Lahore School of Economics

Innovation & Technology Centre

INNOVATION AND TECHNOLOGY IN EXPORTING AND NON-EXPORTING FIRMS FROM THE LIGHT ENGINEERING SECTOR IN LAHORE, SIALKOT, GUJRAT AND GUJRANWALA

2020

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TABLE OF CONTENTS

RESULTS AT A GLANCE

Who was surveyed?

47%

of exporting firm in the sample were medium sized firms, while a majority of non-exporting firms were small sized firms (61%).

37%

of exporting firms were selling 100% of their output abroad.

40%

of exporting firms were exporting their output to Asia, while 17% were exporting to Europe.

100%

of exporting firms in the sample said that they innovated, i.e. purchased new machinery/equipment, in the last 10 years.

47%

of exporting firms innovated during the last 1-5 years. Whereas, a majority of non-exporting firms (48%) innovated between 5 and 10 years ago.

The machines most frequently bought by the exporting firms in the light engineering sector were Verma machines/drill machines, while the most frequently machines purchased by the non-exporting firms were Leth Machines.

Characteristics of Innovating firms

65%

of surveyed exporting firms claimed to have purchased their technology/equipment from abroad. Whereas, more than half (53%) of non-exporting firms purchased their last four technologies from Pakistan.

72%

of the non-exporting firms reported that they adopted already established machinery / software. Whereas, 45% of the exporting firms adopted state of the art machinery.

78%

of exporting firms and 63% of non-exporting firms reported that they preferred buying already established technology.

34%

of non-exporting firms reported that they initiated innovations themselves. Whereas, 33% of exporting firms reported that their organization along with other organizations/ institutions were responsible for developing these innovations.

50%

of exporting firms claimed that they were planning to introduce a new technology in the next 12 months. While, only 43% of non-exporting firms were planning to introduce new technology.

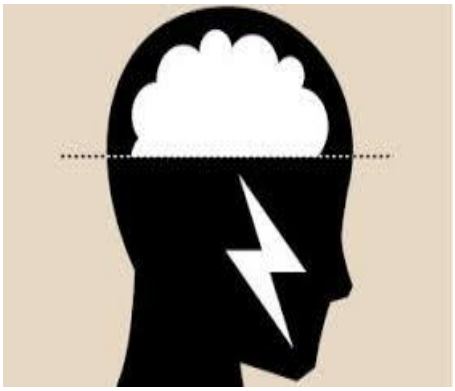
Barriers Faced by Innovating Firms

58%

of non-exporting firms faced major financial barriers while trying to perform technological innovations. While, 27% of exporting firms faced major financial barriers while trying to innovate.

38%

of non-exporting firms faced major barriers due to lack of innovation opportunities while trying to perform technological innovations. While, 30% of exporting firms faced lack of innovation opportunities as a major barrier while trying to innovate.



Sources of Funding Innovations Expenditures

91%

of the surveyed non-exporting firms reported that their innovation related expenditures were financed using their internal resources (equity funds). While, 73% of exporting firms reported that their innovation expenditures were financed by their own equity funds/internal resources.

Types of Innovations

Majority of exporting firms innovated in the areas of Business Model and Marketing, while a majority of non-exporting firms innovated in the areas of Business Model, Marketing and Technology

A majority of non-exporting firms innovated in the areas of Business Model (84%), Technology (79%), Marketing (79%), Process (73%) and Product (52%). While, exporting firms reported that they innovated in the areas of Business Model (70%), Technology (56%), Marketing (50%), Process (43%) and Product (23%).

Results of Innovation

90%

of surveyed exporting firms said that their revenues increased as a result of innovation. While, 62% of non-exporting firms that their revenues increased as the result of innovation.

87%

of surveyed exporting firms reported that quality of product improved as a result of innovation. While, only 50% of non-exporting firms said that their quality improved as a result of innovation.

37%

of surveyed exporting firms reported that their cost of production decreased as the result of innovation. While only 35% of non-exporting firms said that their cost of production decreased as the result of innovation.

50%

of both exporting and non-exporting firms faced resistance from employees while trying to introduce innovation.

87%

of surveyed exporting firms reported that their cost of production decreased as a result of innovation. While only 35% of non-exporting firms said that their cost of production decreased as a result of innovation.

12%

of surveyed non-exporting firms lowered their prices as a result of innovation. While, only 5% of exporting firms lowered their prices as a result of innovation.

Drivers of Innovation

50%

of exporting firms reported pressure to increase quality was one of the most significant drivers of initiating innovation followed by the desire to increase market share (30%). Whereas, 41% of non-exporting firms reported that pressure to increase quality (41%) followed by desire for market leadership (24%) were the greatest drivers for initiating innovations.

Impact of Innovation on Profitability

49%

of the surveyed non-exporting firms and 43% of the exporting firms reported that product innovation followed by innovations in technology/equipment (34%) resulted in higher profits.

INTRODUCTION

Productivity growth is critical for long term economic growth. A critical component of productivity growth is innovation and this usually entails significant hurdles in developing countries. The Innovation and Technology Centre (ITC) of the Lahore School of Economics conducted its second survey of light engineering firms across 4 cities in Punjab including Lahore, Sialkot, Gujrat and Gujranwala in the year 2019/2020 to observe the growing trends in the field of innovation and technology upgradation in this sector. The purpose of this survey was to observe the extent, quality and impact of innovation activities on the performance and profitability of the innovating firms. The survey also looked at the barriers faced by the innovating firms in this sector across 4 different cities.

