Intellectual Capital Efficiency and Market Performance: A Bangladeshi Apparel Industry Perspective

Leena Afroz Mostofa Chowdhury Sisili Rahman* Department of Business Administration, University of Asia Pacific, Dhaka, Bangladesh.

Abstract

This paper assesses intellectual capital (IC) efficiency of Bangladeshi apparel firms and its impact on market performance from 2011 to 2016 with secondary data obtained from annual reports. Bangladesh is synonymous with its apparel industry export and low cost labor, which has huge potential of developing intellectual capital through introduction of modern technology, proper working environment, improved organizational structure and human resource training. The existing efficiency status of the industry was examined through the Value Added Intellectual Coefficient (VAIC) rankings. The IC efficiency of Human Capital (HC) and Structural Capital (SC) along with physical capital has been analyzed for their influence on market performance with Market to Book ratio (M/B) applying multiple regression technique. The study found human capital playing a major role in creating firm's value, with physical capital having major influence on the firm's perceived market outcome. **Keywords:** Intellectual Capital, Market Performance, VAIC Model, Bangladeshi Apparel Industry.

1. Introduction

The boundaries on financial reporting in explaining firm market value endorse the fact that modern-day businesses are focusing more on intangibles i.e intellectual capital (IC) moving away from traditional resourcebased view of physical assets (Goh, 2005). The role of IC management for superior market performance, evident from the hidden value omitted in financial statements and the increasing gap between firms' market and book value, has drawn extensive research interest in the last decade with most studies set in developed economies that have long traditions of knowledge management. Lev (2001)'s study implied that 80% of market value of S&P 500 firms has not been explained in corporate reporting. Thus the market value is no longer reflected in the production of material goods, but in the effective use of intellectual capital (Chen, 2005). Not many scholars have focused on the status of intellectual capital management and its impact on market performance in developing countries context. International Monetary Fund (IMF) termed Bangladesh as the second fastest growing major economy of 2016, with 7.11% Gross Domestic Product (GDP) growth rate predominantly explained by its exports of apparels (Akter, 2017). Apparel sector is the top export-based industry in Bangladesh with contribution of 28.1% to the total GDP in 2016 (Akter, 2017). Relying more on physical assets, the idea of IC utilization has never been considered in value creation and market performance analysis in the industry, although the significance of intellectual capital, as a strategic asset, cannot be ignored.

2. Background of the Study

2.1 Intellectual Capital

In 1969 John Kenneth Galbraith first introduced the idea of "intellectual capital" (IC). Failure of traditional financial accounting statements of reflecting the value creation capacity of firms only through tangible assets has initiated the call for measurement of intangibles and its value creation capacity, even though the concept is still regarded as fuzzy and in emerging stage (Marr and Ross, 2005). IC is defined by Skandia as "the possession of knowledge, applied experience, organizational technology, customer relationships and professional skills that provide a competitive edge in the market" (Starovic and Marr, 2003). Similar definition was advocated by Prusak (1998) as intangible resources that have been "formalized, captured and leveraged" for value creation, while Ulrich (1998) regarded IC as "multiplicative function of competencies and commitment".

2.2 Value Added Intellectual Coefficient (VAIC)

Ante Pulic and his team (1998) at the Austrian Intellectual Capital Research Center (AICRS) developed Value Added Intellectual Coefficient (VAIC) as an aggregate measure for corporate intellectual ability. In spite of highly debated the theoretical underpinning of VAIC, this model has been termed as 'practical' and widely used method for complex IC measurement by the researchers (Mavridis and Kyrmizoglou, 2003). The assumption underlying VAIC model treats both physical and Intellectual Capital as investment for value creation. The efficiency levels to be calculated in this model are Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) and the sum of these efficiencies results in the VAIC. A higher VAIC score explains superior IC efficiency level of the firm (Joshi, Cahill and Sidhu, 2013).

