

MANAGEMENT OF INNOVATIVE ACTIVITIES OF SMALL ENTREPRENEURIAL MANUFACTURING WORKSHOPS IN BANGLADESH

Nazrul Islam¹
Muhammad Ziaulhaq Mamun²
Abdullah Al-Aabed³

ABSTRACT

Small entrepreneurial manufacturing workshops of Bangladesh, primarily involved in manufacturing and supplying spare-parts for motorized and non-motorized vehicles, are proliferating. These workshops are principally located at a few strategic crossroads of different cities. Although these workshop entrepreneurs do not have formal technical and management education, they have developed some unique skills of promotion and human resource management through learning by observing. However, these entrepreneurs face some acute problems such as, inadequate governmental protection and policies, unavailability and high cost of raw materials, and infra-structural support. Other important concerns are lack of training facilities, severe competition, availability of skilled personnel, power supply disruption. Other issues are high risk of investment in such projects, problem of getting finance and bureaucracy in the process, no knowledge about information technology, lack of designing capability, inadequate knowledge about importing machinery and raw materials, local pressure to withdraw workshop from their places, and threat from local pressure groups. In addition, customers are unwilling to pay a premium amount for their products and services. If workshop owners are aided with the above mention issues, they will be able to contribute significantly in this strategic sector with their innovative skills.

1.0 BACKGROUND

Smaller firms have played a crucial role in creating the base for the development of non-traditional sector of an economy. It has been highlighted by many studies that these firms are of considerable importance and require nurturing by the incubator organizations. Studies have also shown that historically, smaller size is not an obstacle to growth or innovation (Adame-Sanchez et al., 2001). Their capacity to grow is embedded in their ability to offer new business solutions through innovation, which offsets their shortage of material resources. A large survey of small and medium-sized firms in Canada concludes that innovative activities are the most important factors of the success as they distinguish successful firms better than any other variable (Baldwin, 1995).

In order to underscore what constitutes innovativeness, De Brentani (2001) emphasizes on the degree of newness of a product, service or process rather than innovation as being just the

¹ Associate Professor, School of Business, North South University, Dhaka, Bangladesh

² Professor, Institute of Business Administration, University of Dhaka, Bangladesh

³ Lecturer, School of Business, Independent University, Bangladesh

creation of a new product or process. The study chooses to analyze innovativeness along both dimensions, i.e., incremental innovation (improving existing products and processes) as well as discontinuous innovation (creating new products and processes). It can be noted that discontinuous innovation is a much riskier proposition than incremental innovation.

The Japanese economic transformation has been cited as successful implementation of reverse engineering¹ and imitation strategies. Microsoft in word-processing is another illustration where imitation has been hugely successful (Lowe and Taylor, 1999). At present, China is considered to be experiencing similar success in replicating products and processes that have originally been developed elsewhere. Hence, innovativeness lies not only in creating new products and services but also in betterment or modifying the existing ones.

In Bangladesh, small entrepreneurial manufacturing workshops² are playing a significant role directly and indirectly by producing machineries and spare parts for the transport, agriculture, tea, textile and garment sectors. This sector is also adding values in the society by creating job opportunities, providing training to the unskilled or semi-skilled people, and initiating economic activities in the country. These workshops usually produce essential spare parts like nut, bolt, screw etc and provide repairing services. Statistics show that on an average this sector provides about 500 million metric tons of materials by providing repairing services to the transporting vehicles. It has already created about 400 thousand employment opportunities (especially youths), which are benefiting about 2 million household members throughout the country (Source: Bangladesh Automobile Workshop Owners' Association).

In Bangladesh, more than 1,000,000 vehicles run at the streets and in the water. These vehicles are somehow dependent on the innovative manufacturing workshops. About 300,000 young people are employed in this sector which produces essential machineries and spare parts in more than 40,000 such workshops or enterprises. The costs of these machineries and spare parts are more than \$ 700 million³, of which, more than \$ 286 million are imported substitutes. In addition fifty percent of the shallow engines, mainly used in agricultural purposes, are produced by this sector. At the same time, machineries related to tea gardens, plantation, fishing trawler, engine boats, and spare parts in jute and textile machineries are also produced by these workshops.

