

Current status of plastic production, prospects and training of manpower in Bangladesh

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Abstract

The main strategy for achieving accelerating growth and reducing poverty, income inequality and regional disparity include creation of productive employment in the manufacturing and organized service sector is to accelerate trade and investment in each and every sector. Development of small and medium enterprises (SMEs) is envisaged as a key element in this strategy. In this aspect, a survey on 43 plastic factories, 5 mold industries, 5 importers of plastic raw materials and machineries, 5 National & International Industries (RMG, Leather and plastic Sectors), 2 Association (BGMEA & BPGMEA) & 3 Government Agencies (Export Promotion Bureau (EPB), Ministry of Labor & Empowerment and Bangladesh Technical Education Board (BTEB)) was conducted on the name of "Need assessment to set-up Bangladesh Institute of Plastic Engineering & Technology (BIPET)". SMEF and BPGMEA offered this study on plastic sector. The plastic factories surveyed included micro, small, medium and large factories. About 80% factories belonged to the SMEs. Technical persons in the Management positions were interviewed using detailed questionnaire. The questionnaire was set to analyze the present status of production process, existing working conditions, hiring trends, education-training-technical skills-working experience of workers and technicians, wages framework, troubleshooting problems, types of machine, technology level, training facilities, need for testing, product quality, research & development facilities, existing factory owner's qualification, their demand and facing challenges by entrepreneur & future prospect of plastic production in Bangladesh. Key recommendation for the development and future prospect of this sector is to support newly established Bangladesh Institute of Plastic Engineering & Technology under the supervision of BPGMEA and technical assistance from BUET.

Keywords: Plastic, Engineering; Prospects; SMEs and BIPET

1. Introduction

The plastics industry has developed considerably since the invention of various routes for the production of polymers from petrochemical sources. Plastics have substantial benefits in terms of their low weight, durability, lower cost which can readily be molded into a variety of products that find use in a wide range of applications. From 1980, Bangladesh's plastic sector is growing from a cottage industry to heavy industries. Innovative entrepreneurship and diversification, plastic products have now joined the league of textiles, apparel, leather and jute goods, lucrative packaging, bottle, rigid sheet, PVC pipe with engineering equipment, furniture, health, educational and agricultural uses etc. Today, plastic sector has around 5000 small, medium and large size plastic goods manufacturing units with around 1 million workforces directly or indirectly employed in this sector.

At present total consumption of imported polymers and recycled plastic waste is more than 750,000

metric tons each year and it is continuously growing. Bangladesh is a developing nation and is yet to achieve world-class standard in many items of plastic products. Plastics industry lack in modern technology; capital resources are limited compared to many developed countries. Newly stated Bangladesh Institute of Plastic Engineering & Technology (BIPET) has already conducted professional training for developing skill manpower. This study was conducted to identify the present status of plastic sector by surveying 43 plastic factories, 5 mold industries, 5 importers, 3 national and international institutes.

2. Salient Feature of Plastic Industries

Plastic is used to manufacture a wide variety of products in several engineering process to meet the domestic demand in Bangladesh as well as some products are exported. The plastic industry has emerged as an important industrial sector in the country during more than the last two decades with a potentiality to become a large global player in plastic industry, although it has not yet emerged as

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a global player in the segment. Plastic products were introduced in Bangladesh, in the latter half of the 1940s. Significant growth in plastics sector took place during the last two decades after the introduction of the free market in 1990's. At present, there are about 5,000 plastic industries in the country of which 3,500 are small and 1,480 are medium & 20 are large sized. But there are some factories which are basically micro level including two to five employees. The plastics sector has employed approximately 1.2 million people with investment of 185.5 billion BDT. Development of plastic sector is gradually changed from the year 1960's to present as shown in table-1.

Table-1: Milestones of Development of Plastic Industries in Bangladesh

Year	Technology & Products
1960's	Technology: Manual, handmade mold Products: Small products such as toys, bangles and photo frame were made using handmade molds. Plastic spare parts for jute mills.
1970's	Technology: Introducing injection grade Products: Developed new products as household. Plastic jugs and plate are the example of it.
1980's	Technology: Injection grade and film blowing grade Products: Plastic Bag & related packet for packaging industries
1990's	Technology: Film & injection blow molding, injection, locally produced mold but not critical Products: RMG accessories like hangers, Knob, button, electrical equipment etc.
2000's	Technology: Higher & sophisticated injection molding, Rotational molding, locally developed recycling machines (shredder, extruder, pelletizer), mold production by CNC machine Products: Plastic chairs and tables, water tank made by rotation molding, bag knob, lock etc.
2010's	Technology: Highly sophisticated & automated, imported CNC machines with automation Products: food grade plastic product, mobile phone, parts of car etc.