Table 1: VAIC Model and Calculation of terms (Adopted from Pulic, 2000)							
Model	Source of Efficiency	Formula	Explanations of Terms				
Components							
The Value Added	The intellectual	VAIC =	VAIC = Value added intellectual coefficient				
Intellectual	ability and capability	HCE +	HCE = Human capital efficiency coefficient				
Coefficient	of the firm	SCE + CEE	SCE = Structural capital efficiency				
(VAIC)			CEE = Capital employed efficiency coefficient				
Value Added (VA)	Difference between the outputs and inputs in a particular fiscal year.	VA = OUT - IN	Output (<i>OUT</i>) is the firm's annual operating revenue generated by selling its goods or providing services, while Input (<i>IN</i>) refers to the firm's operating expenses except for the employees' salaries and allowances (Treated as investment and not expenditure). (Puntillo, 2009)				
		VA = P + C $+ D + A$	P =Operating profits, C= Employee costs, D= Depreciation and A= Amortization.				
Intellectual Capital Efficiency (ICE)	Amalgamation of the human and structural capital efficiencies	ICE = HCE + SCE	HCE= Human Capital Efficiency SCE= Structural Capital Efficiency				
Human Capital Efficiency (HCE)	Expenses related to employees' compensation and development	HCE = VA/HC	VA = Value added HC = Total wages and salary costs				
Structural Capital Efficiency (SCE)	The infrastructure that enables human capital to function	SC = VA – HC SCE = SC / VA	VA = Value added SC = Structural capital HC= Human Capital				
Capital Employed Efficiency (CEE)	Physical and material assets of the firm	CE= TA- CL CEE = VA/CE	VA =Value added CE = Capital employed TA= Total Assets CL= Current Liabilities				

Table 1: VAIC Model and Calculation of terms (Adopted from Pulic, 2000)

2.3 Market Performance and Intellectual Capital

Several scholars (Chen et al., 2005; Firer and Williams, 2003) regarded intellectual capital to be the intrinsic value that addresses the rising gap between market value and book value with investors perceiving the value of firms with high intangible assets to be higher than the estimated book value. Lev et al. (1999) concurs that companies with dearth of IC information have higher cost of capital resulting in lower investment and growth and unstable market performance. Some of the recent research works that illustrated the impact of intellectual capital utilization on market performance of firms are mentioned in the following table:

Author & Year of Publication	Research Origin	Methodology Applied	Positive Impact Found
Dzenopoljac et al. (2017)	Arab Region	VAIC	Yes
Ghosh and Maji (2015)	India	VAIC	Yes
Ariff et al. (2015)	The US	VAIC	Yes
Nimtrakoon (2015)	ASEAN	MVAIC	Yes
Morariu (2014)	Romania	VAIC	No
Shaban and Kavida (2013)	India	VAIC	No
Godyn, J. (2013)	Prague, Budapest, Warsaw and Bratislava	VAIC and MVA	Yes.
Mehri et al. (2013)	Malaysia	VAIC	Yes.
Pal and Sooriya (2012)	India	VAIC	No
Maditinos, Chatzoudes, Tsairidis and Theriou (2011)	Greece	VAIC	No
Khanqah, Khosroshahi and Ghanavati (2012)	Iran		No.
Chu et al. (2011)	China	VAIC	No
Gan and Saleh (2008)	Malaysia	VAIC	No
Yalama and Coskun, (2007)	Turkey	VAIC	Yes
Shiu (2006)	Taiwan	VAIC	Yes
Firer and Williams (2003)	South Africa	VAIC	No

The aforementioned studies found diverse results of VAIC components' influence on market performance with several studies did not justify convincing results in this regard. Interesting fact was that the studies on Europe, South Africa, the USA, Turkey and Taiwan, where investors were rational and informed, indicated significant effect on market valuation. Same cannot be said for inefficient stock markets of developing nations (Pal and Sooriya, 2012, and Gan and Saleh, 2008, Firer and Williams, 2003). And there are not many studies on apparel sector either. Thus the impact of IC utilization on market performance in Bangladeshi apparel sector serves as a perfect territory to be unfolded.

2.4 Industry Overview: Bangladesh Apparel Sector

Bangladesh takes pride in being the second largest exporting country in the global apparel industry. Bangladesh has captured 4.5% of the global export of apparel, making EU its largest export destination (Hossain, 2013). The market is characterized by enormous competition from China, Turkey, India and Vietnam. Starting its journey in the 1980s, apparel industry is now the single biggest export earner for Bangladesh. The sector accounts for 81% of total export earnings of the country. International buyers had demanded a gradual incorporation of workplace safety in the apparel industry after the violation of rights of workers was reported in the tragedy of Rana Plaza. Most firms fears of dismal market performance and financial losses without an increase in prices. Training up the workforce and improving working conditions, through successful IC utilization, will guarantee better output with less wastage and thereby enhancing long-term market performance.

