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**ENABLING INNOVATION AND PRODUCTIVITY GROWTH
IN MANUFACTURING SMALL AND MEDIUM SIZED ENTERPRISES
IN LOW INCOME COUNTRIES**

Qualitative Exploration of Policy and Research Issues in Bangladesh

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I would like to thank the enterprise owners and managers who gave up their time and were willing to talk and share their perceptions of daily realities, their stories and views with us. I also thank the research partners of the Chittagong Independent University (CUI), in particular Vice Chancellor Dr. Mahfuzul Hoque Chowdhury for the fruitful cooperation and Dr. Mir Mohammed Nurul Absar for organising my stay, participating in the interviews, and sharing his valuable observations and thoughts.

Jaap Voeten (Tilburg University/Radboud University Nijmegen)

Contents

Introduction.....	1
1. DFID research project challenges.....	3
1.1 Approach: complementing quantitative with qualitative research	3
1.2 Case study methodology.....	4
1.3 Selection of SMEs and fieldwork.....	5
1.4 Fieldwork	5
2. Introducing manufacturing SMEs in Bangladesh.....	7
2.1 The manufacturing sector.....	7
2.2 Small and Medium-sized Enterprises (SMEs).....	7
2.3 Policy environment.....	8
3. Empirical data: Cases of manufacturing SMEs in Bangladesh.....	9
3.1 Metal – crucible casting for steel mill supplies (50 employees).....	9
3.2 Textiles – jeans stone washing (85 employees).....	12
3.3 Automotive – trucks and buses (20 + 100 employees).....	14
3.4 Textiles – garment accessories (62 employees)	16
3.5 Chemicals – lubricant recycling (150 employees).....	19
3.6 Food processing – dried fish packages (5 employees)	21
3.7 Paper production – print paper (150 employees).....	23
3.8 Textiles – textile prints (40 employees)	26
4. Analysis and conclusions.....	31
4.1 Trends and patterns in the cases	34
4.2 Policy issues – insights for policy makers to consider	36
References.....	41
Annexes.....	43
Annex 1: List of questions for semi-structured interviews	43
Annex 2: List of companies interviewed	47
Annex 3: DFID research questions	49

Introduction

The promotion of innovation in Low Income Countries (LICs) has recently appeared on the agenda of policy-makers and international development agencies. Many agree that innovation is crucial in these countries, because it is fundamental for growth in order to catch up with middle and high income economies (Chaminade et al., 2010). Current research, theory development and policy formulation to promote innovation, however, have mainly focused on innovation in the more advanced economies, whilst investigation of these issues in low income countries to date has been limited.

The 5-year research project '*Enabling Productivity and Innovation in Low Income Countries, (EIP-LIC)*' funded by the British Department for International Development (DFID) and commissioned to Tilburg University, aims to fill research gaps on innovation in LICs from an economic perspective. EIP-LIC aims to deliver robust high quality evidence from Africa and Asia on how to increase innovation and raise productivity in manufacturing SMEs, through a coordinated set of thematic and country case studies providing internationally comparable data. The countries of study include Kenya, Tanzania, South Africa, Ghana, Ethiopia, Uganda, India, Indonesia, Bangladesh and Bangladesh.

EIP-LIC focuses on manufacturing Small and Medium-sized Enterprises (SMEs) in LICs. Promoting innovation in these enterprises has a particularly positive impact on development (Szirmai et al., 2011); SMEs are usually operating on the edge of the formal and informal sector and have low levels of productivity and competitiveness. Compared to the agriculture and services sectors, manufacturing in LICs is typically characterised by a limited share of the total GDP. Innovation within SMEs in manufacturing enables these enterprises to raise productivity and grow, resulting in a better-balanced economic structure while generating employment opportunities for poorer groups and contributing to poverty reduction. Moreover, promoting innovation in domestic manufacturing is a way towards import substitution and increases the competitive (export) position of firms on the world market.

One part of the project concerns a quantitative analysis of the internal and external factors of the innovation process within firms in all countries of study. Another part concerns a complementary qualitative exploration of the policy and research issues in each country. This involves the development of a series of case studies of manufacturing SMEs. The research output of qualitative reports, working papers and policy briefs are available at the EIP-LIC's website: <http://www.tilburguniversity.edu/dfid-innovation-and-growth/>

This report presents the findings of the qualitative exploration in Bangladesh. It is targeted at the DFID project researchers as well as the broader academic community with similar research interests in providing ideas or supporting them to identify and/or validate research questions and hypotheses. The report may also serve as reference material for reflecting and interpreting the outcomes of quantitative research in this area. In addition, it may provide useful bottom-up insights to policy makers within governmental agencies, firms and NGOs on innovation involving the entrepreneurs' perspective. It is also targeted at SME owners and SME branch organisations, who will hopefully see their business and socio-economic and institutional context reality accurately reflected in the report.

The structure of the qualitative exploration reports is the same for all countries in EIP-LIC, enabling cross-country comparison of the research and policy issues. Thus chapter 1 is standard for every report, outlining the DFID project research challenges, approach and methodology. Chapter 2, by contrast, focuses on the country of study only and briefly summarises latest trends in the manufacturing sector from secondary sources. Chapter 3 constitutes the main part of the report and provides the original primary qualitative data (cases) and analysis with regard to innovation in manufacturing SMEs in Bangladesh. Chapter 4 of the report concludes with analysis of the data and the identification of policy and research issues with special reference to the 'Innovation Systems' and 'Finance for Productivity Growth' research themes of the project.

1. DFID research project challenges

1.1 Approach: complementing quantitative with qualitative research

EIP-LIC aims to deliver robust high quality evidence from Africa and Asia on how to increase innovation in manufacturing SMEs so as to raise productivity, through a coordinated set of thematic and country case studies providing internationally comparable data. The project takes an econometric approach within two thematic areas: ‘Innovation Systems’ and ‘Finance for Productivity Growth’. The research teams address internal capabilities and external institutional factors, institutions and policies that support or hinder the diffusion and adoption of innovation and finance raising productivity at SME firm level. Specifically, the project takes an ‘economics’ perspective on innovation, and involves econometric analysis of a set of variables concerning barriers at firm, regional and national levels and their causalities with the *innovative behaviour/capability of entrepreneurs* and subsequently innovation and productivity. This constitutes a reductionist and deductive approach in defining variables for analysis in which the impact of individual factors on innovation is assessed by applying quantitative econometric methods. The research methods include firm-level surveys in all countries of study (in cooperation with The World Bank), experiments and Randomised Control Trials (RCTs). The quantitative analysis will serve as a basis for identifying relationships between internal capabilities, external institutional factors and finance on the one hand and innovativeness and productivity growth on the other.

Applying quantitative methods in development research brings some limitations and challenges. In EIP-LIC too, conceptual issues emerged, in terms of the definition and measurement of innovation and productivity in LICs. These may seem straightforward variables at first glance, but their measurement can be more complicated in the LIC context. Innovation may be manifested differently, not via high profile technological and radical breakthroughs, usually measured by R&D expenditures or patents (OECD, 2005), but by more incremental adoption and adaptation or new combinations of existing technologies (Szirmai et al., 2011). These forms of innovation are equally important for raising productivity and competitiveness of SMEs in LICs.

Moreover, innovation research and theory development in recent decades has typically involved empirical material from advanced economies, such as the innovation systems literature of Lundvall (1992) and Freeman (1987), where innovation takes place within a relatively stable institutional and Science, Technology and Innovation (STI) policy context and is ‘controlled’ and supported by established innovation system actors and innovation policies. In LICs, however, the contemporary institutional realities and formal/informal dual economic contexts are different and may involve other less visible or less commonly known factors and policies around SMEs affecting their innovativeness and how innovation manifests itself.

Therefore, the theory and associated policies of how innovation evolves within an innovation system in the institutional contexts in LICs may be different, which is increasingly acknowledged in recent innovation systems literature (Lundvall, 2009; World Bank, 2010). For instance, entrepreneurs are innovating by Doing, Using and Interacting (DUI) in fast-changing contexts, enabled by informal institutions and informal (social) learning. Applying the research variables on innovation and productivity in LICs from existing literature and theory (deduction) based on advanced economies, therefore, might not take all relevant variables into account. A more precise identification of variables might be obtained by complementing the selection with a broader understanding of contemporary realities and context on the ground in LICs.

Another research challenge in EIP-LIC concerns the interpretation of the quantitative survey research outcomes of the project, involving cross sectional analyses amongst others, where attribution and explanatory issues among independent and dependent variables arise. Although control variables are typically verified, the correlations cannot be easily translated into causalities in complex and dynamic contexts. This is

particularly important for the interpretation of research outcomes at the policy level in the realities of the country concerned. A broader insight into how innovation processes and actor interaction mechanisms evolve might help to open the black box and analyse and interpret the quantitative outcomes.

In an effort to manage these challenges, EIP-LIC includes complementary qualitative research, involving an exploration and description of contemporary realities of innovation in manufacturing SMEs in the LICs. This aims at inductively identifying actual and relevant *research and policy issues* as input for the EIP-LIC research themes as well as for additional explanatory evidence supporting research output.

In operational terms, Tilburg University and partners conducted a series of case studies of manufacturing SMEs in each of the 10 target countries of study in the project. The holistic case study approach and method involves interviews capturing original insights, views and perceptions of SME owners and managers. Similar report format and comparable data will be used for all countries of study in EIP-LIC, enabling cross-country comparison to identify overall trends and patterns in innovation and productivity policy and research issues in manufacturing SMEs in LICs.

1.2 Case study methodology

The objective of the qualitative study of EIP-LIC is to identify relevant policy and research issues concerning innovation in manufacturing SMEs within contemporary realities in Bangladesh. Applying a case study approach is particularly useful in this respect, since this method is an approach for inductively exploring and identifying concepts, noticeable similarities, trends and patterns of socio-economic phenomena (Yin, 2003).

The case study research involves a series of 15 interviews with managers and/or owners of manufacturing SMEs. This may seem a limited number to justify research validity. However, the approach usually involves in-depth rich and detailed descriptions and a multidimensional analysis of the complexities and linkages of a few cases to gain an understanding of the (socio-economic) mechanisms and processes of the case subject. In the case descriptions, innovation as an economic phenomenon is the case 'subject', whereas the unit of analysis is a manufacturing SME. The case description holistically explores the type and basic features of innovation within the SME, and reviews the impact on productivity and competitiveness over the past 2 to 5 years.

The data for the case descriptions are obtained via 'semi-structured' interviews with SME owners and managers. 'Structured' refers to the systematic review and discussion of innovation(s) in the firms, the *innovation process, internal capabilities*, and innovation system actors around the firm, including *formal institutions, the business system and informal institutions* (attached as annex 1). These actors and institutions encompass formal and informal, private, public, and quasi-public institutions or organisations around the SME. 'Semi' refers to the interviewing approach of encouraging owners or managers to tell their story, and express their concerns and perceptions freely, without being confined to the 'questionnaire framing'. Of particular interest is what innovation means in the manufacturing SMEs in their context, and the less known favourable and unfavourable institutional conditions and barriers enabling or preventing it.

All interviews are recorded and transcribed. The data generated are entered and stored using qualitative data analysis software. The writing of the case is a step-by-step process of unravelling, ordering and organising the transcriptions into compact SME case descriptions of 2/3 pages following a similar format. The series of case descriptions are compared and analysed for patterns, differences and similarities in internal capabilities and socio-economic and institutional contexts. The findings are summarised as policy and research issues that could serve as input for the quantitative research of the 'Innovation Systems' and the 'Finance for Productivity Growth' themes under EIP-LIC.

1.3 Selection of SMEs and fieldwork

The selection criteria for the cases included:

- The company is a formally registered SME. In the DFID project context, an SME is understood as a company with 10-100 employees, whereas turnover, assets and capital formation are not considered.
- The company is involved in manufacturing. The project follows the International Standard Industrial Classification of all Economic Activities (ISIC). In this standard, manufacturing is defined as the physical or chemical transformation of materials of components into new products, whether the work is performed by power- driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail. Assembly of component parts of manufactured products and recycling of waste materials are included. Moreover, given the pace and importance of the new technologies, the project considers software and mobile app development as a form of manufacturing to be included in the selection of cases.
- The company is a 100% Bangladeshi owned/indigenous company. No foreign or joint ventures.
- The company introduced some form of innovation, preferably process or product, which resulted in increased productivity and competitiveness in terms of export promotion or import substitution. Other types of innovation may also be considered: management, business concept/practice, inputs, functional innovation.
- Value creation within the company, as a result of the innovation, is essential. This may concern a significant productivity increase by reduced costs (pushing the productivity frontier - saving on labour, capital, and input) or more sales and income due to the launch of premium products and competitiveness.
- Innovation process - idea, test, implementation and commercialisation - takes place in the firm and is initiated and owned by the entrepreneur. The SME owner appropriates the additional innovation value.

These selection criteria are defined in such a way that the selected cases represent the EIP-LIC target group: manufacturing SMEs. Moreover, the criteria assure a certain homogeneity within the selected cases, which will enable comparison of cases while supporting a certain validity of the identified trends or patterns. At the same time, allowing some heterogeneity, by including deviant cases, provides more contrast, and thus enables the research team to better construct and highlight divisions in the innovation process, linkages, system or mechanisms.