The data was collected from 138 firms involved in light engineering during the period from October 2019 to May 2020. The firms were also characterized in terms of exporters and non-exporters in order to see the innovative behavior of each.

Some basic information on the surveyed firms is given below:

Sample Statistics:

Category	Total Firms	Small	Medium	Large
Number of firms	138 (100%)	77 (56%)	50 (36%)	11 (8%)
Exporters	30 (22%)	11 (37%)	14 (47%)	5 (17%)
Non-exporter	108 (78%)	66 (61%)	36 (33%)	6 (6%)
Innovating firms	135 (98%)	76 (56%)	48 (36%)	11 (8%)
Non-innovating firms	3 (2%)	1 (33%)	2 (67%)	0 (0%)

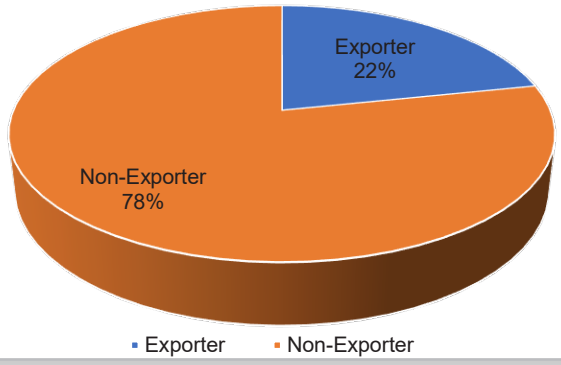
1. REVIEW OF TECHNOLOGICAL INNOVATIONS

1.1 Exporter or Non- Exporter

A majority of firms in the sample were not exporting their output abroad, while 22% of firms in the sample were exporters.

Figure 1.1: In the sample of 138 firms, almost 22% of firms were exporting some of their output abroad while the remaining 78% were non-exporters

Is your firm an exporter of products?

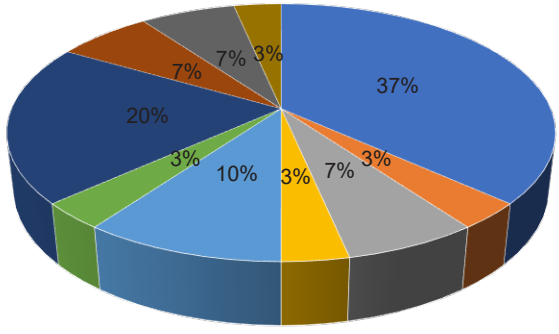


1.2 Percentage of Output Exported:

When asked about the %age of output exported, almost half of the exporting firms were selling 50% -100% of their output abroad.

Figure 1.2: 37% of total exporting firms reported that they were exporting 100% of their output abroad

If the firm exports, what is the %age of output exported?

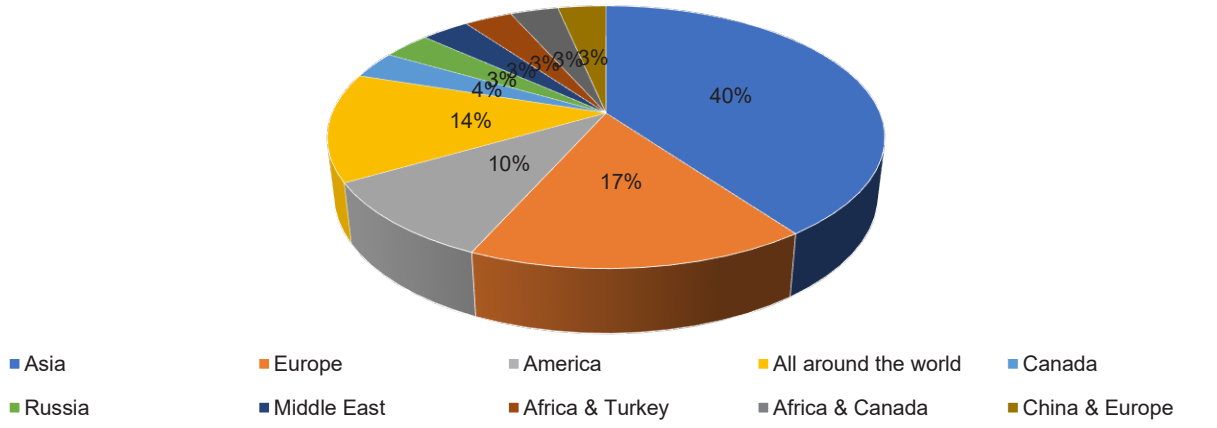


1.3 Export Destinations:

When asked about the export destinations, a majority of exporting firms in the sample were exporting their output to Asia followed by Europe.

Figure 1.3: Almost 40% of firms were exporting their output to Asia, followed by Europe (17%) and America (10%)

Regions where firms were exporting their output



1.4 Size of Firms:

When asked about the size of firms in the sample, a majority of exporting firms were medium sized firms, while a majority of non-exporting firms were small sized firms.

Figure 1.4a: Almost half of the exporting firms were medium sized

What was the approximate number of employees in your firm?