3. Design of Research

3.1 Sampling and Data Processing

The conceptual framework of the study was to examine the IC efficiency of apparel firms listed in Dhaka Stock Exchange (DSE) for a six-year period from 2011 to 2016 and the relationship between IC value and the stock market performance. The DSE has 48 apparel firms listed as public limited companies. Firms with negative VA, like RN Textile (FY 2015-2016) and Modern Dying (FY 2011-16) were ignored in the VAIC analysis following works of Firer and Williams (2003), and Deep et al. (2014). Some samples were excluded for unavailability of annual reports and M/B value for a particular period. Even the leading company in terms of market capitalization, i.e. Square Textile had issues with comparability, as they had not published FY 2015-16 results for a one year period. Thus it was excluded for VAIC calculations as well. The study examined mainly secondary data obtained from the annual reports published by the 28 listed apparel companies. For descriptive statistics, the degree of IC efficiency, in terms of HCE, SCE and CEE, has been considered through the VAIC model and compared with industry-wise rankings concerning total asset, VA and shareholder's equity. Quantitative study involves multiple regression technique with SPSS to assess how VAIC components influence the market outcome of the listed apparel firms through Market to book value ratios (M/B ratios). M/B represents

the degree to which a company's market value surmounts its book value (Singh and Narwal, 2016). This ratio combining both "historical accounting and forward looking market indicators of firm performance" is regarded as an effective market performance indicator in terms of both efficiency and growth by several researchers (Sharma, 2013). Here dependent variable was M/B ratio and independent variables were HCE, SCE and CEE. For the calculation of M/B ratio, the following formula was used:

M/B=Market Capitalization for 365 days (MV)/Book value of Total Assets (BV)

Where, MV= Number of shares /Share price at the end of the year

BV=Shareholders' Equity – Paid- in capital (preferred stocks) (Maditinos *et al.*, 2011)

3.2 The Research Questions and Regression Model

Firer and Williams (2003) empirically noted that investors may perceive the three components of VAIC in value creation differently. The VAIC components, at individual level, may explain firm's market value more precisely, than the cumulative VAIC (Najibullah, 2005). Therefore, the following hypotheses were used to observe the association between market value and each component of VAIC:

- **Research Question # 1:** How efficiently and effectively are apparel companies utilizing their intellectual capital?
- Research Question # 2: Which companies are the top players in VAIC and revenue rankings?
- Research Question # 3: Which component of IC is playing major role in VA and VAIC index?
- **Research Question # 4:** Is IC performance a key factor explaining the market performance in Bangladeshi apparel industry, i.e. is there a significant positive relationship between the components of Value Added Intellectual Coefficient (human capital, employed capital and structural capital) and firm's market performance (M/B)?
 - a. Are firms with greater HCE likely to produce superior market performance?
 - **b.** Are firms with greater SCE likely to produce superior market performance?
 - c. Are firms with greater CEE likely to produce superior market performance?

The research questions led to the following linear regression equation for the assessment of the association between market performance and IC components:

 $M/B_{it} = \alpha_0 + \alpha_1 CEE_{it} + \alpha_2 HCE_{it} + \alpha_3 SCE_{it} + \varepsilon_{it}$

4. Findings and Analysis

4.1 IC Performance of Bangladeshi Apparel Firms

The means of Value Added (VA), VAIC, revenue, net income after tax and equity are indicated in Table 3. VAIC posted highest results in 2011, with the mean score fluctuated over the period. 2015 was a poor year in terms of industry average, from which the VAIC mean picked up in 2016. As indicated in the table 3, VA and equity was highest in 2014. Value addition in the industry dropped significantly in 2015 to improve a bit in 2016. FY 2015 saw in industry doing very well turnover-wise, while the industry posted highest net income after tax (BDT) in 2013.