An essential element of the selection is the notion that types of SME innovation in LICs are not confined to technological (radical) inventions resulting from particular R&D investments and efforts. Innovation in manufacturing SMEs in LICs more often encompasses incremental adoption and adaptation or new combinations of existing technologies, products, marketing, management or business practices. Moreover, innovation often does not concern one type only. More often, an initial innovation enables and/or triggers other types of innovation within a firm; a new technology allows the introduction of new products, for instance.

1.4 Fieldwork

The qualitative data collection through interviews in Bangladesh took place from 20 to 31 May 2017. The research partners of Chittagong Independent University identified SMEs in Chittagong and around. SMEs were identified by tapping into informal and personal networks and drawing information from formal business associations. In total, 15 owners/managers were interviewed (see list attached as annex 2). An average of 2-3 interviews per day were completed. The interviews typically took 1.5 hours.

The research team respected a set of ethical codes in conducting the fieldwork. This involved a transparent explanation of the project and the purpose of collecting the data to the interviewed owners and managers.

The research team provided assurance that the firms' data were kept confidential, with SMEs and interviewees anonymised in the descriptions. Before publication, a draft version of the report was first sent to the SME owner/manager to check whether there were any issues mentioned that he or she did not agree with, or felt uncomfortable with.

During the interviews, the SME owners and managers expressed interest in learning more about the project and about innovation in other SMEs. The team sent a copy of the final report to all interviewees, expressing their intention to maintain contact, and to 'give something back' in terms of participation in future policy debates, policy dissemination, contacts or networks. The final reports are to be accessible to the public and downloadable via the project website.

The original recording of the interviews and transcriptions are available for the project researchers - eventually open access - for further analysis and development of scientific papers and journal articles.

2. Introducing manufacturing SMEs in Bangladesh

The market oriented economy of Bangladesh is the world's 44th largest in nominal terms, and 32nd largest by purchasing power parity. Goldman Sach's directory of Next Eleven Countries (N-11) included Bangladesh as having high potential to become one of the world's leading economies in the future. J P Morgan considered Bangladesh as one of the 'Frontier Five' economies with most promising growth. PricewaterhouseCoopers, in its report *The World in 2050*, predicted that Bangladesh will be one of the emerging economies expected to dominate the world in 2050, as the 23rd largest economy. The economic boom of Bangladesh is considered to be one of the most successful economic stories of the modern world.

Dhaka, the capital city, and Chittagong, the commercial capital, are the principal financial centres of Bangladesh, being home to the Dhaka stock exchange and the Chittagong stock exchange. Bangladesh is strategically important for the economies of Northeast India (the 7 states of Arunachal, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura), Nepal, Bhutan, and also China (the 3 provinces of Tibet, Sichuan and Yunnan) as Chittagong seaport can provide maritime access for these landlocked regions and countries.

The economic growth rate of Bangladesh reached a record 7.28% in the year 2017, having been stuck between 6 and 7% for nearly a decade. Except Bangladesh, only two countries (Cambodia and Ethiopia) achieved a growth rate of more than 7% in 2017. The recent economic success of Bangladesh can be attributed to remittances, garment exports, the agricultural sector, and a robust NGO sector. Around 8 million Bangladeshis out of the population of 160 million work in 155 countries of the world. Bangladesh is the 7th largest remittance earning nation of the world and in 2017 migrant Bangladeshi workers remitted USD 13.53 billion to the country.

Bangladesh's garment industry is the 2nd largest in the world, next to China, with USD 28.15 billion export earnings in 2017. Agriculture contributes around 15% of GDP and Bangladesh is on the threshold of self-sufficiency in food grains production. Bangladesh's success in the areas of poverty reduction, healthcare, primary education, gender equality and life expectancy is also credited to its high performing NGOs. Bangladeshi NGO BRAC, the world's largest NGO, has been claimed to have provided more than 600 million people of Bangladesh with access to a toilet.

2.1 The manufacturing sector

The contribution of the industrial sector to GDP is continually increasing in Bangladesh. The contribution of the broad industrial sector (mining and quarrying; manufacturing; electricity, gas and water supply and construction) to GDP was 32.42% in 2017. Among these sectors, the contribution of the manufacturing sector is the highest, at 21.74%. Bangladesh was historically famous for its finest muslin and silk fabrics. Its major manufacturing industries include garments and textiles (world's 2nd largest), pharmaceuticals, leather, tea, ship recycling (world's largest), ship building, steel, seafood and food processing.

2.2 Small and Medium-sized Enterprises (SMEs)

In Bangladesh, SMEs have been accelerating industrialisation, employment generation, technological innovation and economic growth. The SME sector contributes 25% of GDP, employs around 80% of industrial workers and constitutes more than 95% of all businesses in Bangladesh. After assuming power, the present government of Bangladesh declared 'Vision 2021' with a view to graduating Bangladesh to a middle income country by 2021, when Bangladesh will celebrate 50 years of independence.

To realise the vision, Bangladesh needs to significantly increase employment in the manufacturing and service sectors, especially through sustainable SMEs. Development of SMEs in Bangladesh requires a multi institutional approach where the Ministry of Industries, Ministry of Commerce, Bangladesh Bank, Bangladesh Small and Cottage Industries Corporation (BSCIC), and SME Foundation can play pivotal supportive roles.

2.3 Policy environment

In order to expedite the pace of development, the government of Bangladesh announced its ‘National Industrial Policy 2016’. The main objectives include sustainable and inclusive industrial development through the creation of productive employment to produce new entrepreneurs, bringing women into the mainstream of the industrialisation process, and international market linkages.

In the ‘National Industrial Policy 2016’, SMEs are considered the main force for the country’s industrial development. Chapter 5 of the policy emphasises creating a favourable environment for the development of the SME sector through:

- collateral-free and single-digit SME financing;
- cluster-based SME development;
- keeping special quotas and privileges for women SME entrepreneurs;
- state of the art training and development for capacity enhancement of SME entrepreneurs;
- improving market access and market linkage of SME products;
- providing special incentives for acquiring environmentally friendly and productive machinery and technologies for SMEs;
- creating linkages between large scale industries and SMEs;
- setting up SME industrial parks, common facility centres, and design centres for cluster-based SMEs;
- establishing one-stop SME service centres in every district;
- introducing a ‘one village one product’ policy;
- developing SME entrepreneurs by providing physical facilities, start-up financing, and credit guarantees;
- giving financial and non-financial incentives for import substitute and export oriented SMEs for export diversification, etc.

After the successful achievement of its Millennium Development Goals (MDGs), Bangladesh is now planning the achievement of its Sustainable Development Goals (SDGs). 10 out of 17 SDGs focus on sustainability. Bangladesh needs huge local and foreign investment, especially in establishing an environmentally friendly SME sector, to achieve its SDGs through employing its large young population.

3. Empirical data: Cases of manufacturing SMEs in Bangladesh

This chapter presents eight cases of SMEs whose owners and/or managers were interviewed in Chittagong in the period 20 – 31 May 2017. The selection of eight out of the fifteen interviews was completed with a view to providing homogeneity in terms of the SMEs in manufacturing as well as to present a broad overview of the issues from the various SME owners' perspectives. The write-up format is similar for each case: a description of the innovation, the internal capability and external environment (formal institutions, business systems and informal institutions). Notable issues outside this framework, which were stressed by the owner and/or manager of the SMEs, are also included.

3.1 Metal – crucible casting for steel mill supplies (50 employees)

The company is located in the outskirts of Chittagong and produces crucibles as supplies for the steel mill industry. Crucibles are board-based containers, pots and plates into which melted metals or other metal substances in liquid form may be poured, and are able to withstand high temperatures.

The company was set up 17 years ago as a family business, when the father suggested that it would be profitable to produce boarded products. He used to work as general manager for a leading steel manufacturing company in Bangladesh, which imported board pots from India. The interview is held with the two brothers (aged 25 and 29), who manage the business today.

The basic raw material is board and clay, to which some chemical substances are added. The clay input comes from India and China. The composite product is mixed and baked at 200°C, a process which the brothers comment is not very difficult – *“it is like baking biscuits.”* Sourcing and importing high quality chemical input is more complicated. The chemicals are procured from South Africa, India, Australia and China. According to the brothers, the production process is not risky in terms of safety or working conditions. The temperature of the oven in the production line is *“only”* 200°C and the production process is not very labour intensive.

The younger brother acts as the director of the company. He has an MBA degree, which is a great help in running the business. Their retired father is still actively involved – *“he takes care of research and development and procurement of chemical and clay inputs.”* The older brother manages the staff and looks after the daily company administration. He acknowledges that he relies a lot on his younger brother. None of them have a technical educational background in the production of crucibles or steel.



Internal capabilities

While still in high school, the younger brother was already motivated to join the family business. He has no regrets about his career path, and is happy to take responsibility for the firm. He feels that his generation has developed itself quickly through social media – *“which means that the older generation relies on us.”* He mentions that their father has faith and trust in them and their capabilities. The father has accepted the new style of management and trusts his sons – *“today we sign cheques for 2 million Taka, and our father does not*

ask any more about that.” At the same time, their father is consulted on a daily basis. The whole family lives in one large house – *“every night, we talk with my dad for about an hour and discuss everything about the day’s business.”*

The company has a small office and a large production facility, where 45 people work in three eight-hour shifts – *“we run the plant 24 hours a day.”* Ten to twelve workers and one supervisor cover each shift. In the daytime, the production manager is nearby, but *“we don’t need a manager in the night shift because of the senior workers who can run the plant at night.”* All staff have leave on Fridays and government holidays.

In the past, the company had a high staff turnover. The company established a policy that salaries would be paid on the 10th of every month, on condition that workers were present the first ten days of the month – *“it was kind of a risky management innovation but it worked out well. The staff turnover has reduced to a minimum level.”* Initially, there was some opposition to the new salary payment strategy, but today the workers are content with the regulation and give notice before leaving the company.



The company is hindered by the lack of skilled manual labour in Bangladesh. The brothers are also dissatisfied with the attitude of several of their workers, who lack ambition and motivation to do manual work – *“some labourers just want to work for fifteen days to earn minimum survival income for the month, and then take the rest of the month off.”* The workers are reluctant to change these habits.

To address the motivation issue, the brothers set up a bonus system and provide extra benefits. During religious celebrations, they hand out bags of food and rice as presents for the workers – *“it is a practice our father began. It is a good policy from our company’s perspective but also from a religious perspective.”* The company does not employ child labour on principle. However, there are occasional exceptions – *“a few days ago a kid came looking for a job. He needed money urgently for his family.”* Motivated by compassion, the younger brother gave him light work and told the child that this work was temporary and outside the core work of the company.

The company has hired several external technical consultants in the past, all from India – *“over the last few years, we have learned most of the technical details of the regular production process.”* The brothers explain that India is much more experienced in the steel industry – *“so Indian companies are dominant in Bangladesh.”*

To reduce their dependency on manual labour, they modernised the plant three years ago and automated the production process and management system – *“demand was increasing so it was originally our idea to improve the production process so that we could speed up our production.”* For technical advice on the automation implementation, they hired a specialised Indian technician, who came over for four months. He was recruited through their father’s network of contacts.

The technician, who had designed many plants in India, proposed a new production line set-up. The brothers had to invest in several new machines and installed a new oven. The actual construction was completed by local technicians. The new installation was a *“costly”* investment of 4 million Taka (50,000 USD). Since then, the production process and quality have both improved substantially, according to the brothers. The production cycle period decreased from 6 hours to 20 minutes – *“it is a drastic change in productivity and we still maintain the same quality.”* The brothers consider the design an open invention – *“if someone wants*

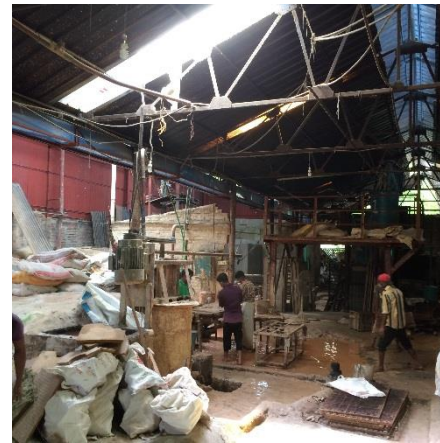
to copy our production line, that is okay, it doesn't matter." The Indian technician continues to be employed as a consultant – *"he gives regular technical advice over Skype."*

The company does not pollute the environment, according to the brothers. Water, pumped from the ground, is mostly used for preparing the input composite. Waste water is recycled in a small treatment plant. Hot air from the gas oven is also recycled. There is little solid waste – *"pollution is not a big issue in this kind of business."*

External business and institutional context

The external business environment is challenging, according to the brothers. There are small competitors trying to copy the company *"but because of our higher quality, we are able to keep 70-80% of the local market share."*

A bigger problem is competition with the Indian multinational Tata and other Indian suppliers – *"it is a huge fight. They are too dominant in our country."* Tata develops similar steel industry supplies and sells these in Bangladesh. Many steel companies in Bangladesh engage Indian consultants and technicians. As a result, these companies prefer to buy from Indian suppliers, rather than from local producers in Bangladesh. *"We also guess that personal relations in the supply chain are critical here. The procurement officers may have a vested interest, greater than the interest of the local company."* Despite the fact that the company delivers higher quality at a lower price, the brothers cannot sell to many of the steel producers in Bangladesh.