Retail packaging (cosmetics and industrial packages; woven sacks, garbage bags, butcher bags, industrial films, polythene sheets, plastic hangers, gloves, ropes, freezer bags, etc.), industrial and bulk packaging (woven sacks for food grain, chemical, fertilizer, cement, poultry food, rain protectors, green-house films, etc.), household uses (tableware and kitchenware, pet bottle, chair, table,

bathtub, jug, mug, bucket, container, food box, flasks, plates, glasses, spoons, soap case, toilet brush, pan, toys, artificial flowers, clock, etc.) office equipment (ball pen, marker, paperweight, scale, desk calendar, File cover etc., building materials (door, windows frame, pipes, pipe fittings, electric cables, electric switches, water tanks etc., engineering parts & industrial parts (cone, bobbin, silver can, screw, containers, drums, plastic spare parts for machinery etc., medical instruments (blood bag, medicine container, injection, saline bag, medicine packages etc., agricultural Products (plastic pipe, dram seeder etc., poultry & fishing (pot, Jar, fishing net, fishing ball, egg crate, fish crate etc.), automobile & cycle parts (cars bumper, handle griever cover, back light, spoke light, dash board etc. , electronics (calculator, plaque, holder, multi plaque, regulator, cables, fridge and TV parts, etc., Textile Articles (polyester yarn), Engineering Products: Accessories for electronic products, etc., musical products (video/audio CD, DVD players, etc.) etc are the basic products that's are produced by the plastic industries. Presently world market is trying to change all products material into plastic made. But highly technological advanced plastic goods are not produced in Bangladesh due to lack of technical support and unskilled labor. Survey on production basis, approximately, 50-60% per cent of plastics are used for single-use disposable applications, such as packaging, agricultural films and disposable consumer items, between 20 and 25% for long-term infrastructure such as pipes, cable coatings and structural materials, and the remainder for durable consumer applications with intermediate lifespan, such as in electronic goods, furniture, vehicles, etc. Over 5000 Plastic Manufacturing units are currently operating and most of these are small-scale (about 70 per cent) and domestic market-oriented. Nearly about 250-300 units are currently involved in the export market. (source: BPGMEA).

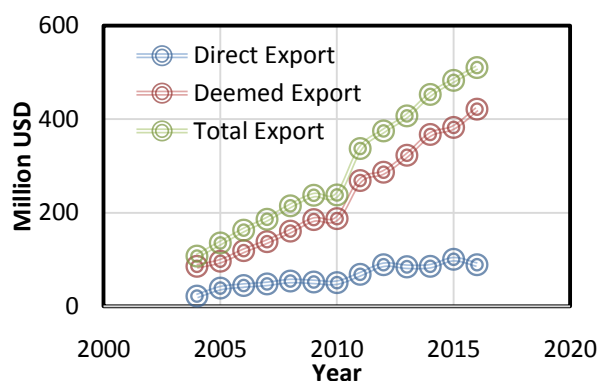


Fig.1: Trends of income from the export (direct, deemed & total) of plastic products

Export performance of Bangladesh in the recent past has been somewhat gloomy as based on data from Export Promotion Bureau. During July-

December 2016, Bangladesh's exports grew by only 4.4 percent which was targeted to achieve a growth of 8 percent. Export growth of readymade garments was 4.4 percent and of non-RMG 4.8 percent – both remained quite low compared to their respective growth targets of 8.1 and 7.4 percent for FY 2017. This is disappointing since the country aspires to reach a USD 60 billion export target by 2021. Plastic goods are exported directly to Poland, China, UK, Belgium, France, Germany, USA, Canada, Spain, India, Nepal, Bhutan, Australia, Sri Lanka, Japan, Malaysia, UAE, Hong Kong, Bahrain, Italy, New Zealand, Netherlands, etc.