		Danghaacom ar		periormanee		
Item	2011	2012	2013	2014	2015	2016
VAIC	9.1864486	5.615918127	5.615918127	7.04896254	3.830342788	4.423611201
VA	435138830	436211996.5	540743186	683827151	508047158.6	567670773.2
Revenue	1854290045	1756257894	2064921853	2027770530	3719246389	2135564341
Net Income After Tax	179313708	129787603.6	206414582.9	165814578	148358458.1	117900591.4
Equity	1638268796	1721968442	1941303646	2478954956	2248314788	2438717719

Table 3: Bangladeshi apparel industry performance at a glance



Figure 1: VAIC performance of Bangladeshi apparel industry performance at a glance

Figure 2: Contribution of VAIC components for value creation



Figure 1 demonstrates VAIC performance trend over the observed 6-year period. VAIC performance in terms of HCE replicated the trend in overall VAIC, which can be explained through figure 2. Figure 2 indicated that HCE was the dominant factor in explaining VAIC performance in this labor intensive sector, as human capital is considered to be the most active variable of value creation for organizations (Singh and Narwal, 2016). All the VAIC components and VAIC as a whole posted the highest results in 2011. After plummeting in 2012, the components indicated improved performance from 2014, even though the performance was not consistent over the next two years. With mostly illiterate work-force, training facilities are required to boost production efficiency (Gehl Sampath, 2007). However in 2016 only six firms, i.e. Stylecraft, Paramount, Fareast, Dragon and Delta invested in training of workforce.

Year	Number of listed companies spent on employee training	Listed Companies spent on employee training	Total Expenditure in employee training (BDT)
2016	5	Stylecraft, Paramount, Fareast, Dragon, Delta	2,464,106
2015	4	Tosrifa, Paramount, Matin, Envoy	1,760,565
2014	7	Tosrifa, Paramount, Matin, Fareast, Envoy, Dragon, Delta	5,203,296
2013	6	Tosrifa, Paramount, Matin, Fareast, Dragon, Delta	1,631,925
2012	3	Paramount, Matin, Delta	533,624
2011	1	Matin	608,137

Table 4: Ex	penditure on	employe	e training	and develop	pment	(year-wise))

As mentioned earlier, the presentations of financial reporting of FY 2016 were not consistent enough due to the change of regulations for adaptation of new financial reporting period. Therefore, the financial performance of FY 2015 was considered more reliable and relevant for the study. Table 5 indicates the performance of top performing firms in terms of turnover in FY 2015. In table 5 it was clear that high score in VAIC did not always explain high turnover. However the top and bottom spot held by Shasha Textile and Modern Dying were consistent in both the rankings.

glance									
VAIC Rank	Company Name	VAIC= ICE+CEE	Turnover Rank	Turnover (BDT)	Net Income After Tax (BDT)	Equity (BDT)			
1	Shasha	7.850554303	1	51447327484	560945609	4776811304			
6	Malek	6.538968132	2	8297896015	397753467	8732455591			
3	Envoy	7.461194829	3	5479121542	668613448	400000000			
22	Stylecraft	2.684336697	4	3940429027	34415675	204962240			
15	Apex	3.255517912	5	2989845894	23203688	420178924			
17	Paramount	3.089430997	6	2935282617	193993676	2324504601			
20	Fareast	2.923921313	7	2760228469	314661130	2909970743			
11	Saiham Cotton	4.528575763	8	2726083474	189629548	3369420161			
4	GNF	7.06692138	9	2640589103	340042273	4868432174			
10	RN	4.619334639	10	2326946405	57456684	6743547146			
5	Matin	6.903832194	11	2029007454	415930642	4038745673			
23	Saiham	2.667672178	12	1741464985	79735695	2305688347			
26	Zahintex	2.479076077	13	1549752166	75784447	1880179074			
27	Tosrifa	2.190214482	14	1537038272	135062213	2044262824			
16	Altex	3.248425816	15	1521894079	64399114	1539035218			
8	Simtex	5.504828952	16	1364024239	96617480	642239409			
12	Delta	4.306666863	17	1348800252	72149112	2191114325			
13	Hwa Well	3.812201133	18	1337888116	114415102	1413879986			
18	Makson	2.976739982	19	1302140161	51717237	4335553637			
25	HR	2.489196429	20	1237809538	30890780	409052705			
9	Dragon	5.282008808	21	793594941	100960154	1227932960			
2	Metro	7.626653182	22	774463983	21850320	1018013770			
21	RahimTex	2.749732646	23	598621652	23564710	190954365			
7	Zaheen	5.805965109	24	525723838	41487909	908117316			
14	Desh	3.782532985	25	437540598	8370786	34223830			
24	Alhaj	2.535742339	26	266644659	19263573	208804601			
19	Anlima	2.975596988	27	228739935	19536511	199016551			
28	Modern Dying	(10.10624405)	28	0	1585845	15716585			

Table 5: Rankings of VAIC and company turnover in Bangladesh apparel industry: performance at



Figure 3: VAIC performance of top ten apparel companies in terms of turnover (2015)

Figure 3 illustrates VAIC performance of top ten revenue-earning companies in FY 2015. However the result was stationary and no significant trend was observed in the VAIC performance trend in the firms.