One day, the younger brother was approached by an individual from an Indian company who offered money to close down his company – *"they are afraid they will lose their customers because of our local business."*

The investment for the new facilities was financed by a bank loan and their own savings. *"One problem we are facing in our country is that the interest rate is very high compared to developed countries, around 14%. It used to be even higher."* One reason that the interest rate is high is because people take out loans but fail to repay them.

The brothers wonder why the government is not helping the local industries in Bangladesh – *"in India, there are export policies helping Indian companies to export to Bangladesh."* The key issue is that the government opened the local markets for imports and now international companies are dumping – *"they are killing the local manufacturers in business."* The brothers are somewhat cynical – *"the government officials are only doing what is necessary for their personal interests, with a short-term view."* As an example, they describe their imports of raw materials – *"we have to bribe the customs officials every month. You have to give them incentives every month. If we miss a single payment, they create unnecessary problems. Giving them a bribe became a regular procedure."* Sometimes they are invited for meetings at government agencies – *"not much happens after these meetings, there is no follow-up on our recommendations."* The company has to work within the limitations of its market share and it will not develop – *"there is no possibility to innovate."*

There is no association for their industry since they are a pioneering sector in Bangladesh. There are no links with universities or technical institutes – *"the gap between the practitioner and academic communities is substantial."* University graduates only learn theory from international textbooks and lack both the ability to

apply it and a notion of the reality – *“there is no management textbook explaining that you have to bribe government officials to get things done!”*

The brothers explain that all this results in low return on investment. For the time being, they are running the factory to survive – *“the margin that we have is very poor. If these things do not change, how can we local entrepreneurs do business?”*

The brothers expect positive policy changes in the future because politics has opened up. People are more educated, involved and concerned and they talk about government policy openly – *“it was not the same 20 years ago.”* The brothers are still optimistic. They have an emotional attachment to their factory, which was initiated by their father – *“we are still fighting every now and then. We are hopeful that the situation will improve.”*

3.2 Textiles – jeans stone washing (85 employees)

The core business of the company is the washing of jeans to achieve a faded effect. The production process involves treatment with enzymes and chemicals or stone washing. The interview is conducted with the owner, who started the business in 2006.



The company has a large production hall and employs 85 staff in total. 70 workers, split into two shifts every day, are involved in the actual washing process. There are hazardous chemicals used, so the company has a water treatment plant to purify the water before discharging it into the river nearby.

The company carries out subcontracts from large domestic garment manufacturers in Chittagong – *“the subcontract orders are 20,000 pairs or more.”* The garment manufacturers provide the semi-finished jeans and take them back after washing. The domestic garment manufacturers then deliver to international buyers such as Norwest, Walmart, Zara, Bershka and Massimo Dutti, to name a few, for markets in the US, Europe and India. There is no direct contact between the interviewed washing company and the international buyers.

The volume of subcontracts varies over the year. On the day of interview, he had orders from three local garment industries – *“I have fewer subcontracts at the moment, but maybe in a few days I will get more orders.”* The number of subcontracts has increased over the past three years *“because my factory is a compliant factory.”* Despite this growth, he is still not using the full capacity of the company.

Before setting up his business in 2006, the owner and two friends leased an existing jeans washing company – *“I paid 1 lakh Taka (1,200 USD) rent each month to the proprietor.”* In the first two years, the profit was around 100,000 USD approximately, *“which was beyond expectations.”* The reason for this success was the knowledge he gained of the jeans washing process – *“I learned and understood every small step.”* After two years, he stopped the leasing contract and established his own factory.

To finance the investment in the new factory in 2008, he had saved 100,000 USD from earlier profits. He borrowed another 50,000 USD from friends and 160,000 USD from a bank for some additional investments. From that day on, *“I repaid my debts day-by-day.”* He has now settled all the loans and is debt free.

Innovation

Most domestic garment manufacturing factories in Bangladesh comply with the internationally agreed social labour conditions imposed by international buyers. As a local subcontractor, “*you need big investment to get this certification for compliance.*” The owner explains that small factories without a compliance certificate cannot survive – “*to get orders from garment industries you need a compliance certificate.*”

When he started, only domestic garment manufacturers were under pressure for compliance by international buyers. However, the owner anticipated that subcontractors would soon be required to comply in the same way, so he made the necessary installation investments to make his production facility a safe and hygienic working space. He started to fulfil orders for larger companies and shortly thereafter garment manufacturers started to request evidence of compliance from him. The owner considers the compliance an innovation because it improves the competitiveness of the company.



Today the company has a compliance certificate issued by ‘Inditex’, which is a collaboration of large international textile buyers such as Zara, Berska, Norwest and Massimo Dutti. Inditex works with local businesses to meet compliance requirements in the textile supply chain, and provides guidelines for certification. The compliance programme focuses on labour conditions for textile suppliers and manufacturers and whether they are aligned with international labour standards.

As a service from the larger international buyers, auditors from Inditex come and audit the company – “*if it is not okay, then the auditor will give comments and suggestions for improvement.*” After approval, Inditex, on behalf of the international buyer, issues the certificate. The company has a compliance certificate from the Indian Norwest group. The comprehensive compliance report covers several key elements such as human resource management, forced labour, child labour, discrimination, freedom of association, harsh or inhumane treatment, safe and hygienic working conditions, payment of wages, working hours, environmental awareness and regular employment.

Internal capabilities

The owner completed a master’s degree in Bangla Literature, which is very different from the work he is doing today. After his studies, he worked for seven years in the garment sector, first as a worker, then a supervisor and a sales representative. Finally, he was asked to become executive director of a washing company section. His previous experience made him aware that “*it is easier to manage a small number of employees.*” He applies this lesson in his own capital-intensive company; the investment required is greater, but there are fewer workers needed.

In line with the compliance guidelines, the workers have full-time contracts and are paid monthly – “*in my factory, the salary always comes in time each month, in other factories it does not.*” The employees are paid regardless of the number of orders received.

The company does not have a high staff turnover – “*most of the workers are very loyal, only 5% of the staff per month come and go.*” It is not difficult to find workers, recruited either through references “*or workers come to my gate.*” Most new recruits are skilled workers. The unskilled workers get training and start out as helpers to senior staff for six months. The company has regular meetings with the workers, who sometimes give ideas – “*I also talk with them about the new orders and ask them what process would work best to have good quality.*”



The company has somewhat outdated technology according to the owner, but this does not prevent him from delivering the quality required by the garment industries. From internet research, and information from his earlier machinery and equipment suppliers, he knows that much better technology is available, which would result in lower input of chemicals and faster washing. All the technology comes from China – “*I went to China to buy the machines for my factory.*” He also visited several washing companies in Chittagong to see more advanced technology.

External business and institutional environment

There are 47 jeans washing factories in Chittagong, but only seven of these have a compliance certificate. The business environment has been good in recent years, according to the owner, “*due to political stability.*” Tax is sometimes a problem and there are occasional payments under the table required, “*but not that much.*” There are six ministries he interacts with for regulations, labour and environmental laws and monitoring, which requires a lot of time, but the demands are not onerous. Members of the labour union visit regularly to check the workplace conditions.

The owner is the vice-president of the association of Bangladesh export-oriented garment washing factory owners. There are around 500 member factories all over Bangladesh (Dhaka alone has 450 washing companies). The objective of the association is to solve members’ technical problems, and a wide range of issues are shared – “*we help each other internally.*” If there is a large technical problem, the senior leaders of the association will visit the factories concerned. Sometimes a delegation from the association meets with government ministries or the electricity company to discuss problems. The owner mentions that, other than via the association, there is no other way to get technical advice. There are no contacts with scientific institutes or universities, nor does the government offer support programmes.

There is a limited supply of electricity – “*I get only 8 hours per day, whereas we are operating 20 hours a day.*” The owner invested in a generator, which is expensive to run. The sporadic availability of gas is another problem. The company uses gas for the jeans dryer – “*I require 130 cubic metres per hour, but the government only supplies 30.*”

3.3 Automotive – trucks and buses (20 + 100 employees)

The company, based in Chittagong, manufactures transport vehicles and truck and bus bodies. The interview is held with the owner, who started the company in 1985. The vehicles are produced tailor-made on order according to the preferences and choices of the customer – “*every product is different.*” The metal input parts, such as metal sheets, are bought from producers in Chittagong and elsewhere in the local area. The more technologically advanced parts, such as the engines, hydraulic systems and chassis, are imported from

Thailand and other countries in the region. The company has grown slowly since the beginning – *“it has been a struggle all along.”*

The company has a printed glossy catalogue and a website with the many trucks and vehicles available. Some are new designs developed by the owner himself, others are copied from existing vehicles. The owner stresses that extensive design work and associated calculations are needed to develop a solid and reliable design for the particular purpose the buyer has in mind. For example, *“if the body of the truck is light, you can travel on more types of roads.”*

The owner secures contracts from public and private companies, usually via tender procedures. For example, the company is a *“listed car body builder”* for the state-owned automobile company Pragati Ltd. Another sales route is through intermediary companies, who trade the vehicles. *“However, customers prefer to come to me directly for their orders, because the intermediary company makes a charge for handling the sale.”*

Although he does little advertising, the business has a large order portfolio at present. The owner has secured a number of government contracts recently – *“we have a lot of work coming.”* The current portfolio includes 130 vans for the police, 30 transportation units for the air force and 82 transportation units for the City Corporation. The fiscal year for government agencies is from July to June, so the pressure is high to finalise delivery before the 1st of July every year.

Innovation

The owner claims that his company was the first in Chittagong to build metal bodies – *“most trucks had wooden bodies in the past.”* He has developed various new designs of vehicles – *“for instance, a truck for transporting large 120-foot containers.”* Another design concerns a covered van for garment products, thus protecting the load from dust and bad weather. The owner is also designing and producing a variety of dump trucks, student buses and aviation fuel tankers, to name but a few. Another idea currently under development is a mobile clinic van – *“I built one in 1991 for a Marie Stopes foundation.”* The owner now sees many other possibilities: mobile libraries, mobile banks and mobile dental clinics. Another project involves an order for refrigerated vans for cooling at minus 5 degrees – *“we have to learn how to build refrigerated vans for clients.”* He is currently calculating all the insulation parameters such as thickness, materials and strain – *“refrigerated vans and air-conditioned buses will become big business in the future.”*

Internal capabilities

The owner is a mechanical engineer by education. After graduating from university, he worked for a cement manufacturing company, then as a technician in a truck body factory in Dhaka. In 1988, he rented a small factory by himself and started with only four welding machines. Since then, he has been committed to his business – *“I am a hard-working man and busy 18 hours a day.”* Notwithstanding, he considers himself not very successful and feels that he gets too little acknowledgement from his clients and others for his new designs and hard work. Developing and producing new designs is very costly and time consuming – *“customers do not give you the price for the innovation.”* R&D costs are not explicitly included in the price.

The owner explains that his company has both direct and indirect employees. 20 permanent staff are involved in marketing, sales and technical engineering work. In addition, the company subcontracts the actual production of the vehicle to specialised contract teams of technicians – *“we developed this way of working 20 years ago.”* There are teams for the metal frames, paintwork, glass and windows, and electrical wiring. For a large order, the workforce can be up to 150 in total. The owner learned this way of organising and subcontracting to teams during a visit to Malaysia. Before that, he employed all the workers himself, with the challenge of covering high payroll costs in times of low orders. The team subcontracting system is a much

more viable way of running his business. To build one bus, he engaged 25-30 people – *“in this subcontract system, their productivity is much higher.”* The owner negotiates and agrees the work and price with the team managers.

The owner knows that some of his ex-employees have opened workshops by themselves and become competitors. *“However, they don’t have a solid technological education. They are not professional engineers, they are only technicians.”* Technicians cannot create the design, according to the owner, only a production plan – *“they gained their experience by trial and error.”* The owner explains that it is very complicated to design a vehicle with all the details and specifications. A tailor-made truck, for instance, needs a robust design, suitable for dirt roads. *“The new competitors only copy existing models. They cannot calculate new specifications. As a result, there are more accidents. There is less security.”*

External business and institutional context

There are many opportunities to develop new vehicles in the automotive sector in Bangladesh – *“I am always looking for new designs and exploring new things.”* He is aware that several other body building factories in Chittagong are copying his ideas. Other competition comes from imports, yet he retains the advantage of low local labour and material costs, and the system of subcontracting to teams, which enable him to be competitive. However, his profit margin *“remains low.”*

The government is investing substantially in road construction, requiring heavy transport vehicles and dump trucks. Because these vehicles are seen as contributing to building national infrastructure, the government supports the import of dump trucks. A fully constructed imported truck attracts lower custom duties than the duties on the component parts. This is unfair competition, according to the owner, *“so how can I survive?”*

The owner illustrates the *“unfair”* government duty regulations with the example of VAT. He has to pay VAT on all local and imported materials used in the manufacturing process. When he sells the finished vehicle body, *“VAT has to be added again,”* which he considers to be paying twice. The owner regrets that *“there is no protection for local industries from the government.”*

The owner feels that he could do much more if there were a proper environment to facilitate innovation, in terms of support from government, banks and clients – *“we are on our own. The entrepreneurs do not get any acknowledgement.”* Development policies are not clear in Bangladesh and the owner sees considerable political influence in policy making. There are high levels of foreign investment in Bangladesh, but the owner wonders who is benefitting – *“the foreigners are not thinking of the benefit for Bangladesh or for the people. They are only concerned about profits.”*

3.4 Textiles – garment accessories (62 employees)

Established in 2011, the company manufactures garment accessories such as threads, linings, elastics, cords, ribbons and pocket fabrics. There is a production factory in Chittagong and a sales office in Dhaka, together employing 62 members of staff. The firm supplies the domestic garment industries in Bangladesh, which in their turn produce for international buyers.