Bangladesh, at present, has a share of 0.01 percent of the global plastic market that measure up to \$599 billion, according to a recent report of the Center of Policy Dialogue (CPD). But it is alarming that export earnings of plastic sector are largely depending on RMG section named deemed export. Deemed exports refer mainly to plastic products as accessories to apparel.

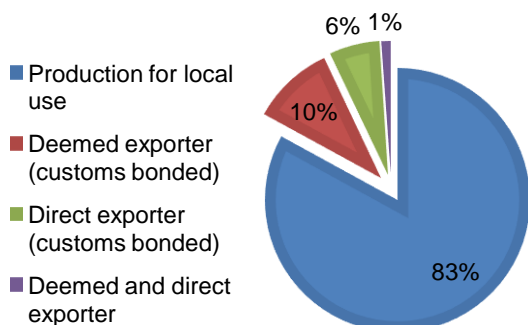


Fig.2: Market orientation of plastic factories in Bangladesh

Gradually increasing of plastic market as shown in Fig.2, it is clearly observed that Bangladesh is growing as a global player. During the FY 2015-16, production of plastic products for domestic market is 2.5 billion US dollar, where as direct and deemed exports are about 89 and 421.41 million US dollar respectively.

Only 1% factory have capacity to maintain the international quality for both direct and deemed export whether 6% factory have capacity only for direct export. But 10% factories have capacity for maintaining the international standard for deemed export. However, by Deemed export was 421.41 million USD for the FY 2015-16. Which indicates it is huge potential to attain this market. Deemed export is depending on RMG export mostly. But direct export of plastic was decreased by 11.5% of its growth and 24.58% of its export target. Bangladesh can expand its share globally but the reasons for failing to take benefit from advantageous market conditions are the supply constraints and unskilled

workforce in the sector and also other factors as described in previous.

3. Survey Findings:

In Bangladesh about 98% factories belong to SMEs and rest are large. But in our survey 81% of SMEs and 18% for large (Micro- employees' number up to 10, small- employees' number 10 to 50, medium-employees' number 51 to 300, large- employees' number is over 300)sampling because of reliable and availability of data's. The most dramatic result of the data collection effort is the similarity among all factories in terms of challenges and needs which confirmed the hypothesis that many plastics factories within the region share similar operating conditions such as regulatory requirements, training needs, economic conditions, competitive forces and raw material needs. Summary of findings are listed in **Table.2:**

4. Limitations

There are more than 5,000 plastic factories are operating in Bangladesh but only 43 plastic factories were chosen for survey because of time, budget constraints, time frame and some unavoidable circumstances. On the other hand, large factory numbers are proportionally high for getting more reliable technical information.

Only plastic factory owners and higher officials were interviewed during the survey. However, despite severe time and resource constraints, the use of multiple primary research instruments (e.g., field visits, depth interviews with key informants and focused group discussions) helped to gain very effective and meaningful information.

5. Recommendations

Based on analysis of the survey findings of this study, several recommendations are provided to address the need assessment to set up BIPET and also additional activities to develop the plastic sector.

- a) Training Module:
 - i. Due to lack of educational background of most of the employees, the training language should be in Bengali and academic curriculum should be according to educational background. On the other hand, training should be focused on the survey-identified topics.
 - ii. As to training method it should be on-the-job training using suitable instructor for the current workers. New recruits are to be trained in the plastic training institute.
 - iii. Training class should be under the digital supporting's

Table-2: Major Findings of Current Status with Facing Challenges by Entrepreneurs & Future prospect of Plastic Sector in Bangladesh.