4.2. Regression Results between VAIC Components and M/B Ratio

This regression model is based on the sample of M/B ratio and VAIC results of the listed companies of four year data from 2013-2016. Although intellectual capital has been hailed as a significant intangible asset for value creation by several scholars, this empirical research does not support the hypothesis that VAIC components influence a company's stock market value. Consistent with the results found in the Indian textile sector study by Deep et al. (2014), only financial outcome make material difference for investment decision to the Bangladeshi investors.

			Mo	odel Sum	mar	у		
Model	R	R Square	Adjust Squa			Std. Erro	or of the Esti	mate
1	.568	.323		.298				20.38825
		-	_	ANOVA	ł			
Model		Sum of	Squares	df	N	Mean Square	F	Sig.
	Regression		16067.809		3	5355.936	12.885	.000
1	Residual		33670.143	8 81	l	415.681		
	Total		49737.952	2 84	1			
	-		(Coefficie	nts			
Model		Unstat	ndardized	Coefficie	nts	Standardized Coefficients	t	Sig.
		E	3	Std. Erro	r	Beta		
	(Constant)		30.411	12	.267		2.479	.015
1	HCE		896		.558	246	-1.605	.112
1	SCE		-6.766	18	563	063	364	.716
	CEE		24.427	7	.093	.514	3.444	.001

Table 6: Regression Results Model Summary

The regression model for M/B ratio showed an R-squared (coefficient of determination) of 0.323, which implies that the 32.3% of variation in the M/B is explained by variation in VAIC components. These findings evidences that the Bangladeshi market responds more to returns from physical resource assets then from IC with CEE being the only significant factor in the analysis. HCE and SCE, both with negative coefficients, do not influence investment decision at all. The findings are in line with market outcome in other sectors in developing countries by Firer and Williams (2003), Ghosh and Mondal (2009), Chu (2011), Mehralian et al. (2012), and Pal

and Soriya (2012). With high volume and low value-added products, this industry still survives on low cost female labor, and preferential treatment of foreign buyers (GSP).

5. Conclusion

Though IC management is regarded as a function of wealth and value creation, this study found no significant evidence of human capital and structural capital influencing market valuation in the short-term. Bangladeshi stock market is not fully efficient. Most investors lack knowledge in fundamental analysis and they go by market rumors. That was the reason of market bubble created in two major stock market collapse in one in FY 1996-97 and another in FY 2010-11. Financial reporting in Bangladesh only focuses on level of utilization of physical assets in generating returns with lack of enthusiasm for voluntary IC disclosure activity (Khan and Ali, 2011). The precise IC reporting is likely to be highly valued for investors and foreign buyers alike. The study is valuable for the investors, managers and firm-owners as it indicated huge knowledge gap in the industry and scope for improvement by incorporating intellectual capital in future market strategy formulation. The study fails to establish IC as a key strategic asset for market advantage, giving rise to previous claims on emerging economies that stakeholders do not consider intellectual capital in their decision (Shaban and Kavida, 2013; Pal and Sooriya, 2012; Khanqah, et al. 2012; Gan and Saleh 2008). The situation can be improved, if the regulatory authority encourages the reporting and investments in intellectual capital through mandatory disclosures, tax and interest rates subsidy to the projects linked with IC utilization, thereby influencing the attitude of the investors as regards IC efficiency and investment decision, providing a new dimension to finance theory and reflecting true value creation capacity of IC in explaining market outcome in developing countries.