The company does not create the accessory designs, which are developed by international buyers, who hand them over to the domestic garment industries. If the company is able to produce and show an example, a subcontract is agreed, subject to approval from both the domestic garment industries and the international buyers.

The owner got the idea to start the accessories business from his family – *“I gained experience from my father, who worked in the garment industry and advised me to engage in this particular business.”* Old student friends and work colleagues from the garment industry helped him to secure orders. At the start of his business, he contacted the large garment industries directly and submitted his company profile – *“I offer a good price and good quality. They were interested to do business with me.”*



For the initial equipment and machinery, the owner invested 120,000 USD and borrowed an additional 70,000 USD for working capital – *“I didn’t take out a bank loan because I find the interest rates of 14% per year too high.”* Instead, he borrowed the investment and start-up money from his family. Since the start, he has been making a profit and using this to pay back part of the loan, and the rest to reinvest in the factory. Most of the loan amount has been repaid.

The input materials for the accessories are imported from China and India because they are not available in Bangladesh. He buys via ‘indenting firms’ in Chittagong. These are a liaison companies between importers and exporters – *“they have information on where to find the input materials and they complete all formalities.”*

Internal capabilities

In 2008, the owner successfully completed a bachelor’s degree in business administration at the University of Science and Technology Chittagong (USTC), and then an MBA from the Southern University in Bangladesh in 2010. The owner finds his management education particularly useful for marketing and HR management and hopes that this education will enable him to become a successful businessman – *“that is my dream.”* However, he feels that management education generally and MBA programmes in particular are still too theoretical. There is a wide gap between learned theory and the realities on the work floor – *“the course should be more practical, through workshops and factory visits; more hands-on experience and case-based study.”*

For the technical part of the production process, he has three well-qualified technicians in his company – *“I found the technical experts at other companies. I hired them by paying them higher salaries.”* The production process is handled by a production manager and two supervisors – *“they are older but that is not a problem, they are also my friends.”*

The 50 production workers are both male and female workers (50/50) – *“female workers are more sincere, but the quality of their output is the same.”* There are no reported problems between men and women on the work floor. Staff turnover is low (only 3-4 employees leave each year) and recruiting new staff is not difficult: a sign on the gate generates sufficient interest – *“the production manager interviews candidates and checks their experience.”* Previous work experience is the most important element in recruitment decisions. Supervisors and technicians give additional on-the-job training, lasting around 10 days.

The workers provide occasional ideas to improve the production process. For instance, the staff suggested changing the timing of the day and night shifts. There is now a morning shift, from 6 am to 2 pm, and an afternoon shift, from 2 pm to 8 pm. At night, the company is closed – *“many workers find it difficult to work at night.”* The owner agreed that removing the night shift was a useful idea because productivity at night is low.

The work is organised each day with the help of a production plan, which sets the number of items to be produced in a certain time frame. The owner sets the targets and passes these to the managers. Only very rarely is the production target not met, but *“if that is the case, the salary of all staff is reduced.”*

The product range is constantly changing in response to the demand of the international buyers. Initially, the owner was only able to produce a limited range of products. Over the years, he has increased the number and diversity of his machines. Quite often he has to change the machines to make new products. The owner is now able to make three types of accessory products. It is normal for accessories to be fashionable one year and not the next, and then he no longer needs the machine, *“which is a bit of a waste.”*



The factory is “Oeko-tex” certified by a German company. The certification is an independent testing system for raw, semi-finished and finished textile products, which confirms that the product is hazard free, and not harmful to humans.

A new product idea concerns the production of size and washing instruction labels, *“because every product needs a label, but only few garment factories make them.”* The owner sees that demand is stable and labels are mandatory for all shirts and trousers.

External business and institutional context

There are around twenty competitors in Chittagong in the same line of business. He considers himself one of the better ones in terms of quality and price. The business environment is favourable, according to the owner. Chittagong has the advantage that *“the port is near.”* He sees a bright future for the garment industry – *“for the next 20 years, this sector will dominate in Bangladesh.”* The owner also sees other sectors developing rapidly. Eventually, he expects that the garment industry in Bangladesh will be overtaken by IT, leather and medical products.

The owner does not receive support from the government. There are some difficulties with VAT and income tax – *“sometimes government officials ask a lot of questions about where I earn the money. When I submit a document, they ask whether it is real or fake.”* He has to deal with many ministries at the same time: Labour and Employment, Finance, Commerce and Industry. It would be better to have a one-stop service for the garment sector – *“we need one independent ministry to handle the garment sector.”* The owner finds it disturbing that some government officials ask for extra [under the table] money, but it is manageable.



The firm has no contacts with education or research institutes. If there is a technical problem, the owner brings in technicians from Dhaka since there is a lack of technicians in Chittagong – *“my technicians learn from them.”*

The owner comments on the emergence of green “sustainable” factories in Bangladesh, established according to environmental codes, using less power, polluting less and recycling waste materials and energy

–“the international buyers want sustainability these days. If your factory is sustainable, then you can negotiate better prices.” The owner is not thinking about becoming a green factory, because of the “huge” investment required in land and buildings –“land prices are very high in this country – expansion is unthinkable.”

3.5 Chemicals – lubricant recycling (150 employees)

The company produces base oil by recycling used industrial lubricants and used oil. The base oil is sold as lubricating grease, motor oil and other metal processing fluids. It is a research oriented company and has a laboratory with advanced technology. The interview is held with the owner.

The owner is from a middle class Bangladeshi agrarian family. He is educated as an economist and considers himself a generalist. He is proud that the Grameen Bank founder Mohammad Yunus was his teacher at university – “he moulded us as entrepreneurs.” His university studies were interrupted for two years because of the outbreak of the Liberation War (the country was previously occupied by Pakistan and named East Pakistan). After independence, all the industries were nationalised and abandoned by their foreign managers, so university teachers encouraged their students to start in business by themselves.



He established the company in 1974 as a small project, after graduation. The government provided him with a small plot of land at a low interest rate – “I came out of university with only a certificate – not a penny in my hand.”

After this initial support from the government, some years later, the company acquired the current area of BSCIC¹ land on a 99-year lease term. He faced lot of obstacles when he started – “resilience is the secret. Keep on knocking at the door. We had to pass through many hardships.”

Innovation

After graduation, he was not interested in trade or the construction business – “I was thinking of starting something new that no one else could do.” In the course of his studies, he discovered that Bangladeshi people consume 100,000 metric tons of lubricants a year in cars, trucks, ships and other types of engines – “it becomes dirty and polluting after its use. People used to throw it in the drain.” Since Bangladesh is a rainy country, the used oil spread everywhere, resulting in severe environmental damage.

At that time, the government realised the magnitude of the problem and forbade the dumping of used oil in the drains. Moreover, around 1974, the oil market was in turmoil and oil prices started increasing – “there was demand in the local market, which presented a business opportunity.” He started a company specialised in the refinery process – “once the dirt is removed, then oil becomes clean and a highly valued product.” It

¹ Bangladesh Small and Cottage Industries Corporation

is technically feasible to refine the used oil many times. The owner sees an important contribution of his company “to society and civilisation – “our slogan is: ‘save that drop of oil’.”

Since then, households and businesses have become aware of the problem and have started saving dump oil. The company organises meetings for households and small companies to explain how harmful it is and the possibility of collecting it for recycling. The company prints and disseminates flyers and leaflets in Bengali.

The company produces the recycled oil for the local market. The owner has greater ambitions and is trying to expand into an export business.

The current production level is 10,000 tonnes – “we are going to raise our capacity to 60,000 tonnes.” He has acquired land in the port area of Chittagong to construct a terminal. When the new investments are realised, the owner expects that “the company will produce 60% of the country’s requirement for lubricants.” A few months ago, the owner concluded a joint venture agreement with a German partner, which will help him to export. He has started to export already on a small scale to neighbouring countries such as Nepal and Myanmar.



The oil comes from many sources. End users collect the oil and he pays a little for it. The informal sector of dump oil collectors in Chittagong provides most of the input. There are rickshaw drivers with small oil drums who go door to door to collect the used oil. Initially, all transactions were in cash, but the owner encouraged the rickshaw drivers to open bank accounts. The company also organised trucks and a designated location in the community to collect the used oil. These storage tanks are surrounded by a dyke wall, so that in case of emergency, any leakage will not spread. Ship recycling also provides used oil – “before I started to collect the oil, it was floating in the Bay of Bengal.”

Internal capabilities

The company employs 150 workers, “who are committed to the company. We call it a family organisation.” The company has an organogram and job descriptions including workers in the installation, engineers (electrical, chemical and process engineers), laboratory staff, management and administration, sales, marketing and communication.

In the absence of any technical expertise of the recycling process among his staff, the owner had to build his internal knowledge base himself – “the practical application of oil recycling is not taught in university.” Initially, he hired external and international experts and exposed the staff to new technology. Now the laboratory is systematically organised, with the head of the laboratory and operations responsible for technical oversight of the work. Most of the laboratory staff hold PhDs in chemistry.

Initially, the quality of the lubricants produced by the company was average, but now the products meet international quality standards, following major investments in the R&D laboratory. The equipment and skills are state-of-the-art and purchased from the US and the UK. There are 500 listed competency laboratories in the world – “we are one of them.” It is an accredited laboratory (ISO 17025 and UCAS). The owner has applied for ISO 14001 and ISO 80001, and is also in the process for BMW and Volvo certifications.

The company is working on several technical challenges. One is to meet the requirements of the US aircraft industry – “the base oil should be clean, with a very limited number of particles.” Another example is the

smell of the oil – *“that is important because the clients always smell the oil.”* The owner challenges his young technical staff to improve these things.

External business and institutional environment

Regarding the supply of used oil, the business environment has changed over the years. Households and small businesses have started to ask more money for the used oil – *“people have greater awareness, they want more money.”* The owner tries to convince the suppliers that if the price is too high, he cannot operate. On the demand side, consumers in Bangladesh were initially reluctant to buy recycled oil, but now many people are picking up the idea. The owner mentions that he faces opposition from multinational oil companies, who want to increase their lubricants business in Bangladesh and *“I have become a formidable competitor.”*

Regarding the finances, the company has mobilised its own equity over time. To scale up, the company applied successfully for bank loans. The owner explains that the government has reduced some of the bank interest rates to encourage the import of machinery – *“the interest rate used to be double digit, now it is single digit.”* Market capitalisation is also very strong in Bangladesh – *“I have made the company public now.”* Many people were interested to invest in the company.

Available land remains an issue for expanding companies in Bangladesh. The acquisition of land, particularly in the past, used to be *“tricky because the land must be undisputed.”* When an individual or company buys a plot of land, *“shortly thereafter an individual will come to you and claim some portion of it.”* Now the government is acquiring land and developing infrastructure (electricity, water and gas) for new plots to be made available for young entrepreneurs.

The owner stresses that Bangladesh is an underdeveloped country – *“it used to be one of the richest countries in the region, but Bangladesh passed through many difficult historical times.”* He appreciates the government’s efforts to help the private sector – *“the government is trying to the best of its ability. We business people are sometimes not very good. We also sometimes mis-utilize resources.”* At the same time, the owner feels that entrepreneurs in Bangladesh are resilient – *“taught by our history.”*

With regard to his interactions with the government, he has a pragmatic approach. Many government officials have good intentions, according to him. Their attitude is ultimately to develop the industry and the country – *“if some people are not, then you have to buy them out. Japan developed in spite of having corruption.”* The owner has a lot of business contacts. He is also president of the employers’ association. He travels around the world and has built a large international network.

The owner sees that universities in Bangladesh mostly teach theory. There are only a few practical sessions for industrial application, which he regrets. The company collaborates actively with the university in Chittagong by sponsoring activities and students. The owner is also invited for guest lectures on how to build a career and on technical issues in practice – *“all those practical things are not taught in the university.”* Once the owner went to Japan and Germany and learned about fruitful industry-university collaborations – *“I saw that professors went to the industry partners and listened to the workers on the work floor.”* He hopes that such collaborations will also materialise in Bangladesh.

