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Abstract: Family-based traditional microenterprises are abundant in developing countries, and in many cases they are a major source of income and employment for both urban and rural poor. With a few exceptions, however, most these family-based traditional microenterprises in the rural areas of developing countries seldom grow in terms of enterprises' size and product quality. Thus, they tend to perform poorly relative to their growth potentials. The development of these family-based microenterprises would be instrumental to employment generation, poverty alleviation and sustainable economic growth in developing countries. Using primary data collected from the traditional handloom industry in Bangladesh, this paper inquires into the development process of family-based traditional microenterprises in developing countries. The paper empirically demonstrates that entrepreneurs' general human capital acquired by formal education is critically important for the introduction of new and high value-added fashionable products, and, thus, performance of the enterprise.

Keywords: Family-based business, Handloom industry, Human Capital
JEL Classifications: O14, L67, O15

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What Determines the Performance of Small Enterprises in Developing Countries? Evidence from the Handloom Industry in Bangladesh

The role of family-based traditional microenterprises in developing countries in poverty alleviation and sustainable economic growth has been widely recognized, because of their immense capability to absorb a growing labor force into productive activities, relatively low capital requirement, and low dependence on imported raw materials (e.g., Daniels and Mead, 1998; Lanjouw and Lanjouw, 2001; Weijland, 1999, Otsuka et al., 2009; Hayami; 1998). Particularly, the recent success of East Asian countries, such as China and Vietnam in quick eradication of extreme poverty vividly demonstrates the importance of the development of rural enterprises (Nam et al., 2009; Heston and Sicular, 2008). Whether Bangladesh, one of the most severely poverty-stricken countries in South Asia, can be as successful as China and Vietnam in eradicating extreme poverty by facilitating the development of rural enterprises, therefore, needs to be investigated.

Family-based traditional microenterprises are abundant in the rural areas in Bangladesh, and their roles in generating employment and income opportunities, and in poverty alleviation is widely recognized (e.g., Sen, 2003; Hossain, 2004, 2002; Hossain et al., 2009; Mottaleb and Sonobe, forthcoming). In most of the cases, the entrepreneurs in the family-based microenterprises tend to be concentrated in specific villages or areas in the form of microenterprise clusters. For example, the garment cluster in Munshipara, Syedpur district, the shoe cluster in Vairab, Narsingdi district, the handloom cluster in Delduar, Tangail district, and

the Jamdani *saree* (women ware) cluster in Rupganj, Narayanganj district (MIDAS, 2008; Mahmud, 2010). In these clusters, using simple machinery, traditional technology and unpaid family members, entrepreneurs are engaged into producing z-goods in the sense of Hymer and Resnick (1969). Importantly, while most of the microenterprise clusters seldom grow in terms of size of the enterprises and product quality (e.g., Islam, 1984), a few of these industries have been gradually developing into relatively modern industries, where relatively modern production methods and machines are used to produce relatively high value-added modern z-goods in the sense of Ranis and Stewart (1993). For example, entrepreneurs in Munshipara, Syedpur district have even been successful in exporting their products to neighboring countries, such as India, Bhutan, and Nepal, and based on their products, a wholesale market in Shiliguri, West Bengal, India has emerged (Mahmud, 2010). While understanding such development process of family-based traditional rural microenterprises in developing countries is immensely important to facilitate further development of microenterprises in developing countries, existing studies however, seldom rigorously investigate the development process.

In this context, the objective of this paper is to investigate the process of development of the family-based traditional rural industries in developing countries using the traditional handloom industry in Bangladesh as a case. The traditional handloom industry is the largest non-farm economic activity in Bangladesh since the long past that has created enormous employment opportunities for the rural poor, and particularly for women (BBS, 2005; Latif, 1997). While many countries have experienced the extinction of traditional industries with the advent of modern production methods and technology (e.g., Hymer and Resnick, 1969; Resnick, 1970), the handloom industry in Bangladesh has not only been surviving, but recently also showing a positive growth trend in terms of total employment and output (e.g., BBS, 2005; Latif, 1997).

Importantly, until today, the handloom sector supplies more than one-third of the total available cloth in Bangladesh. Thus, an investigation into the development process of the family-based traditional handloom industry in Bangladesh might provide deep insights into the development of microenterprises in the rural areas of developing countries.

At present, the handloom industry in Bangladesh consists of nearly 90 thousand workers and entrepreneurs, and the sector supplies nearly 36 percent of total available clothes in Bangladesh (BBS, 2005). While until the 1990s, the major products of the handloom industry were low value added traditional men's ware *lungi* and traditional hand towel *gamcha*, recently the industry has been producing relatively high value-added products that have higher demand in the urban market, such as the fashionable women's ware *saree*, high fashion men's wear *panjabi* and *fatua*, and fashionable ladies' dresses made of three pieces of handloom made cloth. Recently, the demand for these handloom-made fashionable cloths has been increasing among the fashion-conscious city dwellers. The large city-based traders, in response have increasingly been placing orders with entrepreneurs in rural areas in the form of the sub-contracting system, in which traders supply design specifications and sometimes cash and raw materials in advance to the entrepreneurs in response of timely delivery of the products. According to available statistics, the handloom industry has been also successful in exporting high-fashioned variety of women's ware known as *Jamdani saree* to India (EPB 2006/07). Thus, the handloom industry in Bangladesh has been growing in terms of value added per worker and per loom (BBS, 2005).

