.	C4	0.9396	0.9943	0.945	IRS	0.93
Gupta Exim (India) Pvt. Ltd.	C5	0.8075	1	0.8075	IRS	0.26
H P Cotton Textile Mills Ltd.	C6	0.2368	0.7084	0.3343	IRS	0.22
Haryana Texprints (Overseas) Ltd.	C7	0.2084	0.6395	0.3259	IRS	0.17
Hisar Spinning Mills Ltd.	C8	0.5905	0.6194	0.9533	IRS	0.83
Indo Cotspin Ltd.	C9	0.2739	0.7266	0.3769	IRS	0.18
Jasch Industries Ltd.	C10	0.4094	0.5945	0.6887	IRS	0.45
Orient Craft Ltd.	C11	0.2049	0.6157	0.3327	IRS	0.18
Partap Spintex Pvt. Ltd.	C12	0.186	0.4024	0.4621	IRS	0.25
Shivani Textiles Ltd.	C13	0.2686	0.7701	0.3488	IRS	0.16
Pasupati Spinning &Wvg. Mills Ltd.	C14	0.245	0.7517	0.3259	IRS	0.17
Voith Paper Fabrics India Ltd.	C15	1	1	1	CRS	1
R L F Ltd.	C16	0.0002	0.9759	0.0002	IRS	0
Richa Industries Ltd.	C17	0.5482	1	0.5482	IRS	0.26
Sanganeriya Spinning Mills Ltd.	C18	0.1599	0.5117	0.3125	IRS	0.19
Uniroyal Industries Ltd.	C19	0.2673	0.5353	0.4992	IRS	0.36
United Leasing &Inds. Ltd.	C20	0.0036	0.8382	0.0043	IRS	0

United Textiles Ltd.	C21	0.2577	0.7534	0.342	IRS	0.17
Tex Corp Pvt. Ltd.	C22	0.1776	0.587	0.3026	IRS	0.2
Biba Apparels Pvt. Ltd.	C23	0.1787	0.4847	0.3687	IRS	0.17
Numero Uno Clothing Ltd.	C24	0.199	0.5397	0.3687	IRS	0.13
Unicharm India Pvt. Ltd.	C25	0.0058	0.6095	0.0096	IRS	0
Jindal Spinning Mills Ltd.	C26	0.2459	0.6954	0.3536	IRS	0.16
Shivansh Textiles Pvt. Ltd.	C27	0.0699	0.2036	0.3433	IRS	0.2
Chaos design Private Ltd.	C28	0.6592	1	0.6592	DRS	1.23
Click Clothing Company Private Ltd.	C29	0.7613	0.8319	0.9151	IRS	0.87
DAG Design Concept Fashion Private Ltd.	C30	0.781	0.8209	0.9514	DRS	1.11
Drips Apparels Private Ltd.	C31	1	1	1	CRS	1
Delphique Fabrics Private Ltd.	C32	0.3271	0.5382	0.6078	IRS	0.51
Dida Brothers Company Private Ltd.	C33	0.5601	0.8135	0.6885	IRS	0.61
J.D. Textiles Private Ltd.	C34	0.3036	0.6745	0.4501	IRS	0.24
Jai Handloom Private Ltd.	C35	0.2526	0.6176	0.409	IRS	0.29
Jindal Cotspin Private Ltd.	C36	0.4076	0.4896	0.8325	IRS	0.76
Panipat Texo Fabs Private Ltd.	C37	0.4894	0.4944	0.9897	IRS	0.9
Radico Fashions Private Limited	C38	1	1	1	CRS	1
RGL Fashion Private Ltd.	C39	1	1	1	CRS	1
Santosh Woolen Pvt. Ltd.	C40	0.3963	0.7013	0.565	IRS	0.42
Sarla Handicrafts Pvt. Ltd.	C41	0.4089	0.5419	0.7545	IRS	0.52
Shivansh Textile Private Ltd.	C42	0.2366	0.3669	0.6449	IRS	0.31
Shree Shiv Shakti Synthetics Pvt. Ltd.	C43	0.5473	0.7695	0.7112	IRS	0.37
Shubh&SanchayTexofab Pvt. Ltd.	C44	0.2956	0.3744	0.7895	IRS	0.4
Sufiana Design Pvt. Ltd.	C45	0.7691	0.8268	0.9301	IRS	0.82
TypioYfm Design Pvt. Ltd.	C46	1	1	1	CRS	1
Angel Fabrics Pvt. Ltd.	C47	1	1	1	CRS	1
Anika Syncotex Pvt. Ltd.	C48	1	1	1	CRS	1
Shiv Sharan Handlooms Pvt. Ltd.	C49	0.6139	0.6984	0.8791	IRS	0.78
Vee Fabrics Pvt. Ltd.	C50	0.0145	0.5696	0.0254	IRS	0
J.D.R.D. Embroidery Pvt. Ltd.	C51	1	1	1	CRS	1