3.6 Food processing – dried fish packages (5 employees)

The company is a small venture at a wholesale market in Chittagong, which produces and sells dried fish in small packages. The interview is held with the owner. The market is a well-known location – *“restaurant*

and shop owners go there to buy fish in bulk.” The owner has been in the fish trading business for the past 18 years and used to sell fresh fish door to door.

Two years ago, the owner met a purchasing representative of a large retail shop chain in Bangladesh, who asked him to supply fresh fish to sell in retail shops. The representative used to go to the wholesale market himself. He discovered that the owner was experienced and active in buying fish “and knows which is good and which is bad.” After the first deliveries, the shop chain asked the owner to work on a more continuous basis. Apparently, the owner has a good sense of buying quality at a good price – “and I am reliable. They do not go to the wholesale market anymore.”

Six months later, the representative asked him to supply dry fish too, to be sold in the retail shops. Since then, he has started packaging different sorts of dried fish for retail sales. He buys dried fish in bulk and selects the higher quality fish. He does some additional drying, if necessary, and cleaning, “which increases the durability.” He then uses a machine for plastic foil packaging and labelling. The manager of the retail shop chain helps him with designing the labels.



The retail customers have been satisfied with his products. The key to his success is his knowledge – “I select from my experience.” He knows the quality of the fish, and the ones that sell well. Sometimes he takes a risk with new sorts of dried fish – “I will take them back if they are not sold.”

Regarding hygienic regulations, the superstores test the fish for formalin. There is no further testing involved. The owner assures the quality. When he buys, he tells sellers to give him better products even if they are more costly. The superstore owners trust him to provide good quality – “no complaints have been received about the products as yet.” The customers are given the best available products.

Today his sales volumes are 30% fresh fish and 70% dried. The owner sees the demand for dried fish in small packages increasing and is confident that it will increase much more in the future. In the past year, his clientele has increased and he is now “in business” with a number of retail shop chains in Bangladesh such as Shwapno (Halishohor), Khulshi Mart and Meena Bazaar – “after Ramadan another buyer, the Basket, promised to do business with me.”

Previously, he did the packaging in his home but recently he has hired a small house near the wholesale market, solely for dried fish packaging, with an office and packaging section. He stores the dried fish in the attic.

The company has five workers, some of whom are also relatives. The employees do not have written contracts and are paid in cash. In the past, the owner’s wife used to help him, but now that he has shifted to the market location, she has discontinued this role.

Regarding the number of packages to be delivered, the retail shop chains place orders based on their sales figures. The buyers indicate in advance what type of fish to stockpile. The shelf life of the dried fish is six months. If the retail shops are unable to sell the dried fish packages in that period, they can return the stock to the owner. This happens on only a very few occasions – “maybe out of 100 kg, only 2 kg is returned.”

Initially, the retail shop chain ordered four types of dried fish. On top of that, the owner developed another eight dried fish types. He is now selling 12 types of dried fish products.

External business and institutional context

The owner has little difficulty with the business environment. He is not aware of other dried fish suppliers to the retail shop chains, “*so I found a niche in the market.*” There are few interactions with the government.

When he started, he invested 500,000 Taka (6,100 USD) for his shop from his own resources. He obtained a formal business licence – “*otherwise the superstore cannot do business with me. The procedure was easy.*” The fee was 8,000 Taka (100 USD). The other requirements for the licence are a passport-size photograph, a national ID card and the address of the business. The yearly renewal of the licence is 12,000 Taka (146 USD).



Some months ago, he opened a business account at a bank in Chittagong with a view to getting credit in the future. He went to apply for a loan shortly after, but was informed he could only get one after having an account for 6 months without getting into debt.

He sells in Chittagong and several surrounding towns. He has plans to sell his products all over Bangladesh, including Dhaka. He has established good contacts with several purchasing managers in retail chains.

Recently he has started supplying a new retail chain – “*the purchasing manager is giving me a lot of ideas for products and packages.*” One of the supply chain managers has expressed interest in becoming his partner. The owner feels that he can develop an extensive network through this manager – “*this man is opening up opportunities to expand.*” They have agreed to enter into partnership in 2018, based on a 50/50 investment. He will buy dried fish from suppliers and handle the packaging, while his partner will do the networking, product range selection and marketing.

The owner is very optimistic about future opportunities. He is confident that the numbers of large buyers will increase and cover other regions in Bangladesh. He foresees that the production facilities will have to be expanded. He envisages employing 15 to 20 staff. For the future, he plans to diversify the range of products and add dried beef, chicken and shrimp.

3.7 Paper production – print paper (150 employees)

The company produces a variety of paper products, for printing and cardboard boxes for instance. The owner is young and ambitious. He completed an MBA in the UK in 2008 and started his business shortly thereafter. Instead of taking a regular job, he explained that “*for young people in Bangladesh, setting up a business and being an entrepreneur is the thing.*” He likes the craft of his business – “*the process of paper making is really beautiful and it is a very sensitive and delicate process.*” The owner is not afraid of a drop in demand due to ‘paperless office’ practices in Bangladesh – “*that will still take a long time.*” He foresees that he can produce paper without problems for the next 15 years.

He has a large production facility just outside Chittagong and a marketing office in the city centre, as well as another in Dhaka. The property outside Chittagong belonged to his father, and borders the Karnaphuli River, which is useful because water is required for paper production.

The production facility has two sections. In the first, the raw material is stocked and prepared, mostly from imported recycled paper. The process of preparing the input includes cleaning the recycled paper from clips, metal and plastic materials, then mixing and blending. To assure good paper quality, it is essential to have consistent input material with no solid particles, which would damage the paper machine – *“in the preparation of the input, you have to check all the time.”* Input preparation is the hardest part of the process, according to the owner. The machines are imported from Europe.



The second section is the actual paper production by a huge machine. In 2011, the owner purchased this second hand machine from a bankrupt business in Norway, for a good price – *“I also got spare parts. The bank said whatever you want, take it.”* He dismantled the whole machine piece by piece and shipped it to Bangladesh. It took seven months to ship the parts to Chittagong and another year to put the machines together again. The owner contracted an Indian company to provide their expertise in installing the machine.

The input material is mostly recycled paper. The raw materials for brown paper for cardboard boxes are collected locally. Recycled input paper for higher quality product such as white print paper for office use comes from Canada, several European countries and Brazil. The recycled paper is very cheap, according to the owner. Another higher quality input material is fibre wood pulp, which can be used to produce tissue paper, *“which is even more delicate to produce.”* The owner is planning to produce tissue paper in the near future.



The pulp has to be imported because the government in Bangladesh has refused permission for a pulp factory, to prevent tree cutting, which is part of their larger environmental protection policy framework.

Innovation

At present, he is installing a tissue paper producing machine for the production of napkins, facial tissues and toilet rolls. He wants to specialise in tissue products as well – *“there is a big demand, and even a chance to export to Europe as well. There are only five tissue producing companies in Bangladesh.”* He is currently also installing converting machines to fold and pack the products – *“last week I was in China to sort out the purchase of converting machines.”* The owner comments that there is a lot of variation in these machines in terms of manual and automatic operation. He acknowledges that automation implies less employment creation – *“these are tough decisions to make for a manager.”* To maintain the new technology, professional technicians are required. Finding and hiring them is difficult, according to the owner. He occasionally hires experts from China and Europe, which is not practical – *“therefore it is not fully automated here. It is a mix of automation and manual.”*

The owner is investing in other technology. There are technological possibilities to increase productivity by increasing speed, by adding more cylinders for instance, or new products. For instance, he has ordered a 'de-inking' machine from China, which will remove ink from recycled newspaper to produce high quality white paper. The high tech machine will be installed by Chinese experts.

He does not have sufficient government-provided electricity, and machinery for higher quality types of paper requires high power input. If the power supply is limited, he cannot run all his machines, so he bought a gas-powered 1-megawatt generator. This means he is independent in terms of electricity, and the gas is also slightly cheaper.

Water from the river is used for the production process, and then recycled – *“we reuse all the water, so there is very little discharge. It’s a green factory.”* The water contains a lot of fibres, which cannot go back into the production system, so an effluent treatment plant separates these out – *“we get one tonne of fibre from the water every day.”*

His uncle produced 35 tonnes per day with a workforce of 300, whereas the owner now produces 60 tonnes with a workforce of 120.

Internal capabilities

The owner is very appreciative of management education in the UK, *“which is very different to the theory-based education in Bangladesh.”* This gave him a solid management background to run the factory. He explains that his lack of fundamental technical knowledge is not a problem – *“if the technical expert explains a technical solution to me, I can understand the logic.”*

The owner does not consider himself a *“bossy boss.”* On average, the company employs 150 technical, production and maintenance staff, on fixed contracts. Lower skilled workers handle loading and unloading the machines. One Indian engineer has overall technical responsibility for the plant. Around 45 staff hold marketing and sales positions. The number of labourers varies during the year depending on production volumes. The owner is aware of the broader significance of creating employment – *“job creation implies prestige and giving something back to society.”* He feels he communicates well with the employees and treat them like colleagues – *“if I do anything based on fear, the employees will not stay long.”*

It is not difficult to find unskilled production workers, whereas the technical positions are harder to fill. The company trains its staff to operate the machines. A senior technical person teaches the younger new staff. Today, 60% of the work force is skilled in operating machines. The owner is aware of the problem of the unskilled labour force in Bangladesh, and is considering building a workshop to provide free technical training – *“just like a school to help the poor, because it better to give them skills instead of money.”*

External business and institutional context

“There is a huge potential and market in Bangladesh and internationally.” The company has competitors in Chittagong and around, but the owner considers his company to be technically more advanced than others in Bangladesh. Recently, the company has faced new challenges from Chinese imports, due to reduced shipping and oil prices – *“imported goods have reduced tax.”*

He got initial support from his family to start his business. His uncle was already involved in the paper business and provided useful advice.

The initial incremental investments were from a combination of bank loans and personal resources. For the latest technology, the tissue machine, he secured investment credit from a bank in Dubai, at “*an attractive interest rate of 3.8%.*” The interest rate in Bangladesh is normally 10%.

Except for the gas and electricity, the business environment and government are supportive. There is some corruption – “*the head of the government is fair, patriotic. The bottom stratum is corrupt. It is a matter of generations.*”



He comments that some government departments have become less corrupt in the past years, such as the Ministry of Environment, which issues environmental licences. The government is strict about river water quality and has developed a clear environmental policy framework – “*corruption is not an issue anymore.*” The owner feels that development and innovation policies in Bangladesh are focused on agricultural modernisation. The manufacturing sector is also a policy priority, particularly in terms of job creation for people in the cities.

In the near future, he sees the need for good infrastructure in Bangladesh because it is a small country and there are many people – “*Bangladesh is a kind of a miracle. It is very densely populated.*”

3.8 Textiles – textile prints (40 employees)

The company prints letters, shapes and figures on textiles for T-shirts, as subcontract orders for domestic garment industries in Bangladesh, who in turn produce for large international buyers. It has a rented production hall and an office in the outskirts of Chittagong. The company gets the T-shirts from the garment industry, prints and returns them to the same garment industry – “*we do not work directly with the international buyers.*” The international buyers provide the designs for the T-shirts and prints, while the owner handles colour selection only. He has guidelines for colours and quantities.

The interview is held with the owner, who started the company one and a half years ago. He installed a production line involving Korean technology and equipment, financing the investment through a bank loan of 20 lakh Taka (4,800 USD) at an interest rate of 20% per year, “*which is very high.*” He expects to have repaid the loan in three years.

The main challenge currently is that American and European buyers are pressuring local textile manufacturers to comply with the ‘Accord’² – “*they have placed so many conditions and restrictions on our garments.*” The owner is upset that on the one hand the international buyers force local producers to comply, but on the other, they continuously negotiate the price down – “*we fulfil their requirements, and we get lower payments for our work after all.*”

² As a measure after the Rana Plaza building collapse, the ‘Accord’ agreement was established. It is an independent, legally binding agreement between brands and trade unions, designed to work towards a safe and healthy Bangladeshi Ready-Made Garment Industry. The purpose is to enable a working environment in which no worker needs to fear fires, building collapses, or other accidents that could be prevented with reasonable health and safety measures.

The international buyers are not willing to pay reasonable prices – “we are suffering from lower prices. Several thousand garments factories have already closed.” The owner illustrates this with the example of Walmart, which buys T-shirts for four dollars apiece and sells them for thirty dollars in the US – “we do not get a fair share. Manufacturers face a lot of problems. Compliance is not making things better in Bangladesh.”\



Internal capabilities

The owner studied fine arts in university and is an artistic person. He set up in the garment business because he believes that it is a promising sector – “moreover, garments are based on colours.” The owner knows about colours and how to apply them – “I like the business very much.”

The company has 40 employees, who all live nearby – “they are hard-working and loyal.” The employees work in two shifts of eight hours daily. Some of his workers have 25 years of experience in textile printing.

He explains that there are many jobs available in textile factories in Chittagong due to a shortage of skilled workers, so it is important to pay their salaries on time – “if there is a delay, they will look for other jobs.” The workers are trained before starting the work. It is difficult for the owner to find workers, particularly for printing. Skilled workers come through references or apply directly themselves. The owner has no written contract with the workers – “it is more an oral and gentleman’s agreement.”