The workshops located in Dhaka city are also playing an important role mainly for the transportation sector. The workshops are primarily involved in manufacturing and supplying small spare-parts for rickshaw, bicycle, auto rickshaw, bus and other motor vehicles. There are about 500 small entrepreneurial manufacturing workshops located in Dhaka city. This sector has paramount importance, as it is responsible for keeping the bulk of transport vehicles running in the city. In addition to that, it is creating small entrepreneurship bases at the different points of the city, which are providing job opportunities mainly to the poor and slum people (Khan, 1985-1986). Among these enterprises 256 workshops are enlisted in the Automobile Workshop Owner's Association. The individual investment in this sector is about \$ 571 million (Ahmed 2006).

Competition for these workshops comes mostly from Indian suppliers and manufacturers. However, these workshops are producing quality-customized spare-parts at comparatively lower cost. Using local technology, they manufacture products and provide repairing services. Their

core activities are related to both product and process innovation. These innovations are intrinsically linked to the personal capabilities of the workshop owners with the help of technically skilled and semi-skilled workers. These entrepreneurs are quite proficient at managing and preserving their technical people who have very high demand in the local market. The market of their products and services produced by the workshops are also highly competitive in nature.

These workshops are primarily concentrated around a few strategic places of Dhaka city. The entrepreneurs also perform various managerial activities for managing the resources (raw materials and manpower). Based on literature, it is evident that workshop entrepreneurs are primarily involved with incremental innovation, which is very significant in the context of a developing economy like Bangladesh. In light of the above discussions, this paper attempts to explain the innovative managerial activities performed by the small manufacturing workshops located in Dhaka city and their contribution especially to the national economy.

2.0 METHODOLOGY

To conduct the study of the innovative capabilities of the workshop owners and their managerial capabilities, both primary and secondary data were used. An intensive, pilot survey of 50 enterprise owners (10% of the total workshops operating in Dhaka city) involved in small manufacturing workshops was conducted. Secondary data were collected from the official record and publications of the workshop owners' association - a forum of the workshop entrepreneurs. For identifying the overall scenario of the workshops (functions performed by them and their innovativeness), officials of the workshop association were interviewed. Descriptive statistics were used to analyze the data.

The enterprises were selected randomly from the locations where these workshops are mainly localized (i.e., Zinzira, Dholaikhal, Gulistan, Mohakhali, Uttara, Jatrabari, and Gabtali) in proportion to their numbers in any one place. The selected entrepreneurs were chosen on the basis of the fact that they have been engaged in this business for more than 5 years so that it is possible to evaluate their innovative and managerial capabilities through the course of time. The distributions of the respondent workshop entrepreneurs are shown in Table 1.

Table 1: Distributions of the Respondent Entrepreneurs by Locations

Name of the Locations	Number of Entrepreneurs Interviewed	Percentage of Entrepreneurs
Zinzira	10	20
Dholaikhal	11	22
Gulistan	07	14
Mohakhali	09	18
Uttara	05	10
Jatrabari	06	12
Gabtali	02	4
Total	50	100

3.0 DISCUSSIONS AND ANALYSIS

This section includes ideographic descriptions of the workshop entrepreneurs, managerial activities performed by the workshops (seeking orders from the customers, sourcing raw materials, finance and manpower, executing customers' orders, and evaluation of performance and future planning of their businesses), innovativeness in workshop activities and localization of workshops.

3.1 Profiles of Workshop Owners

3.1.1 Age distribution

The age distribution of the workshop owners' show that their mean age is – years with a standard deviation of – years (Table 2). Most of the workshop entrepreneurs interviewed is in the 30-35 years of age range (42%). The second largest group of workshop entrepreneurs is at the age of 25-30 years (22%) closely followed by 35-40 years (20%). The reason behind this demographic being slightly mature may be attributed to the time it takes to acquire the experience needed to undertake such an endeavor. Research shows that workshop owners first start their career by working with other workshops as technicians. After gathering some experience, some of them start their own business independently.

Table 2: Age Distributions of the Respondent Workshop Entrepreneurs

Age distribution (Year)	Number of Entrepreneurs	Percentage of Entrepreneurs
Below 25 years	05	10
25 - 30	11	22
30 - 35	21	42
35 - 40	10	20
Above 40 years	03	06
Total	50	100

3.1.2 Technical skill

Technical skill is an important parameter for the workshop owners engaged in producing small spare parts and repairing activities. It is found that most of the workshop entrepreneurs require technical knowledge for operating their businesses. The study also supported Abdullah's (1996) finding that most of the workshop entrepreneurs (66%) do not have formal technical training from the technical educational institutes. They somehow managed this skill through learning by doing and by working with others. Only 34% of the respondents have formal technical training mainly from the different vocational training institutes at Dhaka city (Table 3).