Maharaja Texo Fab Pvt. Ltd.	C52	0.1132	0.2725	0.4153	IRS	0.32
Nik Fasteners Pvt. Ltd.	C53	0.0005	0.5293	0.0009	IRS	0
Prosource Textstyles Pvt. Ltd.	C54	1	1	1	CRS	1
UNMA Textiles Pvt. Ltd.	C55	0.7387	0.8605	0.8585	IRS	0.77
Peacock Fabrics Pvt. Ltd.	C56	0.1387	0.4614	0.3005	IRS	0.17
PCC Interlinings Pvt. Ltd.	C57	0.5486	0.5893	0.931	IRS	0.81
Kanta fabrics Pvt. Ltd.	C58	0.2258	0.4478	0.5043	IRS	0.29
Govind Textiles Pvt. Ltd.	C59	1	1	1	CRS	1
Aan Handloom Pvt. Ltd.	C60	0.392	0.5148	0.7615	IRS	0.3
Neelmani Textile Pvt. Ltd.	C61	1	1	1	CRS	1
Average		0.48	0.72	0.62		

Source: Author's calculation

In addition to this, Table 7.10 shows twelve companies (19.67 percent) have a SE score of 1 and are functioning at MPSS. Thus, it demonstrates that the remaining 49 (78.69 percent) companies have some degree of SIE. Henceforth, eleven companies (18.03%) is nearby of MPSS have a SE score greater than 0.8, and ten companies have a score between 0.60 and 0.80. If this company lessens its inputs by approximately 20%, it can approach MPSS. Table 7.9 shows that, if a company has an OTE score of 1, it must also be efficient in terms of PTE and SE, with a λ score of 1.

Sr.N.	Different ranges of efficiency scores	OTE		PTE		SE	
		DMU's	Percentage	DMU's	Percentage	DMU's	Percentage
1	0.00<= Score <0.2	13	21.31%	0	0.00%	5	8.20%
2	0.2<= Score <0.4	18	29.51%	4	6.56%	15	24.59%
3	0.4<= Score <0.6	10	16.39%	17	27.87%	8	13.11%
4	0.6<= Score <0.8	6	9.84%	16	26.23%	10	16.39%
5	0.8<= Score <1	2	3.28%	9	14.75%	11	18.03%
6	Score =1	12	19.67%	15	24.59%	12	19.67%
	Total	61	100.00%	61	100.00%	61	100.00%