Major Issue	Details		Observations
Source: Statistical data: Export Promotion Bureau, BGMEA and BPGMEA			
Export Earnings of Plastic Sector	Target VS performance of Direct Export	<ul style="list-style-type: none"> During the FY 2014-15 DE increased 11.47 % over export target During FY 2012-13 & 2013-14, performance DE was below the target DE During the FY 2012-13 performance DE growth rate was decreased by 4.71% 	Political stability is one of the major issue for business development
	Deemed Export	<ul style="list-style-type: none"> During the last 13 years deemed export is gradually increased with the supporting's of RMG sector (\$85.29 to \$421.41million) FY 2015-16, it was \$421.41. 	<ul style="list-style-type: none"> Its impact is more than direct export on GDP It is accounted for more than 75% of total export
	% plastic export to the total export	<ul style="list-style-type: none"> During the last 13 years plastic export is average 1.5% to the total export of Bangladesh 	Plastic sector will play a very important role on GDP
Plastic Product development	<ul style="list-style-type: none"> Plastic product from hand made mold to automatic molding is changed from the year 1970s to 2000's. 		Research should be organized for the product development
Location of Plastic Industries	<ul style="list-style-type: none"> The capital city Dhaka owns 65% plastic industries whether 20% for Chittagong, 10% for Narayanganj and 5% for others. 		Strategy should change for decentralization policy.
Import of polymer Granules	<ul style="list-style-type: none"> During the period 1989 to 2007, the import of polymers increased from 10,000 tons to 289,000 tons per year. At present total consumption of polymers including imported polymers and recycled plastic wastes is 750,000 tons in FY 2010-2011. 		Should make a common platform for everyone to easy access of virgin material
Capital Investment or Banking Support	<p>Bangladesh Bank Incentives</p> <ul style="list-style-type: none"> Export Development Fund (EDF) Fund: All member units of the Bangladesh Plastic Goods Manufacturers & Exporters Association (BPGMEA) can now take maximum USD 1 million as loan from EDF fund. Presently it is increased up to USD 1.5 billion with a special interest rate (London Interbank Offered Rate (LIBOR)) 2.5% to further assist the country's export sector. Foreign Loan Access: Bangladesh Bank also allows some large private companies like RFL Plastic Limited to get USD 15 million borrowing from external sources. Start Up financing: New entrepreneurs can take up to BDT 10 lakh as collateral-free loans at maximum 10 % interest rate under a new initiative by the central bank. However, with collateral an entrepreneur can avail up to BDT 25 lakh as loan. 		<ul style="list-style-type: none"> Interest rate should be in single digit for a startup business Should open a fund for some innovative project on plastic at a very small interest loan.

Table-2: Major Findings of Current Status with Facing Challenges by Entrepreneurs & Future prospect of Plastic Sector in Bangladesh. (Cont.)

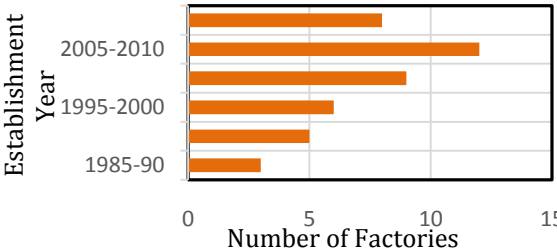
Major Issue	Details	Observations
Source: Plastic Factories & Mold Industries		
Starting Period of the Business	 <p>Fig.3 : Starting Period of Plastic industries Although plastic industry came to Bangladesh in the 1980s the trend for that business in a large scale is relatively much more recent. More than 80% of the industry units that we surveyed started operating in 1990s, majority of them were within 10 years.</p>	Presently entrepreneur of this field is not increased with the rate of demand of plastic products.
Expansion of factory	For the increasing rate of demand of plastic goods in domestic and international market, most of the survey respondents has plan for expansion of it. But it is alarming that some small factory owners are not in feasible condition neither in quality nor at safety for the expansion of it because of political unrest condition.	Government should give some support for the development of small entrepreneur.
Gender Ratio of Entrepreneurs	<ul style="list-style-type: none"> Ignoring the sampling error, 100% owners are male. So it is evident that female are not comfortable in this business relating with environment. 	Female entrepreneur should come with changing the working environment.
Forms of ownership	<ul style="list-style-type: none"> Most of the plastic industry units are either sole-proprietorships or partnerships. Family owned partnerships are also prevalent. 	Partnership business have a huge prospect.
Issue of company registration	<ul style="list-style-type: none"> Initially for surveying we select 60 companies for surveying but 17s were cancelled for reason registration and time bindings. 	Government losses VAT & Tax.
Business Experience of the entrepreneur	<ul style="list-style-type: none"> About 70% of the owners were previously engaged in another job before turning to this profession. 	Business experience should be needed for more development.
Reasons for Starting the Business	<ul style="list-style-type: none"> Most of the owners pointed financial self-sufficiency as the key reason 70% of the respondents identified financial incipency as the primary reason 23% said failure to find employment 	Self-sufficiency is the key but risk is also huge.
Capital invested primarily	<ul style="list-style-type: none"> The amount of capital investment is too much high and varied a great deal, mainly with the product type. The total investment of the SME based industry varied from Tk. 15,00,000 to more than Tk. 30,00,000 lakh. But high range is really expensive. 	Government should give a capital inspective for the development of this field.
Sources of Initial Capital	<ul style="list-style-type: none"> Almost all the owners said that the capital was acquired from own or family sources. Big company have this source from Bank. 	Bank should give support to all category of entrepreneur.
Business Model	<ul style="list-style-type: none"> Micro & Small plastic company's business model is Contract Manufacturing (CM) & Low quality Own Account Manufacturing (OAM); Medium plastic company's business model is OAM & CM; Large good quality OAM CM & OAM is 23%, only CM 58% & only AM is 19% of the survey respondents 	Quality of product should be improved