Based on primary information collected from nearly 800 handloom entrepreneurs in Bangladesh, the present paper depicts the development process of the traditional handloom industry in Bangladesh. Our basic hypothesis is that the general human capital of the entrepreneurs,

measured by formal years of education, plays a vital role in the development process, in which entrepreneurs with relatively higher level of education have been more likely to producing high value-added fashionable products using improved raw materials and dealing with the large city-based traders and receive higher product prices and able to expand their enterprises' size by employing more hired workers.

The rest of the paper is organized as follows. Section 2 presents a brief history of the handloom industry in Bangladesh, and elaborates the testable hypotheses emphasizing the role of entrepreneurs' human capital on product quality upgrading efforts, and the performance of the enterprises. Section 3 describes the survey, methodology and descriptive statistics. Section 4 presents the model specification and regression analysis. Finally, Section 5 concludes with the major findings, and policy implications.

2. Transformation of Handloom industry in Bangladesh and Testable Hypotheses

Since the long past, the traditional handloom industry has been the largest industry in the rural area of Bangladesh, and the handloom products, such as *muslin* were well-known in Asia and Europe. Until the seventeenth century *muslin*, the finest quality of handloom cloth made of silk, was used as cloth for the emperors' family and nobles of the court, and it was a major export items in the early British period (1757-1947). For example, in 1787, Indian Rupee 5.0 million *muslin* was exported solely from Dhaka to Europe (Bhattacharjee and Khaled, 1969 cited in Latif, 1997). Later, this family-based industry faced a serious set-back due to a hostile policy favoring British mill-made cloth in greater India. Nonetheless, even in the entire Pakistan era (1947-1971), and after independence in 1971, the handloom industry preserved its dominance as the largest supplier of cloth in Bangladesh. Table 1 presents the share of handloom, power loom, mills and imported cloth since 1960 to 2003 in the total available cloth in Bangladesh. It shows

that the contribution of the handloom industry in the total available cloth in 1960 was more than 70 percent.

Table 1: Contribution of Loom Sector in Cloth Availability (in million meters) in Bangladesh During 1960 to 2003

Year	Handlooms	Power looms	Mills	Net Import	Total Availability
1960-61	366.5	1.5	58.4	74.3	501.0
	(73.0)	(0.5)	(11.7)	(14.8)	(100)
1986-87	606.9	61.1	60.4	57.6	786.0
	(77.2)	(7.8)	(7.7)	(7.3)	(100)
2002-03	687.0	170.0	1590.0	(-)526.0	1921.0
	(35.8)	(8.8)	(82.8)	(-27.4)	(100)

Sources: Bangladesh Bureau of Statistics. 2005. *Report on Bangladesh Handloom Census, 2003*
*Values in parentheses are percentages

While the handloom industry was the major cloth supplier until the early 1980s, later textile mills gradually replaced the handloom industry, and emerged as the major cloth supplier in Bangladesh. Nonetheless, the total cloth production by handloom industry has increased significantly over the decades though its share has been reduced to 35 percent in 2003. Table 1 depicts an important change: Bangladesh has emerged as a net exporter of cloth. The credit of must go to both handloom industry and textile mills, as the total amount of production from the handloom and textile mills has increased significantly.

Bangladesh Bureau of Statistics (BBS) mentioned that presently, the total product of the handloom industry has not only increased, but also the industry has been largely producing high value added products (BBS, 2005). Previously, the handloom entrepreneurs were mainly producing the traditional men's wear *lungi,* and traditional hand towel, *gamcha*, mainly targeting the rural poor. These products usually used as casual clothes, and mostly used by day laborers and working class people. In most of the cases, entrepreneurs themselves carried their products to the nearby market places to sell. Since the 1990s, however, entrepreneurs have increasingly

been producing high value added fashionable products that have higher demand in the urban areas, such as the high quality and fashionable *saree,* a six/seven-yard long unstitched single piece of cloth for women, *panjabi* and *fatua*, a high fashion men's wear used instead of a shirt, fashionable ladies' dresses made of three pieces of handloom-made cloths. Although *saree* is one of the traditional products of the handloom industry, and a commonly used dress of the women in Bangladesh, the high quality and differentiated varieties of *sarees* are used as formal dress of the female office workers, and used as the national dress for the Bangladesh women.