Source: Author's calculation

7.3.5 Financial performance of textile manufacturing companies in Haryana for the year 2019-20

Tables 7.11 demonstrates the OTE, PTE, SE scores, and RTS analysis of 61 DMUs in Haryana for the year 2019-20 while Table 7.12 outlines the frequency distribution of OTE, PTE, and SE of the same year. The average OTE score in 2019-20 is 0.39, indicating that the OTIE is 61 percent. The 61 percent reduction in input size indicates that the Textile units are capable of growing their outputs simultaneously in 2019-20. Sixteen companies operate at OTE: Gupta Exim (India) Pvt. Ltd., Orient Craft Ltd., Shivani Textiles Ltd., Sanganeriya Spinning Mills Ltd., Tex Corp Pvt. Ltd., Radico Fashions Private Limited, Shree Shiv Shakti Synthetics Pvt. Ltd., Angel Fabrics Pvt. Ltd., Anika Syncotex Pvt. Ltd., Vee Fabrics Pvt. Ltd., Nik Fasteners Pvt. Ltd., Prosource Texstyles Pvt. Ltd., UNMA Textiles Pvt. Ltd., Kanta fabrics Pvt. Ltd., Govind Textiles Pvt. Ltd., Aan Handloom Pvt. Ltd. and these companies are also efficient at PTE and SE. Two companies have achieved a score of 0.8 to 1 in 2019-20 indicating the proximity of efficiency score one. The maximum thirty-four companies (55.74%) are operating below the 0.20 score and seven companies (11.48 percent) are operating at a low score of 0.20 to 0.40, requiring a significant change in operations, or the innovation of technology. Two companies (3.28%) between 0.4 and 0.6 and no company are moderately efficient (0.6 to 0.8). Twenty-four companies have achieved a PTE score of 1 and hence these are locally technical efficient and managerially efficient. PTE mean value is 0.56 (the highest average PTE score out of the five years), which indicates that the amount of PTIE in these companies is 38 percent. In table 7.11, out of 61 DMUs, 16 companies are relatively efficient about local technical efficiency with an OTE score of 1 i.e. they are globally as well as locally technical efficient. The remaining 8 DMUs are locally efficient but globally inefficient. The OTIE in these eight companies is a result of their inability to operate at their most productive scale size (MPSS). Additionally, 33 DMUs (54.10 percent) have a PTIE greater than 20%, while only four DMU (6.56 percent) have a PTIE less than or equal to 20%.

Further, the mean SE score in 2019-20 is 0.71, indicating that the average level of SIE in DMUs is approximately 29 percent. Companies that are technically efficient at a global scale (OTE score = 1) are also technically efficient at the local scale (PTE score = 1). As a result, there is no need for further improvement for DMUs with SE scores of 1 and enterprises functioning at MPSS. The same set of DMUs is efficient at OTE, PTE, and SE. In addition to this Table 7.12, shows sixteen companies (26.23 percent) have SE score of 1 and are functioning at MPSS. Thus, it demonstrates that the remaining 45 (73.77 percent) companies have some degree of SIE.

Table 7.11: Financial Efficiency scores and RTS Analysis of Textile manufacturing Units in Haryana in 2019-20 (DMU = 61)

Name of the Company	DMUs	OTE	PTE	SE	RTS	$\sum \lambda$
Aggarsain Spinners Ltd.	C1	0.0063	0.0083	0.7637	DRS	1.1
Ashnoor Textile Mills Ltd.	C2	0.0959	0.1068	0.8978	DRS	1.8
Benetton India Pvt. Ltd.	C3	0.0965	0.108	0.8938	DRS	1.48
Meyer Apparel Ltd.	C4	0.0455	0.052	0.8765	DRS	1.5
Gupta Exim (India) Pvt. Ltd.	C5	1	1	1	CRS	1
H P Cotton Textile Mills Ltd.	C6	0.2019	0.9217	0.2191	DRS	16.37
Haryana Texprints (Overseas) Ltd.	C7	0.1371	0.1532	0.8948	DRS	1.67
Hisar Spinning Mills Ltd.	C8	0.0757	0.0854	0.8862	DRS	2.69
Indo Cotspin Ltd.	C9	0.0489	0.0706	0.6936	DRS	1.82
Jasch Industries Ltd.	C10	0.1023	1	0.1023	DRS	14.24
Orient Craft Ltd.	C11	1	1	1	CRS	1
Partap Spintex Pvt. Ltd.	C12	0.082	0.0947	0.8661	DRS	1.23
Shivani Textiles Ltd.	C13	1	1	1	CRS	1
Pasupati Spinning &Wvg. Mills Ltd.	C14	0.0529	0.0605	0.8749	IRS	0.03
Voith Paper Fabrics India Ltd.	C15	0.1908	1	0.1908	DRS	12
R L F Ltd.	C16	0.1072	0.1122	0.9556	DRS	1.23
Richa Industries Ltd.	C17	0.0847	0.093	0.9104	DRS	1.08
Sanganeriya Spinning Mills Ltd.	C18	1	1	1	CRS	1
Uniroyal Industries Ltd.	C19	0.0165	0.0245	0.6713	IRS	0.02
United Leasing &Inds. Ltd.	C20	0.0127	0.0155	0.816	DRS	1.25
United Textiles Ltd.	C21	0.045	0.8191	0.0549	DRS	2.97