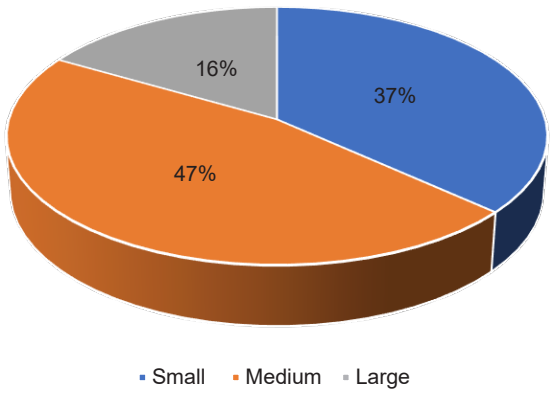
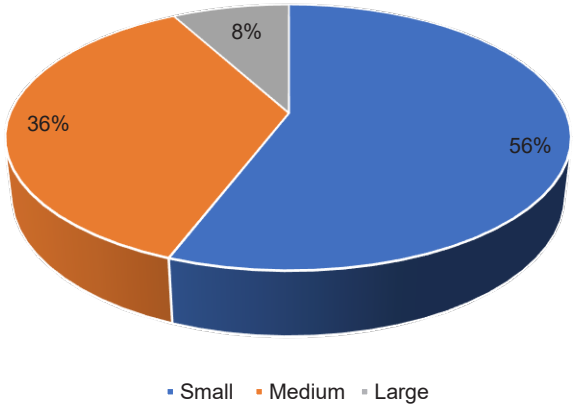


Figure 1.4b: More than half of the non-exporting firms in the sample were small sized firms

What was the approximate number of employees in your firm?



1.5 Purchased New Machinery

A simple measure of innovation is the purchase of machinery. Turning to the purchase of machinery by firms, it is useful to see what percentage of firms purchased new machinery:

All exported firms in the sample said that they innovated i.e. purchased new machinery and/or software in the last 10 years. Whereas, only 3% of non-exporting firms did not purchase new machinery during the last 10 years.

Figure 1.5 a: 100% of exporting firms said they have innovated i.e. purchased new machinery/equipment in the last 10 years

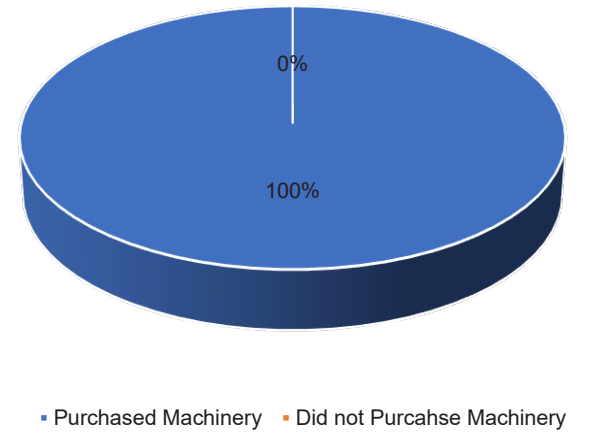
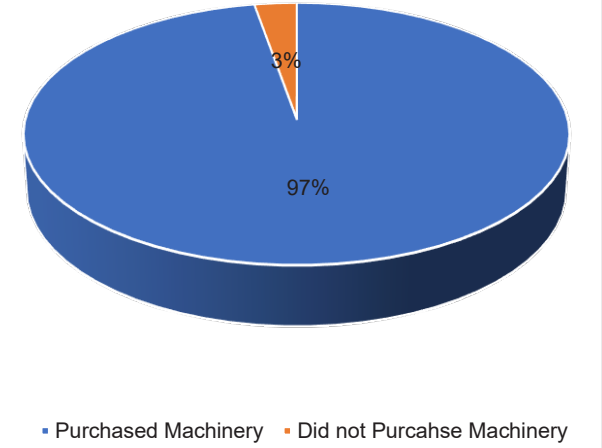


Figure 1.5 b: 97% of non-exporting firms said that they purchased new machinery/ equipment in the last 10 years



1.6 Most Recently Acquired Machinery/Equipment/ Software

When asked about the names of four most recently acquired equipment/software, a majority of non-exporting firms (22 firms) purchased Leth machines, whereas as majority of exporting firms (9 firms) purchased Verma machines/Drill machines. Also, the second most purchased machineries purchased by non-exporting firms (20 firms) was Kherald machines, while the second most purchased machinery by exporting firms (4 firms) was Verma machines/Drill machines.

Figure 1.6 b: Majority of Non-Exporting Firms bought Leth Machines, Kherald Machines and Verma Machines/Drill Machines

4 recently acquired machines by non-exporting firms?

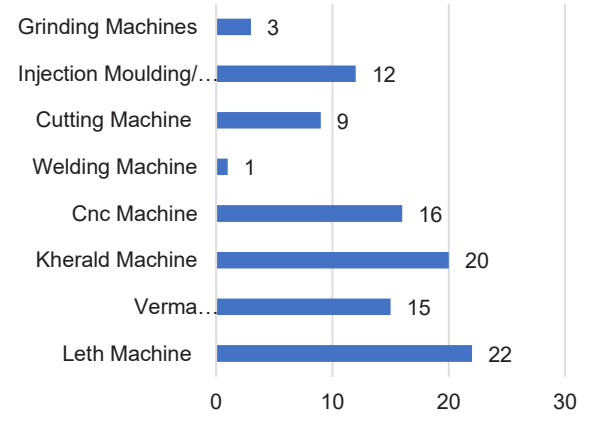
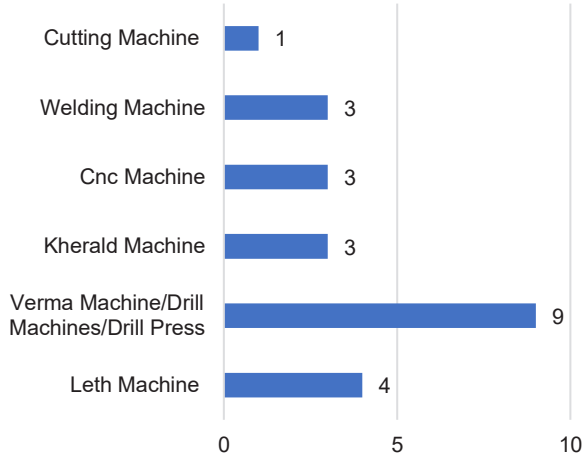