Table 2: Structural Change in the Handloom Industry in Bangladesh

Indicators	1978	1990	2003
No. of looms	437015	514456	505556
No. of persons engaged (owner and worker)	847597	1027407	888115
Percentage hired workers	42.0	46.3	53.9
Male	NA	64.0	53.2
Female	NA	36.0	46.8
Percentage producing low-value added products	NA.	64.2	33.5
Percentage producing high-value added products	NA	35.8	66.5
Value added per loom (USD)a	484.72	531.31	352.10
Value added per worker (USD)b	221.57	265.93	200.36

Sources: Bangladesh Bureau of Statistics. *Report on Bangladesh Handloom Census, 2003* and *1990*
NA- not available
a, b The values were in local currency converted based on information provided in Government of Bangladesh (GOB). 2009. *Bangladesh Economic Review 2008*

Table 2 clearly presents the structural change that has been taking place in the handloom industry in Bangladesh over the last two decades. It shows that the number of looms in the industry has slightly decreased in 2003 compared to 1990, however, it has increased compared to the number of looms in 1978. Although, handloom industry is mostly managed by unpaid family members, the wage employment opportunities represented by the percentage of hired workers and the production of high value added products have significantly increased over the decades. For example, in 1990 the share of *saree* in the total handloom product was only 35.8 percent, but in 2003 it increased to 66.5 percent (BBS, 2005). Table 2, however shows that the value added per loom and worker have slightly reduced in 2003 compared to 1990 that mainly stems from an increase in the price of major raw materials, such as yarn and dye. Nonetheless, Table 2 clearly demonstrates a change in the production structure, in which entrepreneurs' are increasingly producing high value added modern products. It has higher demand and price in the urban areas.

The demand for fashionable high quality handloom products has been gradually increasing in the urban market and handloom products such as, saree is now considered as an indispensable part of

marriage ceremonies, religious, new year and other traditional festivals. Since the per capita income in Bangladesh, has been growing steadily since the 1990s, the income effect, in which the demand for the differentiated improved products increases with the increase in the per capita income of a nation (Hayami, 2001), may also be partly contributing to increase the demand for fashionable handloom products in the urban areas in Bangladesh. To meet the growing urban demand, thousands of traders in Dhaka, the capital city of Bangladesh, and in other major cities link the entrepreneurs those located in the countryside by supplying them designs and specifications and extending credit in the form of cash and kind based on mutual trust and benefit. During our survey, we met one of the leading Dhaka based traders, who was the pioneer in introducing *Tangail saree*, a women's ware made by entrepreneurs of Delduar sub-district of Tangail district to Dhaka city back in 1987[1]. According to her, while the entrepreneurs in the rural areas could produce high quality product, many of them were not familiar with modern taste and preference that changes frequently with the time in urban areas. For example, to make it attractive to urban women, besides color combination, a *saree* should be at least six yard long, and it should be accompanied by a blouse piece of the same designed cloth as the *saree*. While most of the handloom entrepreneurs produce only five yards long *saree,* entrepreneurs who deal with the large city-based traders produce six yards long *saree* along with a blouse piece according to the specification of the large city-based traders.

Rural handloom entrepreneurs who deal with the large city-based traders also try to use differentiated high quality yarn to produce high quality products. As the large city-based traders

[1] The owner operates a saree trading house "Tangail Saree Kutir" in Baily Road, Dhaka city. She informed us that she incidentally found the Tangail saree cluster in Pathrail sub-district while she was visiting with husband. Out of curiosity, she brought six pieces of Tangail saree to Dhaka, and quickly sold it to her relatives. After that she started her won business and at present nearly 500 handloom entrepreneurs produce *saree* according to her design specifications, and nearly 70 workers are working in her business premise in Dhaka localted in Baily Road.

usually buy a large amount of products in a single deal, and appreciate high quality products by providing relatively higher prices, it may generate some positive size effects on the size of the enterprises that deal with the large city-based traders. On the other hand, the entrepreneurs those deal with the large city-based traders try to expand their businesses size, to meet the growing demand of the large city-based trader, by getting loan from the formal commercial banks. Overall, the growing demand for fashionable handloom products in the urban market contributes to a steady growth of the handloom industry in Bangladesh over the past decades. At this stage, a question arises as to who the entrepreneurs are who are more likely to produce high value added products, deal with large city-based retailers, and, thus, receive higher product prices, earn higher sales revenue, and operate larger plants by employing more workers.

One obvious answer of the question would be that the entrepreneurs, who can relatively accurately, predict the future stream of profit considering all risks relating to producing high quality products and new investment, would be more likely to adopt product quality upgrading efforts, and try to sell to the large city-based traders to receive higher prices of products. Based on the successful cases in East Asia, South Asia and Africa, emerging literature on the cluster-based industrial development empirically demonstrate that the general human capital or formal education of the entrepreneurs plays a crucial role in adopting the product quality upgrading efforts, and the performance of the enterprises (Sonobe and Otsuka, 2006, 2011). This is because, the use of differentiated high quality raw materials to produce high quality products that match urban market, dealing with the large city-based traders, and managing relatively a large number of workers require entrepreneurial and managerial ability. That managerial ability is mainly the function of formal education of the entrepreneurs, as education enhances peoples' ability to adjust to new opportunities (Schultz, 1975).