Table-2: Major Findings of Current Status with Facing Challenges by Entrepreneurs & Future prospect of Plastic Sector in Bangladesh. (Cont.)

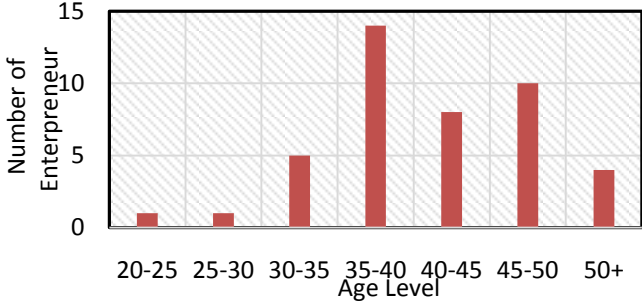
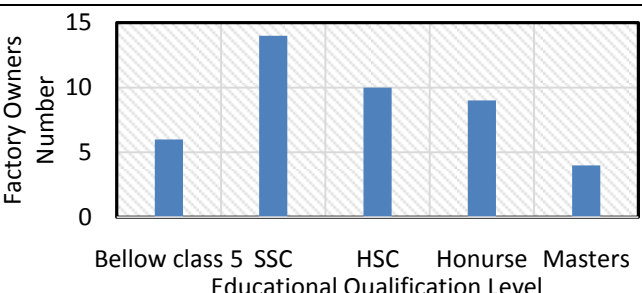
Major Issue	Details	Observations
Age variation for entrepreneur	 <p>Fig.4. Age Variation for Entrepreneur</p> <p>Because of a healthy amount of initial investment, very young entrepreneurs are found rarely. Most owners of the plastic industries show a trend to engage in the industry in their late 30s and early 40s.</p>	Government should give some support for the young entrepreneur for the development of it.
Age variation for workers	Most of the labor of factory have average age limit is 20 to 35. But on the other hand here child labor is visible in these industries.	Child labor should be prohibited.
Educational Qualification of entrepreneur	 <p>Fig.5: Educational Qualification Level of the Factory Owner</p> <p>Largely the entrepreneurs seem to lack much educational background. Generally educational qualification is not of much importance in this industry. Most of the owners are only High-school passed.</p>	Educated people should come on this business for the more development.
Plastic based product	1829 types of plastic product were found in survey where almost 2,500 types of plastic products are available in Bangladesh.	In the household segment, more expensive wood-based products can be replaced by less costly plastic products.
Capabilities of identifying technical problems	Approximately 60% of the respondents from factories do not have the ability to identify technical problems. Nearly all large factories (19% of respondents) have some capability of identifying of problems whereas medium size factories have only limited ones.	Wastage of time and money
Mold Used	<ul style="list-style-type: none"> Mostly micro & small companies used local of low quality, medium companies used mostly local and imported and large companies imported only. A very few companies have own automated mold house. 	Mold industries should be in automation technology
Recycling	<ul style="list-style-type: none"> In the year 2010, 60% of the post use plastic waste was recycled in the country resulting in a saving of USD 600 million saving on import of virgin materials. Only 3% respondent use directly only plastic waste raw materials as recycling. Where 37% for non-virgin materials, 40% for virgin materials and 16% for virgin and non-virgin materials. Almost all factory used the recycled from machine rejected. 	Recycling technology should adopt in a innovative way with good quality of product.