Tex Corp Pvt. Ltd.	C22	1	1	1	CRS	1
Biba Apparels Pvt. Ltd.	C23	0.0351	0.0407	0.862	DRS	1.68
Numero Uno Clothing Ltd.	C24	0.0784	0.0833	0.9406	DRS	1.8
Unicharm India Pvt. Ltd.	C25	0.044	0.0488	0.9016	DRS	1.17
Jindal Spinning Mills Ltd.	C26	0.1059	0.1289	0.8215	DRS	3.69
Shivansh Textiles Pvt. Ltd.	C27	0.1012	0.1298	0.7798	DRS	1.63
Chaos design Private Ltd.	C28	0.0187	0.0255	0.7321	IRS	0.01
Click Clothing Company Private Ltd.	C29	0.3069	0.705	0.4353	DRS	23.75
DAG Design Concept Fashion Private Ltd.	C30	0.8524	1	0.8524	DRS	10.26
Drips Apparels Private Ltd.	C31	0.2409	1	0.2409	DRS	13.6
Delphique Fabrics Private Ltd.	C32	0.1787	0.2587	0.6907	DRS	4.71
Dida Brothers Company Private Ltd.	C33	0.1913	0.1949	0.9819	DRS	2.95
J.D. Textiles Private Ltd.	C34	0.1792	0.812	0.2207	DRS	27.28
Jai Handloom Private Ltd.	C35	0.2453	0.4747	0.5168	DRS	13.37
Jindal Cotspin Private Ltd.	C36	0.0756	0.2209	0.342	DRS	9.45
Panipat Texo Fabs Private Ltd.	C37	0.4386	1	0.4386	DRS	33.37
Radico Fashions Private Limited	C38	1	1	1	CRS	1
RGL Fashion Private Ltd.	C39	0.1173	0.1662	0.7056	IRS	0.25
Santosh Woolen Pvt. Ltd.	C40	0.094	0.2374	0.3961	DRS	6.36
Sarla Handicrafts Pvt. Ltd.	C41	0.0727	0.3373	0.2154	DRS	10.33
Shivansh Textile Private Ltd.	C42	0.1363	0.4062	0.3356	DRS	8.5
Shree Shiv Shakti Synthetics Pvt. Ltd.	C43	1	1	1	CRS	1
Shubh&SanchayTexofab Pvt. Ltd.	C44	0.1697	0.3658	0.4638	DRS	7.78
Sufiana Design Pvt. Ltd.	C45	0.3439	0.9242	0.3721	DRS	20.68
TypioYfm Design Pvt. Ltd.	C46	0.2352	1	0.2352	DRS	19.41
Angel Fabrics Pvt. Ltd.	C47	1	1	1	CRS	1
Anika Syncotex Pvt. Ltd.	C48	1	1	1	CRS	1
Shiv Sharan Handlooms Pvt. Ltd.	C49	0.4098	1	0.4098	DRS	33.77
Vee Fabrics Pvt. Ltd.	C50	1	1	1	CRS	1
J.D.R.D. Embroidery Pvt. Ltd.	C51	0.0979	0.2229	0.4391	DRS	14.73
Maharaja Texo Fab Pvt. Ltd.	C52	0.058	0.4859	0.1193	DRS	5.29
Nik Fasteners Pvt. Ltd.	C53	1	1	1	CRS	1
Prosource Texstyles Pvt. Ltd.	C54	1	1	1	CRS	1
UNMA Textiles Pvt. Ltd.	C55	1	1	1	CRS	1

Peacock Fabrics Pvt. Ltd.	C56	0.8617	1	0.8617	DRS	39.6
PCC Interlinings Pvt. Ltd.	C57	0.1509	0.2133	0.7078	DRS	2.41
Kanta fabrics Pvt. Ltd.	C58	1	1	1	CRS	1
Govind Textiles Pvt. Ltd.	C59	1	1	1	CRS	1
Aan Handloom Pvt. Ltd.	C60	1	1	1	CRS	1
Neelmani Textile Pvt. Ltd.	C61	0.303	0.6831	0.4435	DRS	20.59
Average		0.39	0.56	0.71		

Source: Author's calculation

Henceforth, it is also found that seventeen companies are close of MPSS have a SE score greater than 0.8, and eight companies have a score between 0.60 and 0.80. If these enterprises lessen their inputs by approximately 10% to 20%, the majority of them can approach MPSS. As shown in Table 7.11, if a company has an OTE score of 1, it must also be efficient in terms of PTE and SE, with a λ score of 1.