Some children of around 14 years of age are working in the factory, “supporting their families.” The owner believes it is better that they work in a company since they lack government or other support – “they are not educated and they have nothing to do. If they do not work in a company, they do illegal work like selling drugs or theft.” Moreover, the owner mentions that their families force him to employ them – “the children learn lots of things here that are useful for the future.”



The owner says that he pays them a good monthly salary, but acknowledges that it is much cheaper than skilled labour. The large garment industries do not have any child labour due to international pressure, only small subcontractors like his company. Sometimes the international buyers also come to visit the subcontractor – “and we have hidden our child labour.”

He has plans for the future in terms of acquiring a compliance certification by Oeko-Tex – “it will be a compliance factory, in sha Allah.” The owner hopes to find direct international buyers and earn more income. There are several things he has to do in order to get the compliance certification. Labour conditions should be improved by providing more working space, light and fresh air. There should be fire extinguishers and medical facilities. The company cannot engage child labour. The procedure to get an Oeko-Tex compliance certificate costs about 7,000 USD per year.

The company has a production line involving Korean equipment. This owner finds the technology “much better than Chinese equipment.” His production line produces 200 items per hour, but in a compliance factory

with modern machines he visited, they produce 600 items per hour. In fact, the owner would prefer to have Japanese technology, but it would be too expensive. For the future, he plans to buy more machines for finishing such as a large ironing machine, which costs 10,000 USD. He is also planning to have a better ventilation system to make the factory more airy.

External business and institutional context

At present, the garment sector is growing in Bangladesh, which has become the world's second largest manufacturing country, according to the owner – *“because of its quality.”* There are numerous textile related companies all over Chittagong, including 20 garment and two textile printing businesses near his factory. Indeed, his neighbour has a similar printing factory – *“he is my competitor.”* There are many more textile printing competitors in the city – *“someone can always offer a cheaper price.”* The owner does not like to unite or associate with other factories because of a lack of trust – *“if I associate with my neighbour, he will kick me out. So I do everything myself.”*

To secure subcontract orders, he contacts the garments industries directly. It is regular practice to pay the purchasing manager money under the table to get a subcontract – *“it is illegal but some money needs to be paid. It is very difficult to work in this context.”* Then, after delivering the order, the garment industries do not make payments on time – *“even four months late and I have to survive between these times.”* Going to court is not an option to enforce payment as agreed in the terms of the subcontract.



There is also a practice by some garment industries that, after the first delivered order, *“they do not pay and they say that they will not do business with you anymore.”*

The imported dye is bought locally in traders' shops. The quality used for printing depends on the subcontract price offered by the garment industry. For special prints, such as for Walmart, the owner uses higher quality dye from Korea. Sometimes the garment industries provide specific instructions about the dye and chemicals. After printing, the garment industry checks the quality of the prints in detail. If something is wrong, they might pay less than initially agreed in the subcontract.

With regard to the initial set-up technology and exploring new technologies, the owner studied the machinery in a number of factories in Chittagong he visited through personal links and references. Some of the factories advised him on what machinery to buy. He also visited several *“compliance factories.”* His brother is a politician and local councillor and has many contacts. His uncle also has an influential position in politics – *“in case of problems, I am safe.”*

The owner is not happy with the efforts of the government. In his view, the government is not developing policies to promote the sector for the benefit for Bangladesh, nor to solve the compliance issue – *“they do not bother, they are busy taking money through corruption.”* He feels that India is doing much better in terms of policies and regulations, and is competing with Bangladesh in garment production. In India, they have a lot of rules to make it run better – *“our government is totally different from the government of Modi.”*

To improve the compliance challenges of the sector, the owner feels that non-government garment-related organisations and garment trade bodies are better placed and committed to look after the industry. They can

give solutions to specific problems. Under the Trade-Alliance, to be eligible for compliance, you also need to have labour unions. These unions occasionally visit the company, but the owner feels they are not effective and not independent from government – *“they are very politicised.”*

The company faces ongoing challenges with electricity provision. In the days preceding the interview, he had only four hours of electricity. The workers can do the job manually, without electricity, and the printed textiles dried on the roof – *“I have no choice but to continue working without a power supply, to deliver on time.”*

His current profit margin is zero. The owner has a small restaurant too, which provides some financial stability for him. Otherwise he could not survive the difficult periods. He is committed to his factory for the time being, because forty people and their families depend on it. In fact, he is very much aware of the social side of the business and his responsibility in that regard. Then again, the owner is not sure about the future – *“I will try one more year and then I will leave the country”* He mentions that his future might be in Malaysia.

4. Analysis and conclusions

The aim of the qualitative study on innovation in manufacturing SMES in Bangladesh is to support the quantitative research part of EIP-LIC, as well as to share insights with similar research projects by other academic institutions. This could help researchers to validate, compare and complement existing theory in literature and research design and hypothesis development with contemporary bottom-up realities on the ground in Bangladesh, as perceived by manufacturing SME owners and managers. Earlier qualitative studies in the framework of EIP-LIC apply the same qualitative approach and report format, and enabling comparison across the countries of study in the DFID project.

This growing collection of insights of the various countries present how innovation processes and mechanisms are manifested within manufacturing SMEs, and reviews the internal capabilities and external environment, including formal institutions, the business system and the informal institutional context. The research framework is reflected in the list of semi-structured interviews (see Annex 1). In addition, the owners and managers shared their stories outside this framework and advanced issues that are relevant and interesting for current scientific work. The qualitative reports of all 10 Asian and African countries of study are available for researchers and a wider audience, downloadable from the project website³.

It is important to note for the analysis and conclusions below that the validity of qualitative research should not be considered in terms of sample size and representativeness of the cases for the total manufacturing SME sector in Bangladesh. Qualitative research in general does not claim to collect and analyse data from a representative sample. Instead, on a case-by-case basis, qualitative analysis provides exploratory (deductive) insights into issues, processes and systems in a bottom-up way that helps to suggest theoretical concepts for the local context. It may suggest original or overlooked and policy-relevant factors (variables) and conditions to follow up in the quantitative analysis. Against this background, the selection of cases involved ‘information-oriented’ sampling, as opposed to ad-random sampling, aiming at developing a diverse yet comparable dataset with regard to subsector, enterprise size and innovative activities.

In the paragraphs below, several key trends and notable patterns across the Bangladeshi SME cases are analysed. It is important to note that this represents a first analysis of the qualitative empirical material from Bangladesh within the DFID project context, which is to be followed up in more depth with a view to developing or complementing academic articles. The chapter concludes with initial policy ideas and implications and several observations with regard to further research questions and considerations within or beyond EIP-LIC.

General observations

A first overall observation during the preparation of the fieldwork in Bangladesh, compared to organising the qualitative interviewing in other Asian and African countries, was the relatively limited number of formally registered SMEs (10-100 employees) in the manufacturing sector in Chittagong and around. This supports the earlier signalled observation that the so-called ‘missing middle’ of SMEs⁴ is a key issue in Bangladesh (see chapter 2). SME owners and managers were open and happy to receive the research team at their premises for an interview.

³ www.tilburguniversity.edu/dfid-innovation-and-growth/

⁴ This phrase has been used relatively loosely in economic development discussions, meaning a lack of SMEs, particularly in the developing world. See: <http://www.africa.com/blog/investing-in-africa-defining-the-missing-middle/>

Innovation definition

Most interviewed owners and managers in the companies in Chittagong described in chapter 3, in different ways, introduced new products, processes and technology in order to improve and expand their business operations. Some would clearly qualify as innovation, while others would not, depending on how innovation is defined and assessed. In advanced economies, innovation is typically measured by R&D expenditures and number of patents of new products or processes, as proposed in the *Oslo Manual*⁵ (OECD, 2005). From a radical technology perspective, many of the elements of ‘newness’ introduced in the Bangladeshi cases would not qualify as innovation. Such an assessment would in any case have been impossible because the owners do not systematically record R&D expenditures and have not registered patents.

Taking a broader and economic perspective on innovation, viewing it in terms of incremental adoption and adaptation or of new combinations of existing technologies creating value (Szirmai et al., 2011), it is evident that the new elements introduced in the interviewed companies resulted in improved and expanded business operations. As described in emerging innovation theories on LICs, much innovation depends “*on an aggregation of small insights and advances through ‘learning by doing’ rather than on major technological inventions*” (Carayannis et al., 2003).

Despite increasing interest in the literature, the exact definition of innovation in LICs remains an issue in theory (Çapoğlu, 2009) and for its application by the researchers in EIP-LIC. The broadest possible definition of innovation, from an economic perspective, referred to in the qualitative research section, is everything new that the company does to raise productivity and/or to stay ahead of its competitors. Or as Fagerberg et al. (2010) put it: “*Innovation is often seen as carried out by highly educated labour in R&D intensive companies with strong ties to leading centres of excellence in the scientific world. Seen from this angle innovation is a typical “first world” activity. There is, however, another way to look at innovation that goes significantly beyond this high-tech picture. In this, broader perspective, innovation – the attempt to try out new or improved products, processes or ways to do things – is an aspect of most if not all economic activities. In this sense, innovation may be as relevant in the developing part of the world as elsewhere.*”

Assuming the broader perspective on innovation in EIP-LIC, in box 1 several definition elements are proposed to assess innovation in an LIC context for the analysis of the cases in this report.

Box 1: Innovation newness, process and value creation

A cross analysis of definitions in innovation theory from recent decades (Voeten et al., 2011) shows that innovation is repeatedly typified by three key elements: newness, process and value creation.

Addressing the first element, Kotabe and Swan (1995) argue that innovation can be investigated in terms of both **newness** to the company and newness to the market or world.

Regarding the second element, the innovation **process**, all owners and managers themselves initiated, managed and owned the innovation process within the unit of analysis, their company. They developed the idea, sometimes inspired by others, started to run small experiments and trials and eventually implemented the new product or production technique on a commercial scale. As is often the case in incremental innovation in developing countries, this was not a planned and formalised process involving a pre-defined innovation strategy and an R&D department.

The third element, **value creation** of innovation, is evidenced either through lower input costs or higher sales revenues (Porter, 1985). Higher profit through new premium products of better quality, or appealing to a certain fashion, increases competitiveness.

⁵ <https://www.oecd.org/sti/inno/2367580.pdf>

Regarding the dimensions of innovation, Kaplinsky and Morris (2001) identify five types of innovation: (i) process innovation, aiming at improving the efficiency of transforming inputs into outputs; (ii) product innovation, leading to better quality, lower price and/or more differentiated products; (iii) business practice innovation, implying new ways to organise the business and attract new clients; (iv) functional innovation, assuming responsibility for new activities in the value chain, such as design, marketing and logistics; and (v) inter-chain innovation, moving to new and profitable chains. These types of innovation are considered in the analysis in this report.

In many innovation definition and measurement documents, such as the OECD *Oslo Manual* (OECD, 2005), an explicit distinction between product, process and other types of innovation is made. However, distinguishing the types of innovation in the manufacturing SME cases interviewed so far in Kenya, Ghana, Tanzania, Vietnam and Bangladesh was not such a clear and simple matter. It is more common to see an integrated combination of several types of innovation, where one type of innovation triggers or enables another, such as the introduction of a new process (technology) that results in the launch of new products requiring the reorganisation of the workshop and staffing. Analysing the cases for newness, process and value creation, as suggested in box 1, is one possible way to assess whether the observed new phenomena within the companies qualify as innovation or not.

- 1 The crucibles company producing supplies for the steel mill industry has introduced a new style of management with regard to salary payment, set up a bonus system and provides extra benefits (management innovation). Moreover, the owners modernised the plant three years ago, automated the production process and invested in several new machines (process innovation). This resulted in raising productivity while maintaining quality.
- 2 The jeans washing company invested in certification for compliance in order to win orders from garment industries, which improves the competitiveness of the company (business practice innovation). This implies improvements in HRM and working conditions (management innovation). The company has somewhat outdated technology. Better technology is available, which would result in lower input of chemicals and faster washing.
- 3 The transport vehicles manufacturer is producing a variety of new trucks and buses based on existing designs (product innovation). The owner is a mechanical engineer by education and applies his technical knowledge to adapt the technology to the road conditions and transport requirements in Bangladesh.
- 4 The company manufacturing garment accessories produces designs which are provided by international buyers. The product range is constantly changing in response to the demand of these international buyers. The owner has to acquire new and replace older machines in order to make each new design (process innovation). The factory is certified by a German company, enabling him to secure orders (business practice innovation).
- 5 The oil company introduced the idea of recycling oil to the market in Bangladesh (product innovation). The company is a family organisation with an organogram and job descriptions, which is not common in Bangladesh (management innovation). The equipment and skills are state-of-the-art and purchased from the US and the UK (process innovation). The owner has applied for ISO 14001 and ISO 80001, and is also in the process of applying for BMW and Volvo certifications (business practice innovation).