Figure 1.6 a: Majority of Exporting Firms bought Verma Machines/Drill Machines and Leth Machines

4 recently acquired machines by exporting firms?



1.7 Purchased Locally or from Abroad

More than half of the exporting firms claimed to have purchased the technology/equipment from abroad (65%). Whereas, a majority of non-exporting firms (53%) purchased locally made machinery.

Figure 1.7 a: A majority of exporting firms (65%) bought their last four technologies/ equipments from abroad

Where did you purchase the last 4 technologies from?

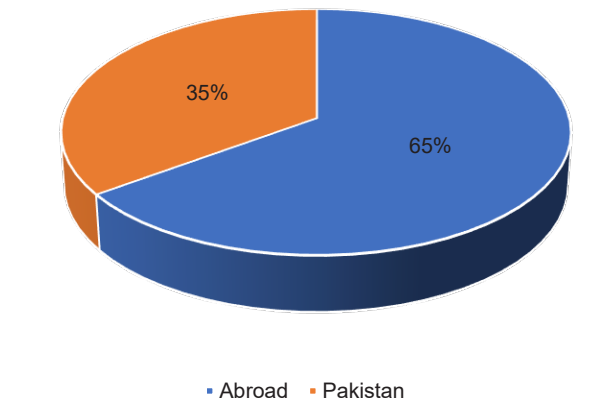
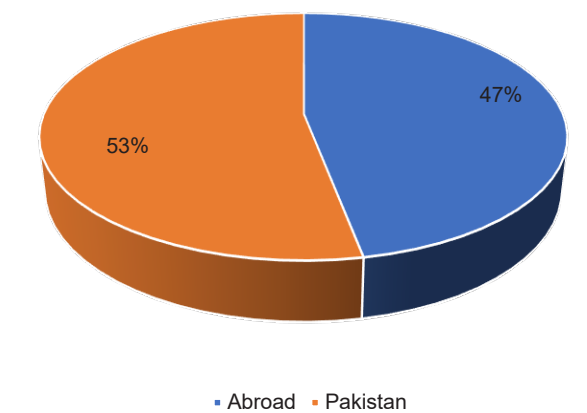


Figure 1.7 b: A majority of non-exporting firms (53%) bought their last four technologies from Pakistan

Where did you purchase the last 4 technologies from?



1.8 Age of Technology

The timing of innovation is also important. In our sample, 47% of exporting firms innovated more recently in the last 1-5 years. Whereas, 48% of the non-exporting firms innovated in the last 5-10 years.

Figure 1.8 a: A majoity of exporting firms bought their latest equipment /technology recently between 1-5 years ago

How many years ago did you purchase your last 4 Equipments/technologies?

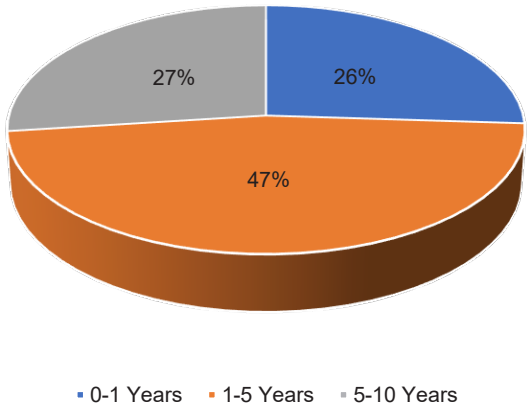
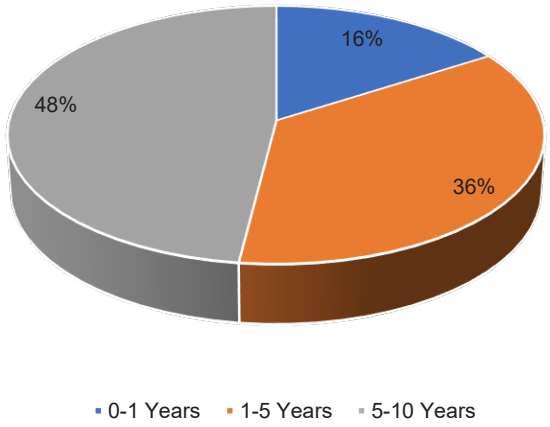


Figure 1.8b: A majority of non-exporting firms bought their latest technology during the last 5-10 year

How many year ago did you purchase your last 4 equipment/technologies?



1.9 State of the Art or Already Established

In our sample, a significant percentage of non-exporting firms (72%) reported that adopted already established machinery/software. Almost half of exporting firms (45%) adopted state of the art technologies/equipment.