Table 3: Training Skills of the Respondent Workshop Entrepreneurs

Technical skill	Number of Entrepreneurs	Relative frequency (%)
Have technical training	17	34
Have no formal training but skill is acquired from working with in workshops	33	66
Total	50	100

3.1.3 Work experience

Working experience also has an important impact on the involvement of the workshop entrepreneurs in manufacturing small spare-parts and repairing vehicles. The study shows that on an average the workshop entrepreneurs had an average experience of – years with a standard deviation of - years. Majority of the workshop entrepreneurs (36%) had 3-5 years of working experience in other workshops and a significant portion (24%) had 5-7 years of experience. Quite a few (20%) had also work experience of 7-9 years. But it is also noted that in few cases the entrepreneurs either took much longer time (9 years and above) or started too quickly (below 3 years) their own workshop (Table 4).

After such a length of service in other workshops, a number of them usually decide to start similar workshops of their own. This indicates that during these years the prospective entrepreneurs acquire the business idea and decide to start the business of their own. Hence it can be mentioned that work experience is important for workshop entrepreneurs.

Table 4: Working Experience of the Entrepreneurs in Other Workshops

Years of experience	Number of Entrepreneurs	Relative frequency (%)
Below 3 years	04	08
3 - 5	18	36
5 - 7	12	24
7 - 9	10	20
Above 9 years	06	12
Total	50	100

3.2 Managerial Activities of Small Manufacturing Workshop Entrepreneurs

The need for managerial skill is of paramount importance for the workshop owners. Starting with customer base formation, they have to motivate and retain own employees, offer quality services and manage operational activities timely and efficiently. The major functions performed by the workshop entrepreneurs include a) seeking orders from the customers, b) sourcing raw materials, finance and manpower, c) executing customers' orders, and d) evaluation of performance and future planning of their businesses (Figure 1).

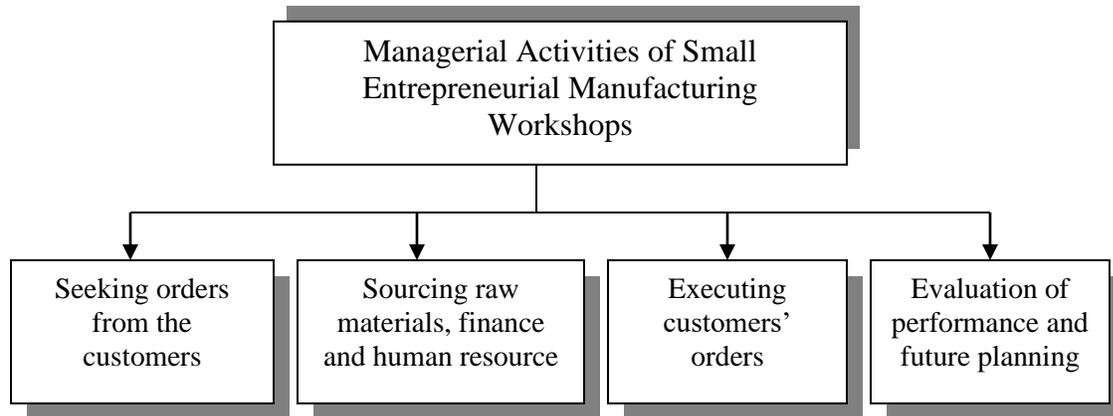


Figure 1: Managerial Activities of Small Manufacturing Workshop Entrepreneurs

3.2.1 Obtaining Orders

The first thing the workshop entrepreneurs' need is to seek orders from prospective customers. Usually, small manufacturing workshops have two types of customers: (i) customers who come to get certain or customized parts of the product(s) and (ii) customers who come to repair their vehicle(s). Therefore, the functions performed by these workshops are related to the needs of these two types of customers.

Due to severe competition in the market, these entrepreneurs follow differentiated strategies to get their desired customers. This study shows that most of the workshop owners (56%) use their customers for furthering their business (Table 5). In essence what they do is first try to identify willing and able customers and use them to bring new customers. By delivering prompt, efficient and superior services and products, they create loyalty among the customers towards their workshops. Subsequently, these customers bring in new customers for the workshop. A significant portion of the entrepreneurs (22%) emphasizes personal relations with the auto parts retail outlets to attract customers to their workshops. In some cases they advertise through employees (10%), and leaflets (8%). This indicates that quality products and personal relationship is important for obtaining customers in this sector.