Table-2: Major Findings of Current Status with Facing Challenges by Entrepreneurs & Future prospect of Plastic Sector in Bangladesh. (Cont.)

Major Issue	Details	Observations
Lack of educational qualification of workers	<p>Legend: ■ illiterate ■ Class v ■ Class VIII ■ SSC ■ HSC ■ Diploma ■ BSc</p> <p>Fig.6: Educational Qualification Level of Worker</p> <ul style="list-style-type: none"> • 26% workers are illiterate; 38% workers have completed only Class V; 23% workers have completed Class VIII; rest 13% have higher than Class VIII education. • Some employees have vast knowledge and also technical expertise about machines and operating a plastic factory regardless of their educational background 	Because of low educational background, worker productivity is low and chances of accidents are increased
Method of training	<ul style="list-style-type: none"> • 36% of the respondents from factories would like to avail short courses; • 19% opted for formal in-house training provided by external trainers, while 17% chose apprenticeship, 17% asked for full time training and 11% for on-the-job training 	Employers find it tough to train worker those have low educational background
Training Topics for worker	<p>Fig.7 : Technical Skill Focus for Training</p> <p>Basic training module for workers should be prepared and conducted in Bangla. Different types of educational background need to be taken into consideration during the preparation of the following training modules: a) Plastic processing techniques b) Material handling and c) Quality control and assurance</p>	Topics to be covered: Machine set-up Machine operation Machine maintenance Quality assurance Quality control Lab techniques Mold design
Willingness to hire trained worker	Approximately 95% respondents have shown their willingness to send their workers for training or want to hire trained workers. Nearly all respondents gave their opinion in favor of setting up of a training institute which will address the training and other services needs of the plastics sector	Will send workers for training if it is fruitful and also meet their requirements

b) Technological advanced research: BIPET should start some research for the development of plastic field. Especially plastic related innovative products. BIPET can offer some research related to innovation of product with engineering faculty at BUET.

c) Entrepreneur Training: For the development of this field there should be a provision of entrepreneur training on this field.
d) Enrich Business Strategy: Plastics industry is now working as a backward linkage industry for many growing industries, especially the RMG

and pharmaceuticals, has created a lot of opportunities for value added within the country. If more forward linkage industries such as food processing, agriculture, automotive, electrical and electronics develop and mature, the plastics sector will experience a robust growth. Conversely, if the plastics sector becomes competitive, these forward linkage industries will enjoy cost advantage.

- e) Innovation Competition: SME Foundation should offer a innovation competition program for come out the young generation and also the development of this field.
- f) Raw Materials: It is important to source the raw materials for all type plastic factories (micro, small, medium & Large) from a common platform.
- g) Registration of All Companies: Starting the business needs lots of paper work and formalities if done properly. It should be stricked for doing this business by proper registration formalities.
- h) Single Digit Loan Facilities: Government should give a support for a single digit loan to reduce the initial pressure of new business venture.
- i) Industrial Zone: First of all Government should create a secluded industrial zone for plastic industries with gas and electricity and other supplies and transfer all the industries there.
- j) Taxation Fascilities: Government should remove taxation on the plastic sector for at least a five-year period to give the growing industries a chance. In the case of PVC pipe, toys, food based products etc. manufacturers, the government has imposed VAT, which is affecting the industry very much. So the government should exempt VAT for all new PVC pipe industry for at least five years.
- k) Regirstration Rules & Regulation: Most of the small enterprises are not following the rules and regulations, which eventually hampers the business. BPGMEA should be strict for giving their certification.
- l) Minimum Education Level: BIPET can arrange at least a minimum education qualification for the entrepreneur and also the worker.

6. Conclusion

The economy of Bangladesh is a developing one that is classified as a next eleven emerging market and one of the Frontier Five with GDP growth is 6.2% over the past five years. Where this is increasingly led by export-oriented industrialization. In 2015, per-capita income stood at USD 1,314 which also indicates the improvement in living standards of the people. With this spur the plastic industry growth is also increasing. Domestic demand is mainly supported by large population, growing middle class & strong forward linkage

industry. Direct Export growth rate on the FY is 17.37% where as Deemed Export growth rate is only 4.08%. Vision 21 target is to reach the turnover for plastic sector will of USD 4 billion by 2021. This survey finding will give a big support if the recommendations will take by the government to reach this goal.

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