Figure 1.9 a: Almot half of exporting firms adopted state of the art technologies

Was the technology state of the art or already established? (top 4 technologies)

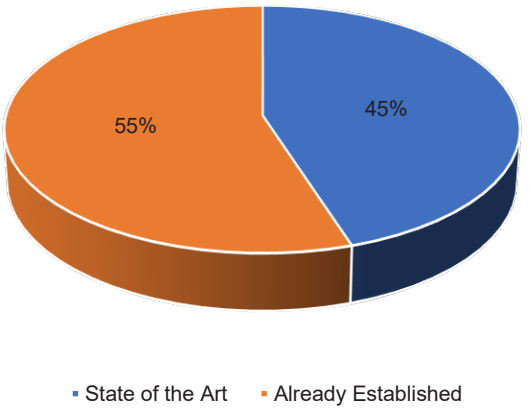
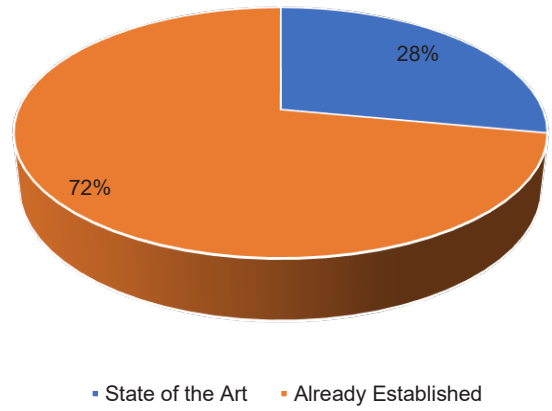


Figure 1.9b: 72% of non-exporting firms adopted already established technologies

Was the technology state of the art or already established? (top 4 technologies)



1.10 Created vs Bought technology

When firms were asked if they preferred making or buying new innovations, a majority of exporting firms (78%) reported that preferred buying innovation, while, only 15% of exporting firms preferred making innovations. Looking at the non-exporting firms, 63% of firms preferred buying already established technologies, while 13% of firms preferred making innovations.

Figure 1.10 a: 78% of exporting firms reported that they preferred buying already established technologies/ softwares

Do you prefer buying or developing your own innovations?

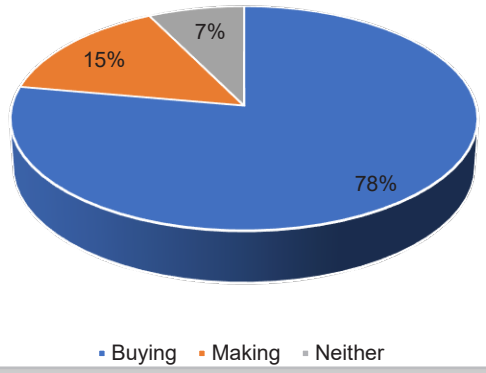
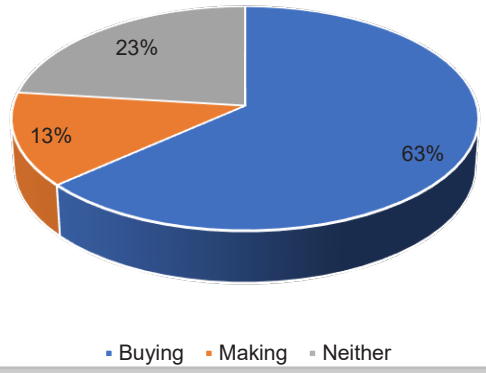


Figure 1.10 b: 63% of non-exporting firms reported that they preferred buying already established technologies/ softwares

Do you prefer buying or developing your own innovations?



1.11 Planning to Introduce New Technology

The survey also analyzed the future innovation plans of firms. Comparatively, a greater percentage of exporting firms (50%) claimed that they were planning to introduce new technology again in the next 12 months. While, 38% of non-exporting firms responded that they were not planning to innovate in the next 12 months.

Figure 1.11a: Half of exporting firm were planning to introduce new technology in the next 12 months

Are you planning to introduce new technology in your firm in the next 12 months?

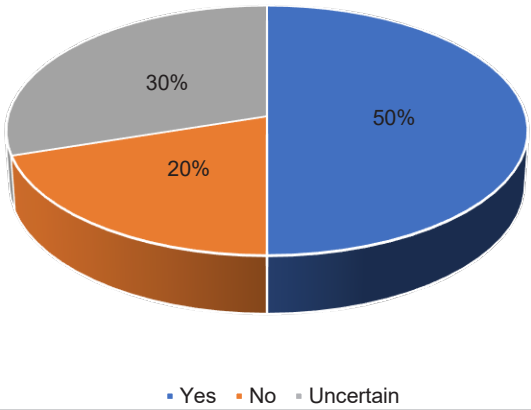
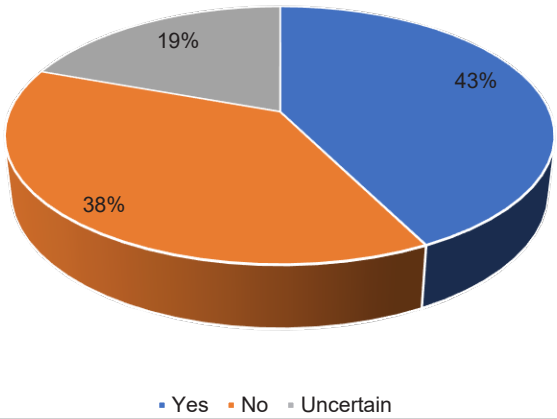


Figure 1.11 b: 43% of non-exporting firms were planning to introduce new technologies in the next 12 months

Are you planning to introduce new technology in your firm in the next 12 months?