References

- Akter, A. (2017). An overview of Bangladesh Textile 2016. [online] News, Views & Articles: Textile, Apparel & Fashion Industry. Available at: http://www.textiletoday.com.bd/overview-bangladesh-apparel-2016/ [Accessed 16 Jul. 2017].
- Ariff, A.H.M., Islam, A. and van Zijl, T., (2016). Intellectual capital and market performance: The case of multinational R&D firms in the US. *The Journal of Developing Areas*, 50 (5), 487-495.
- Berzkalne, I. and Zelgalve, E., (2014). Intellectual capital and company value. *Procedia-Social and Behavioral Sciences*, 110, 887-896.
- Chen, M.C., Cheng, S.J. and Hwang, Y. (2005), "An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance", Journal of Intellectual Capital, 6 (2), 159-176.
- Chiu, S.K.W., Chan, K.H. and Wu, W.W.Y. (2011), "Charting intellectual capital performance of the gateway to China", Journal of Intellectual Capital, Vol. 12 No. 2, pp. 249-276.
- Dutta, B., (2012). Generating Web Based Information Services Using Semantic Web Technology Thesis. University of Pune, Pune, 2009. Shodhganga. Web. 24 Apr. 2012
- Deep, R. and Pal Narwal, K. (2014). Intellectual capital and its association with financial performance: a study of Indian textile sector, *International Journal of Management and Business Research*, 4(1), 43-54.
- Dzenopoljac, V., Yaacoub, C., Elkanj, N., & Bontis, N. (2017). Impact of intellectual capital on corporate performance: evidence from the Arab region. *Journal of Intellectual Capital*, *18*(4), 884-903.
- Firer, S. and Mitchell Williams, S., (2003). Intellectual capital and traditional measures of corporate performance. *Journal of intellectual capital*, 4(3), 348-360.
- Gan, K. and Saleh, Z., (2010). Intellectual capital and corporate performance of technology-intensive companies: Malaysia evidence. *Asian journal of business and Accounting*, 1(1).
- Gehl Sampath, P., (2007). Intellectual property and innovation in least developed countries: Pharmaceuticals, agro-processing and textiles and APPAREL in Bangladesh, *Background Paper no. 9 for the least developed countries. Report 2007 on Knowledge*, Technological Learning and Innovation for Development. UNCTAD, Geneva.
- Ghosh, S. K., & Maji, S. G. (2015). Empirical validity of value added intellectual coefficient model in Indian knowledge-based sector. *Global Business Review*, *16*(6), 947-962.
- Goh, P. (2005). Intellectual capital performance of commercial banks in Malaysia. Journal of intellectual capital, 6(3), 385-396.
- Godyn, J., (2013). Intellectual Capital Valuation and Stock Market Performance in an Era of Financial Turmoil: Blue Chip Banks Listed in Stock Exchanges of the Visegrad Countries. *Theory, Methodology, Practice*, 9(2), 53.
- Hossain, I. (2013). Research Report: Textile Sector of Bangladesh. IDLC Investments Limited.
- Iazzolino, G. and Laise, D., (2013). Value added intellectual coefficient (VAIC): A methodological and critical review. *Journal of Intellectual Capital*, 14 (4), 547-563.
- Kannan, G. and Aulbur, W.G., (2004). Intellectual capital: measurement effectiveness. Journal of intellectual

capital, 5 (3), 389-413.