Table 7.12: Frequency Distribution of financial efficiency scores of OTE, PTE, and SE of Textile Manufacturing Companies in Haryana (2019-20)

Sr.N.	Different ranges of efficiency scores	OTE		PTE		SE	
		DMU's	Percentage	DMU's	Percentage	DMU's	Percentage
1	0.00<= Score <0.2	34	55.74%	21	34.43%	4	6.56%
2	0.2<= Score <0.4	7	11.48%	7	11.48%	9	14.75%
3	0.4<= Score <0.6	2	3.28%	3	4.92%	7	11.48%
4	0.6<= Score <0.8	0	0.00%	2	3.28%	8	13.11%
5	0.8<= Score <1	2	3.28%	4	6.56%	17	27.87%
6	Score =1	16	26.23%	24	39.34%	16	26.23%
	Total	61	100.00%	61	100.00%	61	100.00%

Source: Author's calculation

7.3.6 RTS Analysis (financial performance) of textile manufacturing units in Haryana for five years (2015-16 to 2019-20)

Table 7.13 shows the year-wise RTS analysis of selected 61 DMUs from 2015-16 to 2019-20. In 2015-16 six companies (9.84 percent) operate at CRS, because these DMUs have a summation (\sum) of $\lambda = 1$ (Table 7.3), and 3 DMUs (4.92 percent) operate at IRS, where the

$\sum\lambda$ is less than one (Table 7.3), additional inputs are required to achieve the efficiency level of one. The remaining 52 companies (85.25 percent) are operating at DRS, as $\sum\lambda$ scores greater than 1 (Table 7.3), this implies a need to reduce inputs by an optimal quantity to achieve efficiency level = 1.

In 2016-17, four companies (6.56 percent) operate at CRS, and because these DMUs have a $\sum\lambda=1$ (Table 7.5), and 8 DMUs (13.11 percent) operate at IRS, due to the $\sum\lambda < 1$ (Table 7.5), additional inputs are required to achieve the efficiency level of one. The remaining 49 companies (80.33 percent) are operating at a DRS level due to the $\sum\lambda > 1$ (Table 7.5), implying a need to reduce inputs by an optimal quantity to achieve efficiency level = 1.

In 2017-18, fifteen companies (24.59 percent-the second highest number and the highest OTE score) operate at CRS, and because these DMUs have a $\sum\lambda=1$ (Table 7.7), and 42 DMUs (65.85 percent) operate at IRS, where the $\sum\lambda < 1$ (Table 7.7), additional inputs are required to achieve the efficiency level of one. The remaining 4 companies (6.56 percent) are operating at the DRS level due to $\sum\lambda > 1$ (Table 7.7), implying a need to reduce inputs by an optimal quantity to achieve efficiency level = 1.

In 2018-19 twelve companies (19.67 percent) operate at CRS, and because these DMUs have a $\sum\lambda=1$ (Table 7.9), and 47 DMUs (36.07 percent – the highest number in all the study year) operate at IRS, for the reason that the $\sum\lambda < 1$ (Table 7.9). It can be observed that the majority of companies need additional inputs to achieve the efficiency level of one. Only 2 companies (3.28 percent- the lowest in all the years) are operating at a DRS level due to the $\sum\lambda > 1$ (Table 7.9), implying a need to reduce inputs by an optimal quantity to achieve efficiency level = 1.

In 2019-20 sixteen companies (26.23 percent – Maximum number of companies out of five years of the study period) operate at CRS since these DMUs have $\sum\lambda=1$ (Table 7.11), and 4 DMUs (6.56 percent) operate at IRS, where $\sum\lambda<1$ (Table 7.11), additional inputs are required to achieve the efficiency level of one. The remaining 41 companies (67.21 percent) are operating at a DRS level due to $\sum\lambda>1$ (Table 7.11), implying a need to reduce inputs by an optimal quantity to achieve efficiency level = 1.