In searching the fundamental determinants of the product upgrading efforts, and the performance of the entrepreneurs in the handloom industry in Bangladesh, we postulate following two hypotheses emphasizing the role of the formal education of the entrepreneurs on their behavior and performance:

Hypothesis 1: A more educated entrepreneur is more advanced not only in producing high value added products using high quality yarn, but is also more likely to expand his business by taking loans from formal banks and more likely to be successful in selling to large city-based traders.

Hypothesis 2: A more educated entrepreneur tends to receive higher product prices, earn higher sales revenue, employ more workers, and operate large firms.

3.0 Materials and Method

3.1. Data sources

Data for this study was collected both from primary and secondary sources. Reports on Bangladesh Handloom Census 2003 and 1990 were the major sources of secondary data. Enterprise level data were collected through a questionnaire survey, as these data are not available from the secondary sources. Data collected from primary sources were made by the participants of 40th Foundation Training Course organized by Bangladesh Public Administration Training Centre (BPATC), Savar, Dhaka in 2007 as part of their village study assignments. The sampled entrepreneurs were selected randomly based on a list of the available entrepreneurs at the village level supplied by Upazila Nirbahi Officers (UNOs) prior conducting the survey. The survey covered more than 80 villages in 50 sub-districts in five administrative divisions (out of six) in Bangladesh. In this survey we did not include Barisal division as it was hit by a devastating tropical cyclone “Sidr” in November, 2007 that killed more than 10,000 people in the

division. Barisal division, however, contains only 1.3 percent of the total handloom enterprises in Bangladesh (BBS, 2005). Thus, an exclusion of Barisal division from the sample survey might not create any serious sampling bias problem.

A total of 801 handloom entrepreneurs were interviewed using a well-structured pre-tested questionnaire to collect information on the number of workers, sales revenue, the price of yarn, product prices, and the fraction of sales revenue from dealing with the large city-based traders in 2005 and 2007. Due to incomplete information we could not use 10 questionnaires, and, thus, present paper is based on the information collected from 791 handloom entrepreneurs in Bangladesh.

3.2 Descriptive Statistics

Table 3 presents the location of the sampled entrepreneurs by the type of their product. The sampled entrepreneurs are divided into two groups based on whether they produce high value added or low value added products. The first group consists of 63 percent of the sampled entrepreneurs producing low-value added traditional products, such as *lungi* and *gamcha* and other woolen products. The second group consists of 37 percent entrepreneurs producing relatively high value added fashionable cloths, such as *saree* and other products. Table 3 shows that the largest sample comes from Rajshahi division, followed by Dhaka and Sylhet divisions. The location distribution of the sampled entrepreneurs also matches with the census on the handloom industry in 2005 by Bangladesh Bureau of Statistics (BBS), which also confirms that Rajshahi division has the largest concentration of handloom entrepreneurs in Bangladesh (BBS, 2005).

Table 4 presents information on education, age and years in present business of the sampled entrepreneurs based on their products type similar to Table 1. In Table 2, however, Firstly, we divide the sampled entrepreneurs into two groups based on their years of education. The first group consists of 429 entrepreneurs, whom we consider as less educated entrepreneurs with either no formal education or the years of education is five years at the maximum that is the primary level education in Bangladesh. Table 4 shows that among the total less educated entrepreneurs, a total of 164 entrepreneurs (20 percent of the total sampled entrepreneurs) have no formal education, and a total of 273 (34 percent of the sampled entrepreneurs) entrepreneurs have one to five years of education. The second group consists of 364 entrepreneurs whom we consider as relatively more educated entrepreneur with years of education is higher than five years. It shows that in this group, a total of 226 entrepreneurs have six to 10 years of education that is secondary level education in Bangladesh, and the rest 136 entrepreneurs have more than 10 years of education that is college and above level of education in Bangladesh.

Table 3: Location of the Sampled Entrepreneurs by Division

Name of Division	Sample Survey 2007		Total and percentage
	Producing low-value added products	Producing high-value added products	
Chittagong	113	14	127 (16.1)
Dhaka	96	90	186 (23.5)
Khulna	48	10	58 (7.3)
Rajshahi	153	128	281 (35.5)
Sylhet	88	51	139 (17.6)
Total and percentage	498 (63.0)	293 (37.0)	791 (100)

* Values in parentheses are percentages

Table 4 clearly shows that entrepreneurs with higher years of education are more likely to produce high value added products. For example, it shows that nearly 75 percent of the total

entrepreneurs with no formal education are producing low value added traditional products and only 27 percent of them are producing relatively high value added products. Table 4, thus clearly demonstrates the role of formal education on product choice of the entrepreneurs, in which relatively highly educated entrepreneurs are producing high value added products and vice versa. It lends support to Hypothesis 1. Table 4 also shows that on average, entrepreneurs are 38 years old and have been operating their present business for more than 16 years.