Table 5: Obtaining Orders from the Potential Customers

Ways to Obtain Orders	Frequency	Percentage of Entrepreneurs
1. Use existing customers as advertisers	28	56
2. Establish personal contact with the showrooms/garage	11	22
3. Use employees for acquiring orders	05	10
4. Giving leaflets	04	08
5. Others	02	04
Total	50	100

3.2.2 Sourcing Different Resources

Raw Materials

Availability of raw materials is a basic need to manufacture the parts. This is one of the critical task for the entrepreneurs in this business as not all raw materials are readily available in the market. There are even some inputs, which are difficult to get even from other countries. As a result, they run a risk of losing loyal customers. This study showed that most of the raw materials are imported from foreign countries (84%); only 16% of the raw materials are sourced from local companies (Table 6). Moreover, the foreign raw materials have to be purchased in foreign currency, which increases the cost of production and services of the workshops. With each passing day, the devalued local currency makes imports costlier and the workshop owners have felt the impact too.

Table 6: Sourcing Raw Materials for the Workshops

Sources	Number of Entrepreneurs	Relative frequency (%)
1. Local source	42	84
2. Foreign source	08	16
Total	50	100

Finance

Financing is a major problem for the small entrepreneurial manufacturing workshops in Dhaka city. To import raw materials from foreign sources they need a significant amount of money and procedural experience. Moreover, some raw materials, which are costly in the local market, would be better financed through borrowing. Along with this, to meet up other expenses of the business, they need ready cash. But the financial institutions are unwilling to extend their financial support in this regard. The study shows that (Table 7) the majority of the workshop entrepreneurs source capital for their businesses from their own savings (50%), followed by friends and relatives (20%), NGOs (14%), Banks (10%) and from other sources (6%).

Table 7: Sources of Finance of the Workshops

Source of Fund	Number of Entrepreneurs	Percentage of Entrepreneurs
From own savings	25	50
From friends and relatives	10	20
From NGOs	07	14
From Banks	05	10
Others	03	06
Total	50	100

Manpower

Another challenge for the workshop entrepreneurs is to secure technical persons for the company. In the market, there are very few technically proficient people available and they are very expensive for the entrepreneurs. Therefore, most of the workshop entrepreneurs (24%) are establishing personal contact with the technical persons available (Table 8). Technical persons are also sourced from the vocational training institutes (22%). In many cases the entrepreneurs prepare them by providing on the job training (20%). Due to the shortage of such skilled labor, entrepreneurs are actively engaged in luring away these people from other workshops using higher pay or other motivators (18%). This indicates that due to the shortage of technical persons, entrepreneurs have to constantly monitor them in order to hire and keep them.

Table 8: Acquiring Skilled or Semi-Skilled Manpower

Acquiring manpower	Number of entrepreneurs	Percentage of Entrepreneurs
1. Personal contact	12	24
2. Vocational training institutes	11	22
3. Improving skills through training	10	20
4. Convincing from other companies	09	18
5. Others	08	16
Total	50	100

3.2.3 Execution of Orders

Innovation is concerned primarily at the operational level of the workshops as the demands are always unique and need high skill. In executing orders, workshop entrepreneurs usually follow reverse engineering method. In Bangladesh, brand new innovation is hardly possible by these small entrepreneurs due to lack of technological capability, financial resources, market and appropriate institutions (Uddin, 1999; Islam, 1998). This reverse engineering is practiced in both product and process development. In executing orders, workshop entrepreneurs face some acute problems, like, (a) Inadequate supply of skilled people in the country, b) Electricity disruption / frequent load shedding, (c) Unavailability of raw materials, (d) Lack of designing capability, etc. (Table 9).

Table 9: Problems of Workshop Entrepreneurs during Execution of Orders

Problems	Entrepreneurs Responses (%)
1. Inadequate supply of skilled people in the country	86%
2. Electricity disruption / frequent load shedding	80%
3. Unavailability of raw materials	70%
4. Lack of designing capability	50%

Since orders are placed at infrequent intervals and these workshops do not stockpile their output, they produce on an ad-hoc basis. While making sure that there are several outstanding orders on hand at any given point in time, they manufacture the parts on a case-by-case basis popularly termed as *jobbing*. In general, they do not wait for a certain number of orders to accumulate for

any item before going into production. Given that clients usually specify a time within which their orders are to be delivered, the entrepreneurs concentrate on meeting the deadline rather than engage in cost minimizing procedures such as production in batches.