The overall average number of companies that are operating at CRS during five years is 10.6 companies (17.38 percent). The maximum number of companies at CRS is 16 in 2019-20 and the minimum is 4 in 2016-17. The overall average number of companies operating at IRS in all the years is 20.8 (34.10 percent). The maximum number of companies operating at IRS in 2018-19 is 47 and the Minimum in 2015-16 is 3. The overall average number of companies operating at DRS in all the years is 29.6 (48.52 percent). The maximum number of companies operating at DRS is 47 in 2015-16 and the Minimum is 2 companies in 2018-19.

It can be concluded that DMUs operating at CRS are efficient at OTE, PTE, and thus SE, whereas DMUs operating at IRS or DRS are inefficient to some extent and require increasing or decreasing their input size to achieve the desired level of efficiency.

Table 7.13: Average score and percentage of RTS Analysis in all the years of 61 Textile manufacturing Units in Haryana						
RTS (%)	2015-16 (%)	2016-17 (%)	2017-18 (%)	2018-19 (%)	2019-20 (%)	Overall Avg. (%)
CRS	6 (9.83)	4 (6.56)	15 (24.59)	12 (19.67)	16 (26.23)	10.6 (17.38)
IRS	3 (4.92)	8 (13.11)	42 (68.85)	47 (77.05)	4 (6.56)	20.8 (34.10)
DRS	52 (85.25)	49 (80.33)	4 (6.56)	2 (3.28)	41 (67.21)	29.6 (48.52)
Total	61 (100)	61(100)	61 (100)	61 (100)	61(100)	61 (100)

Source: Author's calculation

7.3.7 The Overall comparison (for five years i.e. 2015-16 to 2019-20) of financial performance of textile manufacturing companies in Haryana

Table 7.14 shows the overall comparison of efficiency across the five years (2015-16 to 2019-20). In 2015-16, OTE, PTE, and SE ranges from 0.01 to 1 (Min. to Max.), and the value of SD efficiency is 0.30 and 0.39, 0.29, respectively. It indicated the higher level of deviation in PTE which led towards inverse efficiency results. It can be optimised by minimizing the inputs as the present study is utilizing the input-oriented BCC and CCR techniques. It can be observed that SE is less fluctuated than PTE and OTE. In 2016-17, both OTE and PTE range from 0.01 to 1 and the value of SD efficiency is 0.28 and 0.38 respectively. It depicts the unfavorable financial efficiency and this can be optimised by minimizing the inputs. This demonstrated the much-fluctuated managerial efficiency than input operations because PTE is concerned with managerial efficiency. SE scores range from 0.10 to 1 and its standard deviation is 0.22, which is less than the half of the PTE standard deviation (0.38).

In the year 2017-18, range of both OTE and PTE is 0.96 (0.04 to 1) that also shows unfavorable efficiency and the value of SD efficiency is 0.35 and 0.28 respectively. The SD of PTE is at its highest level this year with a score of 0.35 and managerial inefficiency is higher than the input scale. As far as SE is concerned, the range (0.79 – lowest in all the five years of the study period) and SD (0.27) both are less than PTE and OTE. It means that SE is less fluctuated and comparatively more stable. In 2018-19 the OTE and SE range from 0.01 to 1 (Min. to Max.), which shows the lower level of efficiency and value of SD efficiency is 0.33 and 0.31, respectively. It shows OTE deviation is higher than SE. PTE ranges from 0.20 to 1 and the standard deviation is 0.22 (lowest in the five years of the study period), less than the SE(0.31) and OTE standard deviation (0.33).

In 2019-20, the range of OTE and PTE is 0.99 (0.01 to 1) and the value of SD efficiency is 0.40 and 0.42. The range of SE is 0.95 (0.05 to 1), and the SD is 0.30 which is less than OTE and PTE. Hence, it is less fluctuated.