Table 4. Years of Schooling, Age and Years in Present business by Product Type of the Sampled Entrepreneurs

Years of schooling	Producing high-value added products	Producing high-value added products	Total /overall
Less educated entrepreneurs (education is up to primary level)	318 (74.1)	111 (25.9)	429 (100)
-*No formal schooling*	117 (73.1)	43 (26.9)	160 (100)
-*Up to primary level (1 to 5 years)*	201 (74.7)	68 (25.3)	269 (100)
Relatively more educated entrepreneurs	180 (49.7)	182 (50.3)	362 (100)
-Secondary level (6 to 10 years)	133 (58.8)	93 (41.2)	226 (100)
-Higher secondary level and above (11 years and above)	47 (34.6)	89 (65.4)	136 (100)
Age	39.3	36.9	38.4
Years in present business	18.1	10.9	16.5

* Values in parentheses are percentages

Table 5 presents information on entrepreneurs' prior occupations before starting their present businesses, and also on the occupation of entrepreneurs' fathers. It shows that nearly 70 percent of the sampled entrepreneurs had previously worked in the industry either as volunteers in their family businesses or as hired workers in the industry before starting their present businesses.

Table 5: Prior Occupational Information of the Entrepreneurs and Their Father

Types of entrepreneurs	Producing high-value added products	Producing high-value added products	Total
Worked in the weaving industry	378	175	553
Agriculture	111	77	188
Wage/salaried worker/other business	9	41	50
Father's occupation			
Worker in the weaving industry	378	119	427
Agriculture	156	104	260
Wage/salaried worker/other business	34	70	104

The finding confirms a common picture of rural industries in developing countries, where apprenticeship is the major learning channel and spin-offs are the major channel of industrial expansion (e.g., Althenburg and Myer-Stamer, 1999). The second largest prior occupation of the entrepreneurs was agriculture, in which 23 percent of them had previously engaged. The rests had engaged into other businesses or worked as salaried, and, or, wage workers in other sectors other than handloom and agriculture sectors. The table also shows that 54 percent of the sampled entrepreneurs are the second generation entrepreneurs whose fathers were either workers or entrepreneurs in the handloom industry. Of 33 percent entrepreneurs' fathers were engaged into agriculture, and rests were engaged as either wage workers (5.6 percent) or in petty businesses (7.4 percent).

Table 6 presents information on the size of the enterprise, price of product and raw materials in 2007. The table also presents information on willingness to apply for formal bank loan and loan accessibility to the sampled entrepreneurs in 2007. We asked the sampled entrepreneurs whether they applied for and received formal bank loan. According to Table 6, in 2007 on average, an entrepreneur was operating his business with seven workers including both hired and family

workers, out of which 2.6 were female, earned sales revenue of BDT 0.58 million, sold products at BDT 327 per piece, and bought yarn at BDT 110.19 per kilogram. It also shows that more than 65 percent of the total products were sold to the large city-based traders, and 22 percent of the entrepreneurs applied for formal bank loans, while only 12 percent of them received the same.

Table 6: Enterprise Size, Product and Raw Material Price and Information on Bank Loans in 2007 (Per enterprise average)

Indicators	Overall	Producing high-value added products	Producing high-value added products
No. of workers	6.73	5.04	9.61
No. of hired female workers	2.60	2.56	2.68
Sales revenue (million BD Taka)	0.58	0.31	1.05
Price per piece (BD Taka)	327.24	196.98	548.63
Price of yarn (BD Taka per KG)	110.19	97.50	131.76
Fraction of revenue from dealing with city-based trader	66.28	60.48	67.63
Percentage applied for bank loan	21.7	13.7	35.1
Percentage got loan after application	12.0	7.80	19.1

USD 1= 70 BDT (Approx)

A closer scrutiny of table 6, however, reveals that the entrepreneurs' who are producing high value added products, operate relatively large enterprises in terms of the number of workers and sales revenue; sell and buy products and raw materials at higher prices, and have a higher fraction of revenue from selling to the large city-based traders. The percentage of applicants and recipients of loans from formal banks is also high in the case of entrepreneurs producing high value added products relative to the entrepreneurs producing low value added traditional products. The worst performer in the group is the low value added products producers. They earn relatively low sales revenue, and sell and buy product and raw materials at a low prices. Importantly, also only a few of them applied for and received bank loans in 2007 relative to the other entrepreneurs.