2. BARRIERS TO TECHNOLOGY ADOPTIONS

The firms were asked to rate the barrier faced in the attempt to adopt new technologies, equipment and or software upgradation. These firms were particularly asked how lack of financing, lack of innovation opportunities, retraining employees and resistance to change affect their technology adoption. The overall analysis of all these barriers revealed that lack of financing was the greatest barrier faced by both exporting and non-exporting firms followed by resistance to change and lack of innovation opportunities faced by non-exporting firms and lack of innovation opportunities faced by exporting firms.

Figure 2a: Lack of financing, followed by lack of innovation opportunities were the greatest barriers for exporting firms

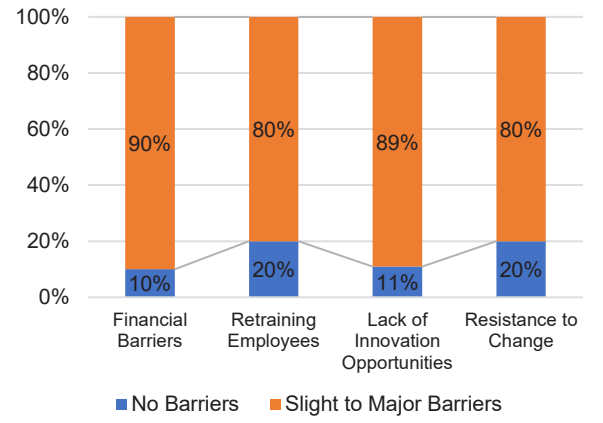
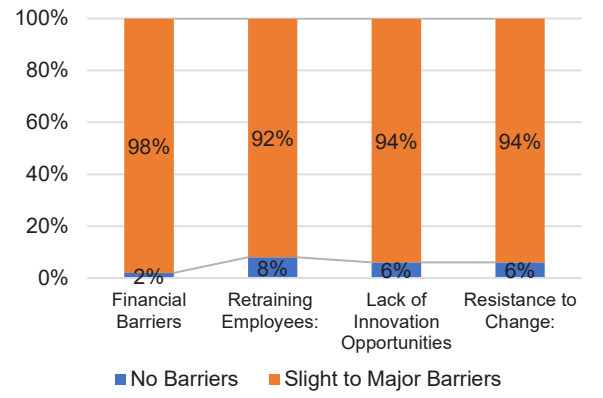


Figure 2b: Lack of financing, followed by resistance to change and lack of innovation opportunities were the greatest barriers faced by non-exporting firms



2.1 Financial Barriers

Firms facing obstacles to technology adoption tend to be less important. In our sample, when asked about the barriers faced while trying to perform technological innovations, one of the greatest barriers faced by the firms was lack of financing. However, lack of financing was reported as a major barrier by 58% of non-exporting firms, while only 27% of exporting firms rated it as a major barrier while trying to innovate.

Figure 2.1 a: 27% of exporting faced major financial barriers while trying to innovate

How would you rate Financial Barriers while trying to perform technological innovations? (1 being no barrier and 5 being major barriers)

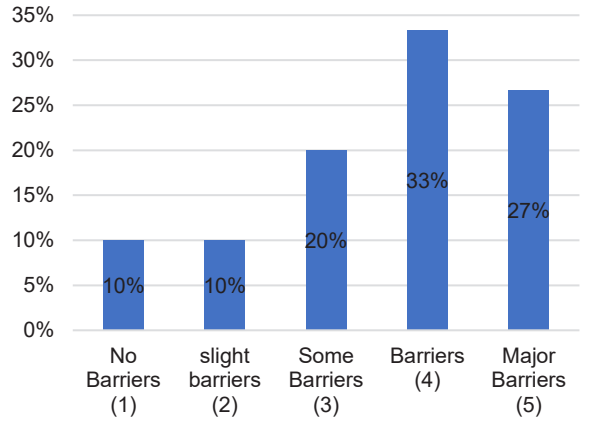
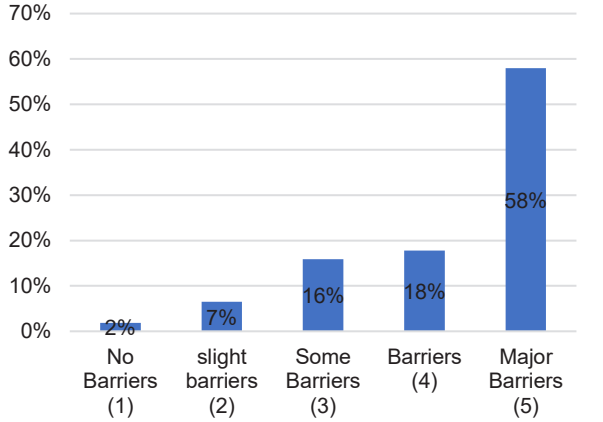


Figure 2.1 b: 58% of non-exporting firms faced major financial barriers while trying to innovate

How would you rate 'financial barriers' while trying to perform technological innovations? (1 being no barrier and 5 being major barriers)



2.2 Lack of Innovation Opportunities

The second greatest barrier faced by both the exporting and non-exporting firms while trying to perform technological innovations opportunities was lack of innovation

Figure 2.2 a: 30% of exporting firms faced lack of innovation opportunities as a major barrier to innovate

How would you rate Lack of Innovation Opportunities, while trying to perform technological innovations?