- Khan, H. U. Z., & Ali, M. (2010). An empirical investigation and users' perceptions on intellectual capital reporting in banks: Evidence from Bangladesh. *Journal of human resource costing & accounting*, *14*(1), 48-69.
- Khanqah, V. T., Khosroshahi, M. A., & Ghanavati, A. (2012). An empirical investigation of the impact of intellectual capital on firms' market value and financial performance: Evidence from Iranian companies. *International Journal of Management and Business Research*, 2 (1), 1-12.
- Lee, S. H., and Makhija, M., (2009). Flexibility in Internationalization: Is It Valuable during an Economic Crisis?, *Strategic Management Journal*, 30(5), 537 55.
- Lev, B., & Zarowin, P. (1999). The boundaries of financial reporting and how to extend them. Journal of Accounting research, 37(2), 353-385.
- Lev, B. (2001), Intangibles: Management, and Reporting, Brookings Institution Press, Washington, DC.
- Maditinos, D., Chatzoudes, D., Tsairidis, C. and Theriou, G., (2011). The impact of intellectual capital on firms' market value and financial performance. *Journal of intellectual capital*, 12 (1), 132-151.
- Marr, B. and Roos, G., (2005). A strategy perspective on intellectual capital, in B. Marr (Ed). *Perspectives on Intellectual Capital*, Oxford: Butterworth-Heinemann, pp.28–41.
- Mehralian, G., Rajabzadeh, A., Reza Sadeh, M. and Reza Rasekh, H., (2012). Intellectual capital and corporate performance in Iranian pharmaceutical industry. *Journal of Intellectual Capital*, 13(1), 138-158.
- Mehri, M., Umar, M.S., Saeidi, P., Hekmat, R.K. and Naslmosavi, S., (2013). Intellectual capital and firm performance of high intangible intensive industries: Malaysia evidence. *Asian Social Science*, 9 (9), 146.
- Morariu, C.M. (2014), "Intellectual capital performance in the case of Romanian public companies", *Journal of Intellectual Capital*, 15(3), 392-410.
- Nimtrakoon, S. (2015), "The relationship between intellectual capital, firms' market value and financial performance Empirical evidence from the ASEAN", Journal of Intellectual Capital, 16(3), 587-618.
- Najibullah, S. (2005). An Empirical Investigation of The Relationship Between Intellectual Capital and Firms' Market Value and Financial Performance: in Context of Commercial Banks of Bangladesh. *Independent University, Bangladesh.*
- Pal, K. and Soriya, S., (2012). IC performance of Indian pharmaceutical and textile industry. Journal of Intellectual Capital, 13(1), 120-137.
- Prusak, L., (1996). The knowledge advantage. Planning Review, 24 (2), 6-8.
- Pulic, A. (2000). VAICTM–an accounting tool for IC management. International journal of technology management, 20 (5-8), 702-714.
- Shaban, M., & Kavida, V. (2013). Intellectual capital, financial performance and market valuation: An empirical investigation of information technology industry in India. Asia-Pacific Journal of Management Research and Innovation, 9(1), 55-62.
- Sharma, A., Branch, B., Chgawla, C., & Qiu, L. (2013). Explaining Market-to-Book. B> Quest.
- Singh, R.D. and Narwal, K.P., (2016). An Examination of the Relationship between Intellectual Capital Efficiency and Financial Performance. *South Asian Journal of Management*, 23 (3), 78.
- Ståhle, P., Ståhle, S. and Aho, S. (2011). Value added intellectual coefficient (VAIC): a critical analysis, *Journal* of Intellectual Capital, 12 (4), 531-551.
- Starovic, D. and Marr, B., 2003. Understanding Corporate Value: Managing and Reporting Intellectual Capital. CIMA.
- Ulrich, D., 1998. Intellectual capital = competence X commitment, Sloan Management Review, 39 (20), 15-26.
- Yalama, A. and Coskun, M., (2007). Intellectual capital performance of quoted banks on the Istanbul stock exchange market, *Journal of Intellectual Capital*, 8 (20), 256-271.

٦

G		VA	(BDT)			HC	E	1
Company Name	2013	2014	2015	2016	2013	2014	2015	2016
Shasha	902868837	880942002	1203745590	1644460250	4.476187	4.36748	6.800086	3.671076
Malek	1174360314	1039934463	1093217614	1045115881	12.5347	8.976134	5.619699	4.011161
Envoy	931102509	948256498	1499553823	726652828.7	13.40993	5.070438	6.424941	5.779185
Stylecraft		726989624	802691393	781634550		1.474943	1.132854	1.153546
Apex	622749689	733379437	869539097	944453232	1.189487	1.13934	1.102725	1.073296
Paramount	1113721516	1075156163	893567632	1157679380	3.741285	3.137396	2.173422	2.519196
Fareast	869702041	973966831	1040457381	1201638983	1.63184	1.980252	2.060665	2.220771
Saiham Cotton	368591991	293415086	406962919	345835418	7.880931	4.732148	3.698068	2.793406
GNF	688841840	744196682	526458365	499852770	13.32933	13.13271	6.123901	5.342829
RN	1819761219	990182077	600381938	134964070	18.14049	6.312714	3.793886	0.73708
Matin	635085799	623296867	792150378	738496237	6.263124	11.02875	5.888092	3.947129
Saiham	193246271	302163960	240877987	227173753	4.173238	3.471558	2.066897	1.859931
Zahintex	918186356	730072195	770462439	792331644	1.522037	1.627073	1.711901	1.710751
Altex	419638375	1016733592	315914821	89321962	2.433162	5.721457	2.496351	1.924908
Delta	405529098	4818983830	376235318	239674379	4.347387	54.15358	3.462031	4.380549
Hwa Well	326671164	343378932	250903620	254997868	2.828861	2.845276	2.723301	2.876029
Makson	207635914	286858287	203728824	311003248	2.252608	2.511692	2.36359	2.402078
HR	331679554	326459776	282461785	287140936	1.621252	1.619437	1.606361	1.582336
Dragon	211296356	272770410	280565980	519708514	3.71924	4.62227	4.335387	2.704199
Metro	251318248	269371509	222401666	205129302	9.036318	8.924092	6.568644	4.764441
RahimTex	148386196	150450439	183701968	180821548	1.649796	1.624001	1.713555	1.524843
Desh	75149145	86203016	116827541	1747590079	1.091319	1.156765	1.23695	24.33692
Alhaj	93004103.5	71393743	62040109	75804526	3.059675	2.19456	1.891613	1.399447
Anlima	99380350	94438713	95428324	89321962	2.745961	2.435739	2.080259	1.924908