Table 7 put some light on why the entrepreneurs producing traditional low value added products are relatively bad performers relative to entrepreneurs' producing high valued products. In table 7, the entrepreneurs are divided into two groups based on their years of schooling. The first group consists of the low educated entrepreneurs whose level of formal education ranges between to 0 at the minimum and 5 at the maximum that is the primary level of education. The second group consists of relatively highly educated entrepreneurs whose level of formal education is 6 years and above that is the high school level of education. We then checked the differences in the mean values and also check the statistical significance of the differences in the mean values of some of the indicators of two comparing groups by calculating t-statistics. Table 7 demonstrates that the entrepreneurs with relatively higher education employ more workers, earn higher sales revenue, more likely to apply for and receive formal bank loan, sell and buy products and raw materials at higher prices, more likely to produce high value added products, earn larger fraction of revenue from selling their products to the large city-based traders.

The corresponding t-statistics demonstrate that the differences in all of the mean values of all of the comparing variables calculated based on the differences on the educational attainment of the entrepreneurs are highly statistically significant. Table 7, thus, supports Hypotheses 1 and 2 that highly educated entrepreneurs are more likely to produce relatively high value added productss, and perform well, compared to others.

Table 7: Relationship between Entrepreneurs' Years of Schooling, Operation Size, Product Price and Sales Revenue in 2007 (Per enterprise average)

Comparing variables	Entrepreneurs with education level up to primary level	Entrepreneurs with education level high school and above	Differences in the mean values and corresponding t-statistics[a]
	A	b	a-b
No. of workers	5.04	9.61	-4.57*** (-13.17)
No. of hired female workers	2.56	2.68	-0.13*** (-0.86)
Sales revenue (in million BDT)	0.30	1.01	-0.75*** (-5.02)
Product price (BDT per piece)	196.9	548.6	-351.65*** (-27.0.6)
% Applied for bank loan			-28.8*** (-4.44)
% Received bank loan			-11.4*** (-4.35)
% Producing high-value added products	24.9	45.3	-20.4*** (-6.19)
Price of yarn (BDT per KG)	104.0	115.5	-11.4*** (-3.98)
Fraction of revenue from selling to city-based traders	64.4	68.5	-4.1* (-1.53)

a. One sided t-test of differences in the sample means: ***, **,* indicate statistical significance level at the 1%, 5% and 10% levels, respectively.

4.0 Regression Analyses

Table7, however, simply presents a one to one relationship between the variables of interest, and the level of education of the entrepreneurs without considering the influences of the other variables at the same time. To control for other variables while characterizing the entrepreneurs who are more likely to produce high value added products and perform well, we specify the following reduced form function as follows:

$$Y_{it} = ß_0 + \Sigma\alpha_j \text{ (Dummy for education level is high school and above)i} + ß_1 (\text{Age})_{it} + ß_2 (\text{Age squared})_{it} + ß_3 (\text{Years in present business})_{it} + \Sigma\, \theta_j \text{ (Two dummies for entrepreneur's three categories of prior occupations) i} + \Sigma\, \varphi_j \text{ (Two dummies for three categories of prior occupations of the entrepreneurs' father)}_I + \gamma_j \text{ (Year 2007 dummy)} + \Omega_i + \xi_{it} ;$$

where Y is a vector of dependent variables that includes (1) the production choice of the entrepreneurs, in which 0 is assigned for producing low value added products, and 1 is assigned for the producing high value added products, (2) applied for bank loan, in which 1 is assigned if an entrepreneur applied for a bank loan, and is 0 otherwise (3) received bank loan after application, in which 1 is assigned if an entrepreneur received the bank loan, and is 0 otherwise (4) fraction of sales revenue earned from dealing with city-based traders, (5) natural log of the yarn price per kilogram, (6) natural log of the product price per piece (7) natural log of the sales revenue (8) natural log of the total number of workers and (9) natural log of the total number of female workers by an entrepreneur/enterprise i and in year t. $ß_0$ is a scalar parameter and , $ß_1$, $ß_2$, $ß_3$ θ_j, φ_j are the parameters of interest, Ω is the time invariant village level fixed effect and ξ is the error term with white-noise property

To estimate all of the functions in all cases, we simply apply Fixed-effect estimation approach at the village level.

4.1 Determinants of Product Choice, Application for Bank Loans and Sale to Traders

Columns 2 of table 8 reports the estimated function explaining the choice of products produced by the entrepreneurs where the base product is the traditional low value added products, such as *lungi* and *gamcha.* The effect of the years of education of entrepreneurs' on his choice of producing high value added sophisticated products, such as *saree*, is highly positive and significant. The finding demonstrates that compared to the less educated entrepreneurs, entrepreneurs with at least high school level of education tend to produce more high value added products.