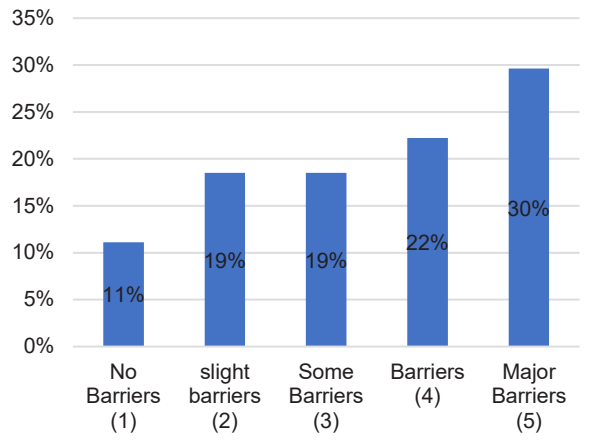
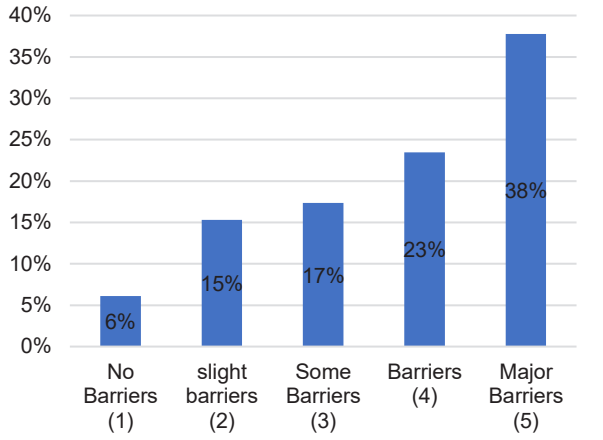


Figure 2.2 b: 38% of non-exporting firms faced lack of innovation opportunities as a major barrier while trying to innovate

How would you rate 'lack of innovation opportunities, while trying to perform technological innovations



2.3 Resistance to Change in Workplace

Comparatively a greater percentage non-exporting firms rated resistance to change as a major barrier as compared to non-exporting firms.

Figure 2.3: 10% of exporting firms faced resistance to change as a major barrier while trying to innovate

How would you rate Resistance to Change while trying to perform technological innovations?

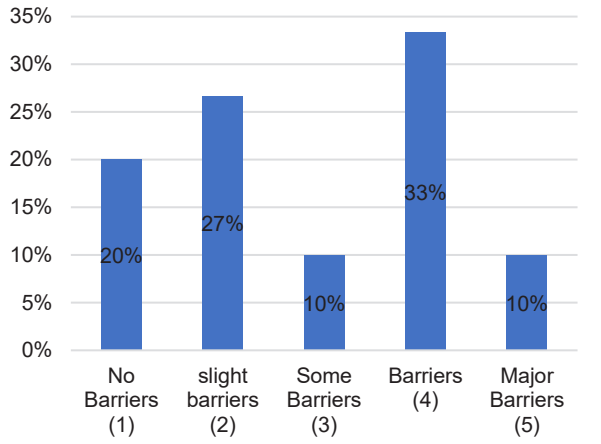
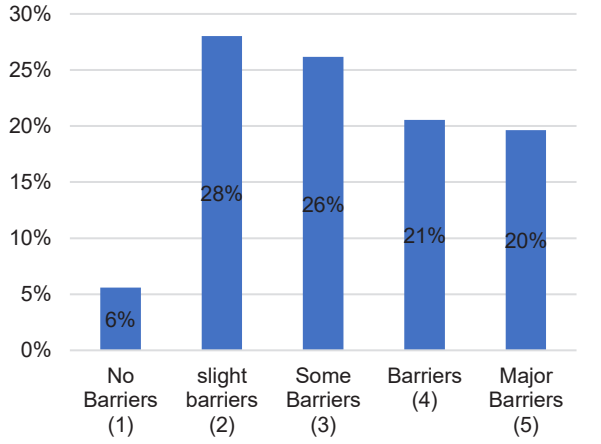


Figure 2.3 b: 20% of non-exporting firms faced resistance to change as major barrier while trying to innovate

How would you rate 'resistance to change, while trying to perform technological innovations?



2.4 Retraining of Employees

Comparatively a greater percentage of non-exporting firms rated retraining employees as a major barrier while trying to perform technological innovations.