Year	Efficiency type	Minimum	1st Quartile	Mean	Median	3rd Quartile	Maximum	SD
2015-16	OTE	0.01	0.02	0.18	0.04	0.15	1	0.3
	PTE	0.01	0.04	0.33	0.09	0.58	1	0.39
	SE	0.01	0.32	0.55	0.53	0.74	1	0.29
2016-17	OTE	0.01	0.02	0.17	0.04	0.15	1	0.28
	PTE	0.01	0.04	0.29	0.09	0.28	1	0.38
	SE	0.01	0.43	0.58	0.52	0.73	1	0.22
2017-18	OTE	0.04	0.21	0.5	0.4	0.93	1	0.35
	PTE	0.04	0.46	0.65	0.59	1	1	0.28
	SE	0.21	0.45	0.71	0.72	1	1	0.27
2018-19	OTE	0.01	0.23	0.48	0.4	0.77	1	0.33
	PTE	0.2	0.54	0.72	0.71	0.99	1	0.22
	SE	0.01	0.35	0.62	0.66	0.95	1	0.31
2019-20	OTE	0.01	0.08	0.39	0.18	1	1	0.4
	PTE	0.01	0.11	0.56	0.49	1	1	0.42
	SE	0.05	0.44	0.71	0.85	1	1	0.3

Source: Author's calculation

7.4 Conclusion

The findings of the present chapter clearly show that the textile industry in Haryana is financially inefficient and unstable. Table 7.14 summarises that the range is found more than 0.95 in all the years except for SE in 2017-18 and PTE in 2018-19 which does not represents an adequate level of financial efficiency. Consequently, the average level of efficiency in each year is very less. On another hand the higher value of SD shows the extent of variation across all the companies as some companies get very good scores near to one but some are at very low efficiency which is again an unfavorable financial position for the textile industry in

Haryana. Although, maximum efficiency in each year is one (1) very few companies are efficient in the study period viz. 6 companies are efficient in 2015-16, four companies are efficient in 2016-17, fifteen companies in 2017-18, twelve companies are efficient in 2018-19 and sixteen companies are efficient in 2019-20 out of the final sample of 61 DMUs. It is worth noting that, although the efficiency level of OTE is found 0.50 in 2017-18, PTE 0.72 in 2018-19 and SE found 0.71 in 2017-18 and 2019-20 (which are the highest scores across all the five years of the study) but there is massive scope for improvement to get financial efficiency in the textile industry in Haryana. As per table 7.14, the improved efficiency has been observed in the operations over the five years (2015-16 to 2019-20) but there is a need to minimize the input scale and management underperformance to get a higher level of efficiency in each DMU of the textile industry in Haryana.

Table 7.15: Average overall and average year-wise financial performance of textile manufacturing units in Haryana (DMU = 61)			
Years	OTE	PTE	SE
2015-16	0.18	0.33	0.55
2016-17	0.17	0.29	0.58
2017-18	0.5	0.65	0.71
2018-19	0.48	0.72	0.62
2019-20	0.39	0.56	0.71
Overall Average	0.34	0.51	0.63

Source: Author's calculation

Hence, it can be concluded that financial performance may vary according to the number of different variables, including industry, country, years, and even case. It is also observed from descriptive statistics given in table 7.2 that some companies are so big and some are very small, so the small companies are always fighting in the market in terms of finance, technology, and other important sources. Mselmi, Lahiani, and Hamza (2017) have supported this finding that smaller companies have higher levels of debt, are less profitable, and have