Columns 3, 4 and 5 of Table 8 present the determinants of applying for and receiving of bank loan and the fraction of revenue earned from dealing with the large city-based traders. Usually, literature states that due to asymmetric information and collateral problems, poor rural entrepreneurs are excluded from the formal credit market (e.g., Kono and Takahashi, 2010). While a small number of applicants and recipients of loans from formal banks in our sample confirms the market exclusion conjecture for the rural entrepreneurs, our finding shows that only the highly educated entrepreneurs are more likely to apply, and also more likely to receive loans relative to the less educated entrepreneurs. Probably this is because, highly educated entrepreneurs can predict the future profit streams relatively accurately, and, thus, tend to be more enthusiastic about expanding their present businesses by taking calculative risks in the form of formal bank loans. On the hand, as they tend to be good performer, banks are also more likely to extend loans to the highly educated entrepreneurs relative to others. The last column of table-8 presents an estimate of the function explaining the fraction of sales revenue earned from dealing with the large city-based traders. It shows that relatively highly educated entrepreneurs are more likely to have larger fraction of revenue from selling to the large city-based traders compared to the less educated or uneducated entrepreneurs. The findings in table 8 provide clear support to Hypothesis 1.

Among other variables, age and the square of age variables shows that although age positive affect the product decision and decision for application of bank loans, it exhibits a tendency of diminishing return with the increase in the age of the entrepreneurs. The years in the present business variable is found positive and significant in functions explaining applying for and receiving bank loan, but it is insignificant in the functions explaining production choice and revenue received from dealing with large city-based traders. The finding, however, confirms the

recent structural change that has been taking place in the handloom industry in Bangladesh, in which relatively new entrepreneurs are more likely to producing high value added products that have higher demand in urban areas.

8: Determinants of Product Choice, Application for Bank Loan and Selling to City-based Traders

Dependent variable:	Produce high value added products=1	Applied for bank loan (yes=1)	Got loan after application (yes=1)	Fraction of revenue from selling to traders
Dummy for education level high school and above	0.03*** (2.99)	0.06*** (2.68)	0.05*** (2.88)	4.12** (2.40)
Age	0.002 (0.86)	0.004 (0.76)	0.002 (0.60)	0.18 (0.45)
Age squared	-0.00002 (-0.78)	-0.0001 (-0.92)	-0.0001 (-0.73)	-0.01 (-1.11)
Years in present business	0.0003 (0.44)	0.004*** (2.99)	0.003*** (3.38)	-0.11 (-1.13)
Dummy for prior occupation was agriculture (yes=1)	0.05*** (3.32)	-0.02 (-0.58)	-0.03 (-1.43)	2.58 (1.09)
Dummy for prior occupation was wage/salaried worker/business (yes=1)	0.03 (1.13)	0.10** (2.16)	0.19*** (5.32)	12.89*** (3.44)
Dummy for a farmer father (yes=1)	0.02 (1.28)	-0.03 (-1.09)	0.003 (0.16)	-1.21 (-0.55)
Dummy for wage/salaried worker/businessman father (yes=1)	0.001 (0.03)	-0.05 (-1.50)	-0.08*** (-2.87)	11.12*** (3.77)
Year 2007 dummy	-0.001 (-0.15)	-0.01 (-0.42)	-0.01 (-0.61)	3.10** (2.14)
Const	0.29*** (5.92)	0.09 (0.94)	0.02 (0.29)	62.35*** (7.60)
No. of observations	1582	1582	1582	1582

Numbers in parentheses are z-statistics , ***, ** and * represent statistical significance level at the 1%, 5%, and 10% level, respectively.

Among the prior occupation dummies of the entrepreneurs, in which having previously worked in the handloom industry is the default group, shows that entrepreneurs who were previously engaged in other businesses, are more likely to produce high quality products, apply for and receive bank loan and also have a relatively higher fraction of sales revenue from dealing with the large city-based traders. This finding thus indicates the importance of the specific human

capital of entrepreneurs acquired from learning by doing on their product upgrading, business expansion and marketing efforts. Fathers' occupation dummies in which having a father in the handloom industry is the default group, has no systematic effects on the functions explaining production choice and applying for and receiving bank loan by entrepreneurs.

4.2 Determinants of Products Prices and Raw Material Prices and Enterprise Performance

Table 9 presents the estimated functions explaining yarn and product prices, sales revenue and the total number of workers of the entrepreneurs'.