3.2.4 Performance Evaluation and Further Planning

The workshops usually do not have any formal procedures of evaluating performance. The only feedback they are able to obtain is expression of satisfaction from their customers. Good performance hinges on the ability to produce the output by a certain deadline and hence their evaluation is quite swift. If they find that they are unable to produce a certain part in the required timeframe, employees automatically put in overtime and extra effort to get the work done. This contributes to the learning curve of the workshop and they are able to execute subsequent orders within pre-specified time limits. In case of future planning, they concentrate on researching suppliers within the city who can provide raw materials that they will potentially need in the future.

3.3 Innovativeness in Workshop Activities

As already noted that innovative activities are the most important factors of the success for small and medium-sized firms as they distinguish more and less successful firms better than any other variable (Baldwin, 1995). The innovation aspect is involved with the function of executing customers' orders. This means that in executing orders, innovation capability is required at every stage of the process. Innovation may be related to (i) product, i.e., new product development or improvement of existing product, (ii) process, i.e., new process development or improvement, and (iii) application, i.e., development of application on known product or process. Hence, innovation may take place in the manufacturing workshops through their different activities. The innovation could be categorized as replicated products, modified replicated products, new techniques, new practices, new ideas or objects perceived as new by the entrepreneurs. There are three major elements needed for innovation: (i) human resources (ii) technology innovation management capabilities, and (iii) financing and related fiscal incentives (Uddin & Haque, 1999). Therefore, innovation promotion efforts should be made by various ways in these small enterprises. These include:

1. Acquire the capability to replicate an existing foreign technology or goods following 'Reverse engineering'
2. Replicated technology or goods can further be modified or developed to suit various needs and levels
3. Innovation can emerge individually as new goods or technology without replication

3.4 Localization of Workshops

As already noted the workshops are mainly located in few strategic points at Dhaka city. The major localization takes place at the meeting points of major roads of the city, such as, Zinzira, Dholaikhal, Gulistan, Mohakhali, Uttara, Jatrabari, Gabtali, etc. Many of the places are either rented, unauthorized possession, illegal occupation. Many of these sites also belong to government. In many cases they get hold of these sites through illegal means.

3.5 The Problems of the Innovation In Workshop Industry

The problems of the workshop entrepreneurs are many-fold and varied (Table 10). These can be divided into two areas: (i) Direct (Internal), and (ii) Indirect (External). As noted, high cost of raw material (90%), inadequate skilled human resource in the country (86%), and electricity disruption/frequent load shedding (80%) seems to be the major internal problems of the entrepreneurs. Their innovative products and processes require specialized components, which are not readily available in the local market (70%). Some have to be imported from India while other components have to be bought from wholesalers who normally charge a high price for the relatively smaller quantities of orders. Very high risk of investment (60%), sound pollution (60%), and low price paid for product and service (60%) are the other major problems for them. Given the nature of the customers for whom they produce, the risks are calculated by the entrepreneurs to be very high. After starting such a workshop, they live in constant fear that their customer base will become unhappy and sales could grind to a halt if they do not compromise with price with these customers.

Workshop owners also face the difficulty of finding out who actually can supply the materials that they require. They are also unable to keep up to date about the latest advancements made in machinery and equipment because of lack of coordination with such entrepreneurs in the international arena. A severe lack of application of information and communications technology (48%) adds to their isolation from industry experts across the globe. In having to deal simultaneously with the multitude of problems outlined above, workshop entrepreneurs have little time to devote to conduct research and development (56%) or to improve their designing capabilities (50%), which is termed as reverse engineering process.

Table 10: Problems of Workshop Entrepreneurs in Bangladesh

Problems	Entrepreneurs Responses (%)
A. Direct (Internal)	
1. High cost of some raw materials	90%
2. Inadequate skilled human resource in the country	86%
3. Electricity disruption / frequent load shedding	80%
4. Unavailability of raw materials	70%
5. Very high risk of investment in new project	60%
6. Local pressure to withdraw workshop from their sites as it often makes sound pollution	60%
7. Customers unwilling to pay fair amount for their products and services	60%
8. No research and development scope for the entrepreneurs	56%
9. Lack of designing capability	50%
10. No knowledge about information technology	48%
11. Price of local raw materials	44%
12. Inadequate knowledge about importing machinery and raw materials	26%
B. Indirect (External)	
1. Government incentives almost absent	90%
2. This sector is neglected by the government policies	90%
3. Lack of training facilities for technical entrepreneurs	84%