Appendix 1: Value-Added and Human Capital Efficiency Performance of apparel industry (2013-2016)

Industry (2013-2010)								
		S	CE			СЕЕ		
Company Name	2013	2014	2015	2016	2013	2014	2015	2016
Shasha	0.77659557	0.77103499	0.85294303	0.727600282	0.082451	0.206568	0.197525	0.260295
Malek	0.92022146	0.88859347	0.82205452	0.750695643	0.110556	0.099115	0.097215	0.096388
Envoy	0.92542841	0.80277838	0.84435655	0.82696521	0.152528	0.142477	0.191897	0.075122
Stylecraft	-	0.32200788	0.11727365	0.133107926	0.199293	1.458709	1.434209	1.407403
Apex	0.15930167	0.12229864	0.09315531	0.068290987	1.498797	1.749767	2.059638	2.156491
Paramount	0.73271212	0.68126438	0.53989602	0.603047897	0.389926	0.480592	0.376113	0.445686
Fareast	0.38719491	0.49501381	0.51471975	0.549705965	0.408491	0.474611	0.348537	0.356067
Saiham Cotton	0.87311143	0.7886795	0.72958856	0.642014061	0.288089	0.077707	0.100919	0.087493
GNF	0.92497749	0.92385428	0.83670541	0.812833223	0.226453	0.161674		0.099163
RN	0.94487469	0.84158953	0.73641802	-0.35670575	0.601558	0.147231	0.089031	0.020842
Matin	0.84033527	0.9093279	0.8301657	0.746651289	0.247575	0.14948	0.185575	0.151389
Saiham	0.76037789	0.71194489	0.51618294	0.462345507	0.110545	0.096691	0.084592	0.084177
Zahintex	0.34298562	0.38539933	0.41585397	0.415461372	0.492125	0.390607	0.351321	0.34976
Altex	0.58901219	0.82521933	0.59941538	0.480494719	0.50828	1.245195	0.152659	0.201514
Delta	0.76997677	0.981534	0.71115223	0.771718103	0.210743	2.309626	0.133483	0.089972
Hwa Well	0.64650087	0.64854023	0.63279858	0.652298375	0.306767	0.239948	0.456102	0.313708
Makson	0.55607012	0.60186199	0.57691476	0.583693804	0.047378	0.064202	0.036235	0.053841
HR	0.38319288	0.38250151	0.37747502	0.368022942	0.658199	0.58046	0.50536	0.461452
Dragon	0.73112784	0.78365608	0.7693401	0.630204678	0.140697	0.176977	0.177281	0.181098
Metro	0.88933545	0.88794379	0.84776158	0.79011178	0.237377	0.246361	0.210247	0.202226
RahimTex	0.39386439	0.38423672	0.41641802	0.344194731	0.724384	0.51204	0.619759	0.623542
Desh	0.08367784	0.13551984	0.19155989	0.958910168	1.829561	2.08936	2.354023	0.850171
Alhaj	0.67316793	0.54432776	0.47135064	0.285432258	0.28897	0.208264	0.172779	0.351587
Anlima	0.6358287	0.5894469	0.51929052	0.480494719	0.439534	0.431165	0.376048	0.378812

Appendix 2: Structural Capital Efficiency and Capital Employed Efficiency Performance of apparel industry (2013-2016)