Table 9: Estimated Functions Explaining Yarn and Product Price and Size of the Enterprises Measured by Sales Revenue and No. of Workers

Dependent variable	ln(Product price)	ln (Yarn price)	Ln(sales revenue)	Ln (No. of workers)	Ln(No. of female workers)
Dummy for education level high school and above	0.06**	0.06**	0.15**	0.08***	0.08**
	(2.21)	(2.32)	(2.19)	(2.66)	(2.50)
Age	0.02**	0.01	0.03**	-0.01	-0.01
	(2.48)	(0.60)	(2.10)	(-1.58)	(-0.84)
Age squared	-0.0002***	-0.0001	-0.001***	0.0001*	0.0001
	(-2.69)	(-0.82)	(-2.84)	(1.81)	(1.48)
Years in present business	0.0002	0.001	0.01**	0.01***	0.003*
	(0.10)	(0.44)	(2.23)	(3.91)	(1.74)
Dummy for prior occupation was agriculture (yes=1)	0.05	0.003	-0.12	-0.013	0.08*
	(1.44)	(0.08)	(-1.28)	(-0.34)	(1.94)
Dummy for prior occupation was wage/salaried worker/business (yes=1)	-0.02	-0.02	0.31**	0.07	-0.04
	(-0.37)	(-0.30)	(2.04)	(1.05)	(-0.64)
Dummy for a farmer father (yes=1)	-0.05	-0.04	-0.09	0.20***	0.19***
	(-1.31)	(-1.21)	(-0.97)	(5.28)	(4.89)
Dummy for wage/salaried worker/businessman father (yes=1)	0.03	0.09**	0.23*	0.12**	0.08
	(0.72)	(2.24)	(1.90)	(2.38)	(1.50)
Year 2007 dummy	0.08***	0.12***	0.11*	0.04*	0.03
	(3.69)	(5.67)	(1.90)	(1.78)	(1.35)
Constant	5.10***	4.41***	10.81***	1.57***	0.64***
	(39.12)	(37.32)	(32.53)	(11.45)	(4.53)
No. of observations	1582	1582	1582	1582	1477

Numbers in parentheses are z-statistics , ***, ** and * represent statistical significance level at the 1%, 5%, and 10% level, respectively

All across the estimated functions, the dummy high school level education of the entrepreneur is positive and highly significant. Thus, entrepreneurs' with relatively higher years of education tend to use high quality differentiated raw materials to produce high quality products, receive higher product prices and sales revenue, and employ a relatively large number of workers. The last column of Table 9 presents the determinants of the employment of female workers, in which the dummy for the high school level of education of the entrepreneur is positive and significant. It reports that relatively highly educated entrepreneurs tend employ more workers, and particularly more female workers. This is probably because, as relatively highly educated entrepreneurs are more likely to produce *saree* and other high value added products, they also tend to employ more female workers as female workers are suitable to decorate high value added products with hand-made designs. Overall, the findings in Table-9 amply support to Hypothesis-2.

Age variable in Table 9 is also showing positive but diminishing effect on the estimated functions explaining yarn and product prices, sales revenue and the total number of workers of the entrepreneurs'. The variable years in present business is positive in all estimated functions in Table 9, although it appears insignificant in the functions explaining product and yarn prices. Prior occupation variables of both entrepreneurs and their fathers do not expose any systematic effect in Table 9.

5. Conclusion and Policy Recommendations

To reduce extreme poverty in the rural areas of poverty stricken developing countries in South Asia and Sub-Saharan Africa, a growing labor force must be absorbed into productive activities. As the new land frontier is almost closed and crop intensity is already high particularly in

poverty stricken developing countries particularly in South Asia, it is difficult to absorb a growing labor force in the agriculture sector alone. Thus, employment and income opportunities for the rural poor must be generated in the non-farm sectors by developing industries in the rural areas of South Asia and Sub-Saharan Africa.

Using primary information collected from the family-based traditional handloom industry in Bangladesh, this paper examines the determinants of the sustainable development of the rural traditional industries in developing countries, which is instrumental to poverty alleviation and sustainable economic growth. Our empirical analyses support the conjecture of Bangladesh Bureau of Statistics (BBS), 2005 that the traditional handloom industry in Bangladesh has been transforming from traditional to a modern sector by producing more value added products using modern production method and technology. Our empirical result reveals that entrepreneurs' general human capital measured by their formal years of education is critically important for a sustainable development of the traditional industry to a modern industry, as relatively highly educated entrepreneurs, using high quality raw materials producing higher value added products, expanding business sizes by taking loan from the formal bank, and trying to explore urban markets, and, thus performing well. It leads to the sustainable development of the entire industry, which reminiscent the successful cluster-based industrial development in East Asian countries (e.g., Sonobe and Otsuka, 2006, 2011).

Unlike East Asian countries, family-based traditional enterprises in South Asia and Sub-Saharan Africa are mostly de-linked from the formal information opportunities and modern technology. To transform hundreds of family-based traditional microenterprises into modern industries to generate further income and employment opportunities for the poor, and, thus to improve the

living standard of the rural people, the provision of general education in developing countries must be enhanced to build human capital. For the existing entrepreneurs, who may not able to go back to school, modern management techniques, technology and market information can be provided by extending managerial training to the entrepreneurs. Donor agencies, World Bank, UNIDO and NGOs together with governments in developing countries can take action plan to untie the growth potentials of family-based traditional rural microenterprises in developing countries.

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