4. Severe competition from India	80%
5. Inadequate government protection	52%
6. Threat from local pressure groups, extortion, etc.	42%
7. Interest rate of the bank is quite high	40%
8. Government bureaucratic problems in getting loans	40%

Regarding external forces, lack of formal governmental incentive, support, policy or recognition (90%) feeds into the general instability of this industry. The absence of any significant role from the government is also highlighted by the fact that infra-structural support for this industry is very weak. They have not been provided with any form of commercial land to set up these workshops. As such, their workshops operate under threat of imminent electricity and gas supply shortages. Although, the government periodically tries to develop vocational schools to impart technical training, the entrepreneurs think (84%) at best that to be as meager (Financial Express, 1003). That being the case, they are always left in need of more technically trained manpower. Local hoodlums and politicians regularly extort protection money from these workshops and the local law enforcement agencies offer no help (42%). Banks to be risky prospects to begin with assess small enterprises. In addition, the uncertain cash flows of workshop make banks very hesitant about lending money to such projects; even if they do the interest rate is kept very high (40%). To add to their misery, cheap neighboring country's (Indian) products continue to flood the market and force them into a price competition with their Indian competitors (84%).

4.0 Conclusions and Recommendations

This study has underlined the fact that after overcoming deficiencies in technical know-how, sourcing raw materials, human resources and financing, workshop entrepreneurs have had measured success in an industry that demands a lot of innovativeness. However, this success could be very momentary if certain issues are not addressed by policy makers and concerned authorities. Although, the entrepreneurs do not have formal technical education, they adopted it by working with others. It is found that they are quite good at managing and preserving their technical personnel who have very high demand in the local market.

The challenges faced by the workshop manufacturing workshops could be significantly mitigated if the financial institutions came forward with some sort of formalized action plan to help arrange financing. More specifically, arranging working capital for this industry would go a long way in eliminating the uncertainties that the entrepreneurs face once they have launched their businesses. In the past, local banks have helped arrange funding for entrepreneurs in some industries considered to be risky such as the leather processing industry. Venture capital funds are in the process of being set up across the country and these engineering workshops deserve their earnest consideration.

Government involvement in this industry has been very sparse. The initial steps for them should be to allocate some commercial land for this purpose. The workshops are currently based around major intersections of the city. Nonetheless, the entrepreneurs would gladly welcome a move by the government to declare a zone specifically for the manufacturing workshops. This would serve the benefit of providing a central location for all stakeholders in the industry to converge at one point. While this is being worked out, the government could encourage other entrepreneurs

to enter this industry by providing tax breaks, holidays and other non-financial incentives such as setting up a government cell which would listen to their concerns and direct others in the civil administration to aid and assist in their activities.

The deteriorating law and order situation in these areas and the absence of police protection has made the owners susceptible to frequent personal threats and extortion. Given the prevailing situation, some of these workshop entrepreneurs are considering exiting the industry altogether. As an innovative and unique industry that is still in the nascent stage of its life cycle, the situation must be seriously addressed by law enforcement agencies.

Some initiatives have to be undertaken to improve the training facilities for the technical personnel of this industry. The non-government organizations in the country could play an important part here. They have been highly successful with the social improvement of the country's population so far. They have recognized the need for training the youth of the country in appropriate disciplines. However, vocational training in technical skills to be applied in engineering industries has not received much attention from them. By raising awareness about this viable sector of the country's manufacturing sector, they could work with the government to arrange training programs that would ensure a steady flow of technically skilled personnel into this industry.

The workshop manufacturing industry of Dhaka city is at a crossroads. To foster entrepreneurship in an industry, stimulatory, developing and sustaining activities must be undertaken. This industry is at the growth stage and requires consistent consideration from vested quarters for its development and sustenance. Their establishment and development so far can be attributed to the innovative management and technical skills of the entrepreneurs. However, at this stage in its development, the industry needs active participation and special attention from the government and others mentioned in this study to continue to thrive. The workshop manufacturing industry is one of the few attractive solutions for a country that is struggling with high unemployment figures and a workforce that is unskilled. It is hoped by the authors of this study that the entrepreneurs will receive the financial and material support that is needed in the near future so that it can prosper and bring some much needed relief to those who have ventured into this innovative profession.

Notes

- 1 Reverse engineering is a process of learning to replicate a technology by observing and analyzing an existing technology and then making modifications to it.
- 2 As per industrial policy 2005 "small industry" means an industry in which the value/ replacement cost of durable resources other than land and factory buildings is under \$ 215,000.
- 3 \$1 US Dollar = Tk. 70

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