- 6 The dried fish packaging company started packaging different sorts of dried fish for retail sales. He uses a machine for plastic foil packaging and labelling. The manager of the retail shop chain helps him with designing the labels (product innovation).
- 7 The paper production company purchased a second hand machine from Norway. The owner is planning to produce tissue paper in the near future (product innovation). He is installing a tissue paper producing machine for the production of napkins, facial tissues and toilet rolls. The owner is investing in other technology (process innovation). There are technological possibilities to increase productivity by increasing speed, by adding more cylinders for instance, or new products.
- 8 The company printing text, shapes and figures on textiles for T-shirts wished to secure a compliance certificate from Oeko-Tex. The owner hopes to find direct international buyers and earn more income. The company has a production line involving Korean equipment. In the future, he plans to buy more machines for finishing, such as a large ironing machine. Although the owner has many plans, the innovations have not yet materialised.

4.1 Trends and patterns in the cases

The *Global Competitiveness Report 2015-2016* of the World Economic Forum suggests that Bangladesh is a ‘factor-driven’ economy, competing based on factor endowments, primarily unskilled labour and natural resources. Companies process and sell basic products or commodities, with their low productivity reflected in low wages. This is confirmed in the textile cases in particular, a key sector in the country.

As a country becomes more competitive, productivity will increase and wages will rise. In the efficiency-driven stage, companies begin to develop more efficient production processes and increase product quality further because wages have risen and they cannot increase prices. Interestingly, the introduction of new technologies in the cases studied was aimed at enabling production of higher quality products and access to new (international) markets. Most interviewed SMEs expect to hire more staff in this process of expansion. Most of the entrepreneurs demonstrate social awareness and see their importance in the community.

Owners are aware of the importance of introducing new products and technology to raise productivity and efficiency to maintain their level of competitiveness. At the same time, most of the interviewed SMEs introduced management and organisation innovations, whereas the product and process innovations were less important. The new products and processes in the innovative companies were not radical and not ‘new to the world’. The ideas for new products are mainly acquired from the market. Customers come with requests and suggestions, or the owners talk with clients. It is therefore mostly demand-driven innovation.

A new phenomenon is green sustainable factories in Bangladesh, established according to environmental codes, using less power, polluting less and recycling waste materials and energy. These practices are increasingly imposed by international buyers. If the factory is sustainable, the firm may be able to negotiate better prices.

Internal capabilities

In all cases, it is the owner who initiates, coordinates and manages the new ideas, including preparations for the innovation, technical details, and the product launch. Several companies have a design or R&D department or a specialist employee with this function. Roughly, there are two types of innovators in Bangladesh: those who innovate using their technical background and those who innovate from a business managerial perspective.

The workforce in the companies were mostly lower educated yet skilled labourers in the production workshop on the one hand, and well-educated staff in management and marketing on the other. Typical fixed employment contracts are only for key and higher educated staff. Regular work is subcontracted to middlemen who come with a pool of workers, often migrants who work under unfavourable conditions.

Several owners face difficulties resulting from the high turnover rate of unskilled production workers. There are plenty of employment opportunities in the textile sector in Bangladesh for lower educated workers, as reported by several of the managers and owners interviewed. All the companies have some form of reward and bonus system, which results in loyalty to the company. The recruitment of workers is an ongoing concern for the owners and managers.

The education system in Bangladesh does not deliver workers trained to do most of the production skills required by the interviewed firms. Graduates from colleges and universities have theoretical knowledge but lack practical skills, so most companies have to do additional in-house training. Although in some cases the employees provide innovative ideas, most owners signal the limited creativity of their workers and refer to a passive attitude. There are very limited connections between universities and industries. The managers and owners see a gap between industry and academia in the context of Bangladesh, where both parties seem to avoid each other.

Typically, the companies possess technology and machinery that they have had for a long time. The technology is still able to deliver a certain minimum product quality, but occasionally, new machinery is bought from profits and savings. The interviewed owners and managers are well-informed about technological possibilities though the internet or informal contacts, and have ideas and plans for upgrading and expanding their companies. However, new (technological frontier) machines are too expensive and advanced compared to the expected returns on investment in the short run. With regard to the long run, the macro-economic and institutional context does not provide sufficient confidence for such extensive investments with bank credit. The owners and managers are only confident about short- and medium-term stability. The 'glass ceiling' situation seems to be the case among most interviewed SMEs.

External business environment and formal and informal institutions

Bangladesh has many SMEs involved in textile manufacturing, whose product quality meets international and export standards. The working conditions of labourers has been publicly questioned, and as a result, international buyers have set up a compliance certification system. However, compliance is a challenge for smaller firms, involving substantial investment, as explained by the owner of the textile printing company. The process of acquiring compliance is itself an innovation. However, several SMEs report that they are worse off because of the compliance standards, since international buyers are not willing to pay higher product prices incorporating the investment costs.

The cases suggest that entrepreneurs with a family background in a business group can set up a business more easily than those without family support. They know how to play according to the rules and have technical and financial back-up. This might explain the 'missing middle': there are many household-based companies, whereas companies with 10-50 employees are less common. Larger companies and family business groups with 150 and more employees are more prevalent in Bangladesh.

All interviewed SME owners and managers indicate that the business environment is challenging in Bangladesh. There is no 'one-stop shop' offering information on how to set up a business, nor is there information online on licence requirements. Several of them have a negative perception about frequent changes in government policies and regulations. There is no clarity about these changes and SME owners have to navigate the requirements themselves. Many ministries and governmental agencies have different and unpredictable regulations.

Only a few interviewed companies received support from the government. The other owners and managers express regret that they have not received such support, and feel that they have to survive on their own. The banking system is not an attractive source of finance for SMEs. High interest rates and complex paperwork are critical issues.

Branch associations in general are an important source of information and business contacts and contracts for the owners and managers of the cases. Most of them are members of an association. Interaction with formal technology institutions, as suggested in the innovation systems literature (Lundvall, 1997), does not happen. Many SME owners and managers indicate that they would like to cooperate with universities to undertake research at their premises, sharing research insights, for instance. There is very little spill-over of technology as a result of cooperation between firms, subcontracting or other forms of collaboration within value chains, business clusters or networks.

4.2 Policy issues – insights for policy makers to consider

The owners and managers in the cases suggested in the interviews that the government is not really interested in the development of the manufacturing sector, and that government officials are interested in short-term financial gains particularly. This also raised issues for the DFID project in terms of disseminating policy recommendations. As one of the interviewed entrepreneurs put it, “How can you give policy recommendations to government officials who are basically not interested?”

Various ministries within the government have defined and implemented industrialisation and innovation policies. However, these seem not to reach the SME owners interviewed. Some SME owners and managers are aware of R&D centres and programmes aiming at technology development for SMEs, but few are actively engaged. One explanation could be that technology dissemination is implemented in a technocratic top-down way. The companies are seldom consulted, in fact they prefer to stay at a distance from formal institutions. The result is that the interviewed SME owners failed to benefit from any innovation policies.

Owners and managers are aware of state-of-the-art technology but cannot afford the high cost of the machines. Even owners with sufficient financial means do not invest because of their uncertainty about the future. The government provides neither assurance nor governance stability to the sector, so most SMEs continue their activities but do not expand further because of challenging business conditions.

As argued in the introduction of this report, it is desirable to develop innovation within manufacturing SMEs. Some believe that technological innovation is critical for SME development and catch-up in LICs. Technological innovation has, however, been traditionally concentrated in developed countries, given the costs and risks involved in stimulating technological innovation. Foreign sources of technology account for a large part of productivity growth in most countries, evident in the cases in Bangladesh. Therefore, the development process in LICs could be supported by tapping existing technical and product knowledge.

Moreover, the stories and experiences of the owners and managers raise the issue of whether an innovation-driven and new-to-the-world innovation approach would be the way forward. Most of the required technology is already available, but elsewhere in the world. In fact, all owners in the cases are well informed about the technological possibilities of their business. Without too much difficulty, the owners and managers find the technology themselves by drawing on various sources of information (the internet, informal business contacts and trade fairs). Moreover, the companies themselves refine and adapt the existing technology once acquired. So, although setting up technology development projects and programmes may help SMEs, the availability of technology is not perceived as a barrier to innovation by the owners and managers.

The notion of growth as ‘manna from heaven’ reflected in convergence theory, see the exogenous growth model of Solow and Swan, was earlier rejected by scholars as described by Fagerberg et al. (2010). However,

it seems this might work after all because of the free and widespread access to knowledge and technologies via the internet. The knowledge itself is available for local companies. The institutional context, providing trust, predictability, stability and access to finance is more of a problem in preventing investment in technology and innovation and thus preventing ‘convergence’ from happening. At the same time, the ‘manna from heaven’ of technology developed elsewhere may not address local needs or issues in Bangladesh.

Innovation climate

How then can the innovative capacity of SMEs in developing countries be increased? According to the World Bank (2010), an efficient innovation policy by governments will address the overall innovation climate, which goes beyond traditional science and technology policy. At the same time, government action can usefully focus on a few generic functions to help SMEs to grow. It can facilitate the articulation and implementation of innovative initiatives, since innovators need basic technical, financial and other support.

The government can reduce obstacles to innovation and in regulatory and legal frameworks. Government-sponsored research and development structures can respond to the needs and demands of surrounding communities. Finally, the education system can help form a receptive and creative population. Regarding actual innovation policy development, there has been a considerable amount of work in developing countries, such as the World Bank (2010) report ‘*Innovation Policy: A Guide for Developing Countries*’.

The lack of relevant education is a problem for the companies interviewed, who feel there are insufficient skilled workers and operators to work with modern machines. SME owners and managers complain that university and college graduates do not have the required technical and craftsman’s skills, exposure to modern technologies, or an entrepreneurial and creative attitude.

As mentioned earlier, several ministries and agencies are engaged in efforts to develop and promote innovation policy, usually labelled as Science, Technology and Innovation (STI) policy. Despite considerable effort in developing strategies and plans, actual implementation is challenging, due to the limited availability of public budgets and knowledgeable staff.

Nearly all SME owners and managers suggest that creating a stable and predictable institutional context would be an efficient and effective way to promote innovation in Bangladesh. All kinds of innovation policies and programmes could be developed, but the results of such policies will be undermined by the weak and unreliable wider formal institutional context.

Another policy idea emerging from the DFID project is that several owners and managers suggest shifting the focus from governmental policy makers only, to incorporate direct advice to SMEs on how to improve their business. One idea is to develop non-governmental business information exchange networks and platforms, establishing contact between entrepreneurs in Asia and beyond, to facilitate discussion and deals within the various sectors. SME owners suggest that the DFID project could establish a network of all SME owners and managers contacted during the implementation of EIP-LIC and create a website for them to stay in touch with each other.

Research issues - insights to address the research questions

The qualitative analysis in Bangladesh, and also the earlier studies in the framework of the DFID EIP-LIC project, show the many internal and external factors supporting or hindering innovative behaviour of owners and managers of manufacturing SMEs. The econometric analyses and the mathematical models approach within EIP-LIC implicitly seeks correlations and causal relationships between independent variables such as internal capabilities, a favourable policy context, the availability of finance and technology, and the occurrence of innovation and innovativeness as dependent variables. The associated economic theories explain and predict economic outcomes as a basis for further policy development.

However, a limitation is that the claims of econometric analyses are true only *ceteris paribus* — that is, they are true only if there are no interferences or inhibiting factors. Critics say that the most important methodological issue is the simplification, idealisation and abstraction that characterises econometric research. However, the qualitative research element of this project shows the reality of numerous inhibiting factors. This is problematic once research outcomes are translated into policy, from which true impact is expected, and constitutes an emerging methodological challenge in terms of developing meaningful and effective policy recommendations in the EIP-LIC research project.

Theme 1 'Innovation Systems'

In reviewing the innovations in the cases against innovation systems theory, one would expect that the SMEs would be surrounded by a network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies (Freeman, 1987). However, it appears that the SME innovations in Bangladesh are mostly in-house activities. The same phenomenon has been observed in India, Vietnam and Indonesia in the DFID EIP-LIC qualitative reports. Ideally, formal technology institutions would facilitate this process. However, although there are governmental S&T institutions, it seems that the developed technologies they offer are not required by SMEs, while for the technologies they require, no suitable technology institutions exist.

The cases suggest several firm-level factors playing a critical role in the engagement of incremental innovative activities, more than supporting institutions. The innovation process is initiated, managed and owned by the company without any external involvement or support from other businesses. Informal contacts, even within formal institutions, play a key role in some cases. It is the owners who develop ideas for innovation, with employees playing only a limited part by suggesting improvements at the operational level.

By contrast, the motivation, contacts and international exposure of the owner are key factors in engagement in innovative activities. Moreover, the availability of funds as a result of profits is essential. Regarding the risk-taking of their innovation projects, most owners and managers are confident about the market opportunities in Bangladesh, the region and beyond.

There are no cases of collaborative innovative activities. Although the companies are open to sharing information about their needs, most of the owners/managers avoid cooperation with other companies.

Regarding external networks, none of the interviewed firms has been involved in collaborative innovative activities or joint technology acquisition with other businesses or with technology institutions. There are no spill-overs as a result of subcontracts or clustering of firms. Likewise, no company enjoys the spill-over of technology from larger, foreign or other technologically more advanced firms. There are no examples of large foreign enterprises subcontracting and making technology available to SMEs or exchanging information. The companies in Chittagong are very scattered and seem to have no relationship with each other.