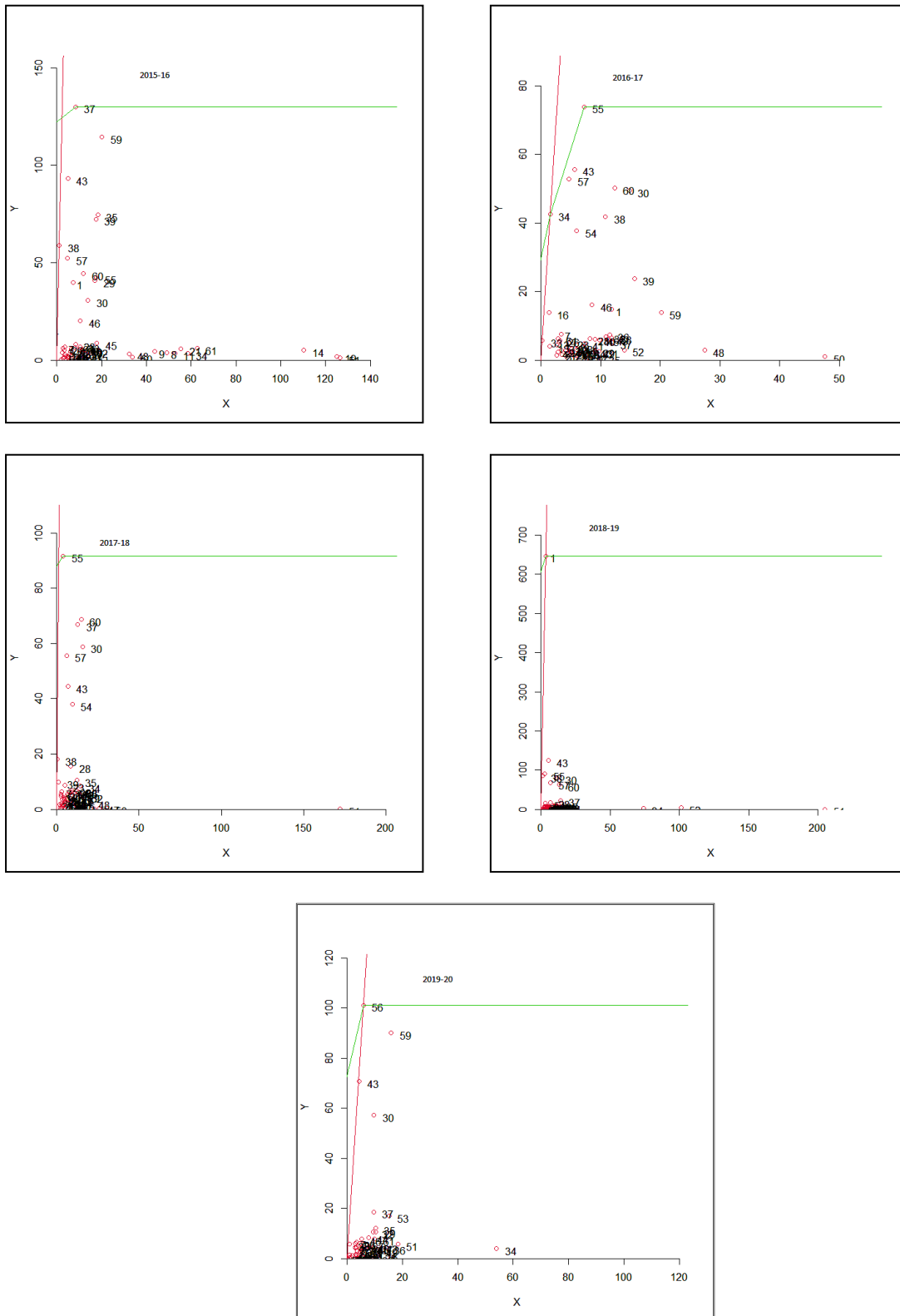
lower repayment capacity, so they reflect lesser efficiency. In a practical scenario, capital structure theory doesn't fit for small businesses.

A company's capital structure theories are best suited to established or large enterprises because debt is typically available for them at a lesser cost. Thus, giant companies always preserve the quantity of debt higher to a certain amount, and this also happens to be more profitable as compared to funds held by the company. An additional important conclusion is that the majority of the companies are operating at the DRS (As per table 7.13) which means they have to lower their input size to reach the level of efficiency equal to one (1).

Figure 7.1 depicts the variation of VRS (green line in PPC) to CRS (red line in PPC). Here VRS line shows the intersection of sum of the total weightage of inputs to sum of the total weightage of outputs of each DMU for each year. The upper line in production frontier shows the best possible combination of input and output variables, also called as CRS and there is no need to improve the input size or process. This line shows the maximum area of production on which ratio of input and output of all the companies will either fall on this line if these are efficient or below the line if the companies are inefficient and operating at Variable Return to Scale i.e. IRS or DRS.

Hence, small companies need to improve their internal sustainability (Shahi, Shiva and Dia, 2020) like financial matters, and management efficiency to improve their performance. Around seventy-five percent of the financial inefficiency observed in Haryana's textile industry can be eliminated through company-level input optimization combined with increased managerial efficiency. The improved financial performance results in better financial disclosure for different stakeholders in decision-making (Quayes and Hasan, 2014).

Figure 7.1: Production Possibility Curve



Source: Author's compilation