There are virtually no links between the interviewed SMEs and public sector actors, such as universities, governments, or NGOs, as presented in the 'Innovation Systems' analytical model. The so-called innovation system, as a co-evolutionary network of actors, does not exist. Instead, the business system actors and informal institutions play a key role in providing information, technology, credit and overall stability and predictability. The role of these actors could be further explored in EIP-LIC research, with particular regard to the doing, using and interacting (DUI) approach in learning and innovation processes, as suggested by Lundvall et al. (2009).

The outcomes of the qualitative inquiry suggest that technology and underlying knowledge may not be the problem. Regarding the diffusion of technology, most of the entrepreneurs are well-informed about

technological possibilities and are able to import the technology by themselves with little difficulty, provided funds are available. For most of the technical problems faced by the SMEs, there is already a technical solution developed somewhere in the world, so there is little need to develop local 'new to the world' technologies. There is therefore little need for intermediaries to bring producers and users of innovation/knowledge together. There are few 'breakthrough' technologies that could be disseminated on a wider scale, and the owners and managers seek to meet their specific needs with available technology. They can identify where to source the technology and have suppliers. In some cases, a local technician can make a copy of the machine. There is little local innovation for local problems.

Theme 2 'Finance for Productivity Growth'

Finance is considered a critical constraint by most interviewed companies in Bangladesh. In most companies, the owners aim to introduce new products and raise productivity because they see business opportunities in doing so. Learning and acquiring the technology is not a problem, but the finance is a major challenge, in particular for expensive state-of-the-art technology to be able to face international competition. Today the SME owners develop their business with small, incremental investment. They do not take the risk of large-scale investment. Although there are well developed ideas for innovation and confidence in the market, investments cannot be made because of uncertainty about the long-term economic and political outlook. Instead, SME owners invest by using the profit of larger orders they have, or by using the contract upfront to secure supplier credit.

The cases in Bangladesh provide some insights into the formal and informal financial institutions. One key issue is that banks charge high interest rates for loans to manufacturing SMEs, which prevents several companies from investing in technology that could enable them to increase the speed of production and broaden the range of products. Although they are 'proven' entrepreneurs of registered businesses, able to assess risk and handle a difficult business environment, they are not considered creditworthy. Most of the interviewed companies were given informal loans and gifts by family and friends.

With regard to managerial practices and innovation decisions, many entrepreneurs do little in terms of in-depth calculations and forecasts. Most owners are self-made entrepreneurs, due to a combination of their limited knowledge of financial management and the uncertain and fast-changing economic and institutional context. It is very difficult to make a financial forecast in the Bangladesh, as the regulations are unclear and subject to change.

Unlike M-Pesa in Kenya, SMEs in Bangladesh do not use mobile banking for business transactions, although most company owners have access to and experience with the internet and mobile phones.

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Annexes

Annex 1: List of questions for semi-structured interviews

A. BASIC INFORMATION

1. Name of business and owner, location, legal status, years of operation, types of products, manufacturing subsector, productive activities, number of employees, management structure, some indication of turnover and profit and average investment size.
2. Short history and background of business model. How is the company generating value? Position in a value chain if applicable, suppliers, major clients/markets.
3. Did the company grow/expand in recent years? To what extent (why) does the owner consider his/her company as an innovative company as compared to other manufacturing SMEs in Bangladesh?
4. Did the company itself introduce a new product, process or technology to raise productivity or to face competition? Provide examples of product/process/technology innovations that enabled survival/growth/expansion in the past 3 years.

B. INNOVATION

New

1. Description of the type of innovation (process, product, incremental, radical). What is new? Did some innovations enable/trigger other types of innovation within the company? Management innovation in terms of goal setting?
2. Is the innovation 'new to the world' involving inventions by internal R&D, or is it a copy, adaptation or adoption of an existing product or technology?
3. How does the owner, employees, clients and others actors perceive the newness? (just a small improvement or as a 'breakthrough')?

Process

4. Idea: Where did the idea and motivation for the innovation come from? What were the first steps in the idea formulation and who initiated these? What was difficult and what was easy?
5. Testing: What were the subsequent steps in testing? At what point in time did it become clear that the new product or process would become a success? On what basis did the owners decide to further implement/commercialise it? Did the owner try new things that failed?
6. Commercialisation: what were the steps towards the implementation? What confidence/trust provided back-up? What was difficult and what was helpful?

Value

7. How do product/process/technology innovations create value for the company?
8. Did the innovation increase productivity, if so how? (lowering production costs per unit, labour/capital input)?
9. Did the competitive position change as a result of the innovation, if so how? (via premium products, better, newer fashionable products and new export markets)?

C. INTERNAL CAPABILITIES (FIRM LEVEL CONDITIONS)

What are the internal strengths and weaknesses with regard to the innovativeness of the company?

Dynamic capabilities

Sensing and shaping opportunities for product/process/technology innovations

1. To what extent do you (and the employees) see the need/urgency to be innovative?
2. How do you or your employees identify new business/innovation opportunities?
3. Who is actively involved in identifying these opportunities?
4. How is raising productivity and competitiveness linked to identifying opportunities for innovation?
5. How do you target a new market segment? How do you consider the competitiveness of your company?
6. How is your company adjusting to customer needs?
7. How does the company select the ideas that it is willing to invest/innovate in?
8. Who is involved in this process?

Reconfiguration of the company

9. How do you adjust by being innovative to the surrounding business environment?
10. How do you share knowledge within your company?
11. How are employees informed about new developments?
12. How does your company train employees to adjust to new developments?

Goal setting

13. Do you have an implicit or explicit goal setting system to improve performance?
14. How do you pay employees for performance? (more salary, rewards)
15. How to you increase motivation? Is there intrinsic motivation (ambition, ownership) and external (money) motivation?

Slack time

16. Do you give employees time to develop or try out a new approach or develop new ideas about products or services, or business processes?
If yes:
 - What exactly was expected from employees during this time? What kind of activities should employees undertake during this time?
 - Did all the employees get some time or was it restricted to a specific group; and if so, which group?
 - Why did this establishment give employees this time? What was the goal/idea behind it?If no:
Have you ever considered giving employees some time to develop new ideas? If yes, what was the reason for implementing it? If not, why not?

D. FORMAL INSTITUTIONS

How does the owner perceive the opportunities and threats for product/process/technology innovations of the surrounding business, policy and regulatory context in Bangladesh?

1. Is the owner aware of governmental policies/programmes in Bangladesh that specifically aim to stimulate product/process/technology innovations in manufacturing SMEs? What is the owner's idea and perception of these governmental policies (programmes/projects)?
2. Does the company actively participate in, or benefit from, such governmental policies/programmes/regulations? (specify in what ways these stimulate the company's innovativeness)
3. What role do intellectual property rights and patent laws play in your innovation activities? Does the owner aim to patent innovations? If so, which patent office is used? Does the owner find intellectual property rights and patent laws helpful for innovation activities? Does the owner respect the intellectual property rights of others when innovating? If not, why not?

4. Are other generic governmental policies/programmes (not explicitly aimed at promoting innovation, stimulating education or providing access to finance) supporting the company's innovativeness in an effective way?
5. Do certain governmental policies or regulations prevent the owner from introducing and investing in innovation? What threats in terms of policy and government regulations emerged in the innovation process?
6. Does the company participate in, or benefit from, programmes or projects stimulating innovativeness run by NGOs and/or international development agencies? (kind of programmes/projects and impact)
7. How does the owner acquire knowledge and technology for product/process/technology innovations? When conducting innovative activities, does the company collaborate with formal bodies, such as universities, R&D centres, research institutes and so on? Why (not)? Which kind of organisation? Does the owner encounter any difficulties in collaborating with such organisations? If so, of what kind? Are these collaborations ultimately beneficial for innovativeness? If not, why not?

E. BUSINESS SYSTEM, SPILLOVERS, EXPORTS

To what extent (and how) are contacts and interactions with other businesses - local, national and international - important for stimulating product/process/technology innovations within the company? Examples?

Business systems interaction

1. Has the company ever introduced a new product/process/technology to suit the needs of a local client/buyer? If yes, did the client/buyer help in any way to make these changes?
2. Has the company ever followed the advice of a supplier in introducing a new product/process/technology?
3. Does the company have active business cooperation (subcontracts)? What is the nature of the cooperation and what is the benefit? Did that involve a new product/process/technology?
4. Does the company buy from or sell to any multinational firms located in Bangladesh? If yes, has the company ever benefitted in any way from cooperation with these firms to develop a product or improve production techniques?
5. Where does the company typically recruit employees? Has the company ever recruited employees from a client, supplier or competitor? Were these employees particularly helpful in improving products or production techniques? Has the company recruited employees with the explicit aim of improving products or production techniques? Where did they work before?

Location

6. How long has the company been located at the present address? Did the company move to this address or was it created at this address? What were the main reasons why the company was moved to/founded at the present address?
7. How does the presence in the location/region affect the company's performance, innovation, growth? What is the owners' perception of the dynamics of the present location/region with regard to the businesses around (micro, SMEs, large, multinational)? What is the size of the region to which the owner refers?
8. Are the other businesses in the region similar or different in terms of size, production, sector and type? To what extent do firms produce comparable goods in the region?
9. Alternatively, to what extent are these other business hindering and competing? Does the owner see them mostly as competitors? Does that imply a need for innovation?

10. Does the company buy inputs (what, quantity) from firms located in the region? What is the quality of local inputs? Did the owners ever ask a local supplier to change a product to suit certain needs? If yes, did the company help the supplier make these changes in any way?

Export

11. Has the company ever exported some of its products to foreign countries? If yes, when was the first export? Has the company exported some of its output abroad in the last year? To which countries?
12. What was the main driver of the company's decision to export? Did the company actively look for foreign clients? Did foreign clients or a wholesaler contact the company (if yes how: website, fair, etc.)? How did the company hear about export opportunities or has the company ever been recommended to foreign clients? If the company was contacted or recommended, why was this the case?
13. Has the company ever improved an existing product or created a new product with the explicit aim of exporting it? If yes, was it at the direct request of foreign clients or to find new foreign clients? Did the company make improvements to comply with standards and regulations?

F. INFORMAL INSTITUTIONS

1. Family and friends (overseas)
2. Cultural perception of innovation. Is innovation something good? Or should we strive for stability and harmony in society?
3. Informal think tanks, informal knowledge through contacts with university experts
4. Rent seeking individuals, corruption
5. Hindering culture, traditions or customs
6. Social learning, collective learning
7. Community solidarity, craft traditions

Annex 2: List of companies interviewed

Manufacturing SMEs interviewed in Chittagong in chronological order (20 to 31 May 2017)

	Subsector	Products	# of employees
1	Printing and publishing	Cardboard boxes for cosmetics	150
2	Textile and garment	Accessories	65
3	Steel production supplies	Crucible casting for steel mill supplies	60
4	Textile and garment	Prints for shirts	35
5	Metal processing	Construction rods	300+
6	Textile and garment	Washing jeans	80
7	Rubber	Rubber sheets for car tyres	200
8	Agro processing	Animal (fish) feed pellets	30
9	Automotive	Truck building	30 + production teams
10	Paper	Paper rolls production	150
11	Textile and garment	T-shirt printing	200
12	Food processing	Dried fish packing	5
13	Furniture and wood processing	Children's bedroom furniture and other furniture products	35
14	Chemical oil	Lubricants	150

Annex 3: DFID research questions

The DFID research project takes an ‘economics’ perspective on innovation, and involves econometric analysis of a set of variables concerning barriers at firm, regional and national levels and their causalities with the *innovative behaviour/capability of entrepreneurs* and subsequently innovation and productivity. This constitutes a reductionist and deductive approach in defining variables for analysis in which the impact of individual factors on innovation is assessed by applying quantitative econometric methods (*ceteris paribus*). The DFID project key research questions are grouped under two themes:

Theme 1 ‘Innovation Systems’:

- What firm-level and regional-level factors hinder or foster the engagement of firms in innovative activities?
- What is the impact of in-house innovation activities versus collaborative innovative activities or technology acquisition activities on the innovative performance of firms in developing countries?
- What is the role of economic spillovers within clusters of firms in fostering economic growth and innovation?
- What are the most critical barriers to the process of innovation and the diffusion of technology in low income country settings?
- What types of links between the public/private sectors, universities, governments, NGOs and the private sector are more conducive to innovation activity?
- What is the role of intermediaries to bring producers and users of innovation/knowledge together?

Theme 2 ‘Finance for Productivity Growth’:

- How does the design of formal and informal financial institutions affect firm productivity dispersion across SMEs?
- What are the firm level margins that make finance matter for productivity?
- What role do observable managerial decisions (e.g. managerial practices, innovation, product market competition, product quality, technology adoption, location of the plant and the trade status) and managerial characteristics (e.g. gender, age, education, behavioural aspects) play in explaining the nexus between financial development and firm productivity?
- How does firms' productivity respond to exogenous developments in the financial environment?
- What are the macroeconomic implications of such development experiences?