Figure 2.4 a: 13% of exporting firms rated retraining employees as a major barrier while trying to innovate

How would you rate Retraining Employees while trying to innovate? (1 being no barrier and 5 being major barrier)

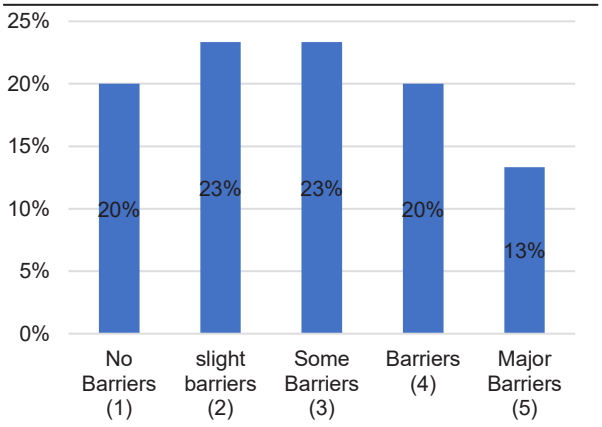
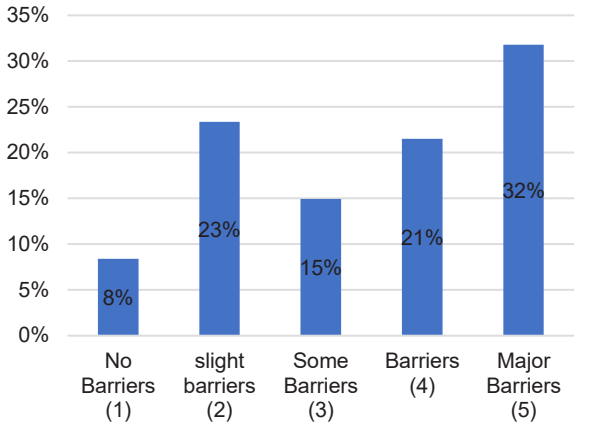


Figure 2.4 b: 32% of non-exporting firms rated retraining employees as a major barrier while trying to innovate

How would you rate 'retraining employees' while trying to perform technological innovations?



3. COMPETITIVE INNOVATIONS

In this section of the survey, both exporting and non-exporting firms were analysed on competitive innovations as compared to their peers.

In this part, the innovating firms were asked about their major areas of innovations, who were responsible for these technological developments, their sources of funding to finance their innovation activities and drivers of initiating innovations

3.1 Frequency of Different Innovations

When asked about how often the firms innovated in different types of innovation in the last 3 years, non-exporting firms reported that they innovated in the areas of Business Model (84%), Technology (79%), Marketing (79%), Process (73%) and Product (52%). While, exporting firms reported that they innovated in the areas of Business Model (70%), Technology (56%), Marketing (50%), Process (43%) and Product (23%).

Figure 3.1a: 70% of exporting firms said that they innovated in the area of business model at least some of the time

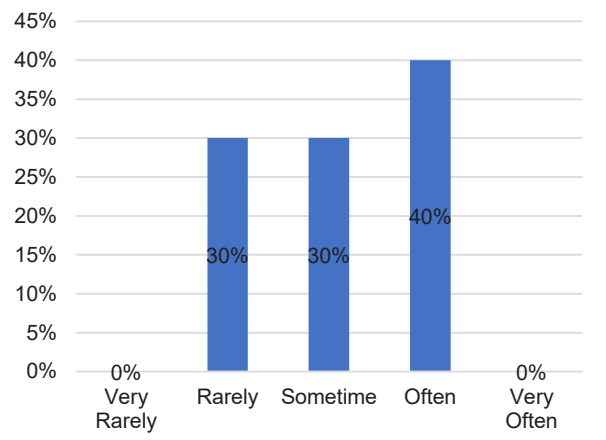
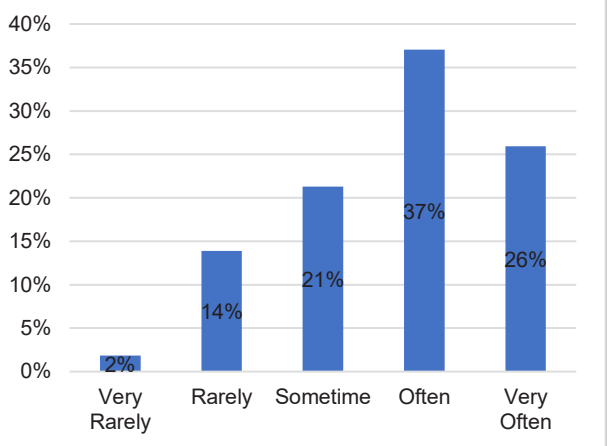


Figure 3.1 b: 84% of non-exporting firms said that they innovated in the area of business model at least some of the time



When asked about how often they innovated in the area of business model, comparatively a greater percentage of non-exporting firms as compared to exporting firms reported that they innovated (sometimes, often and very often) in this type of innovation.

Figure 3.1 c: 50% of the exporting firms innovated in the area of marketing at least some of the time

How often did you innovate in the area of marketing over the last three years?

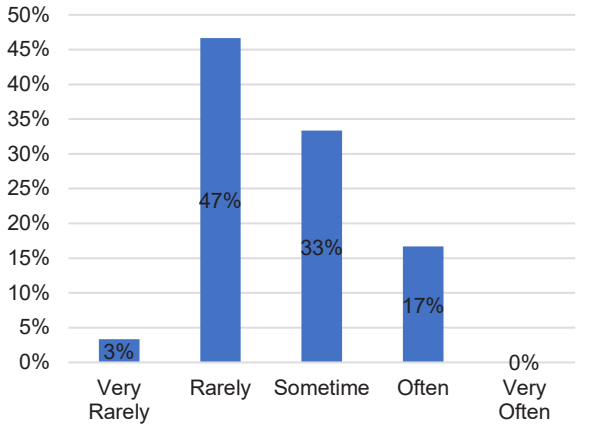
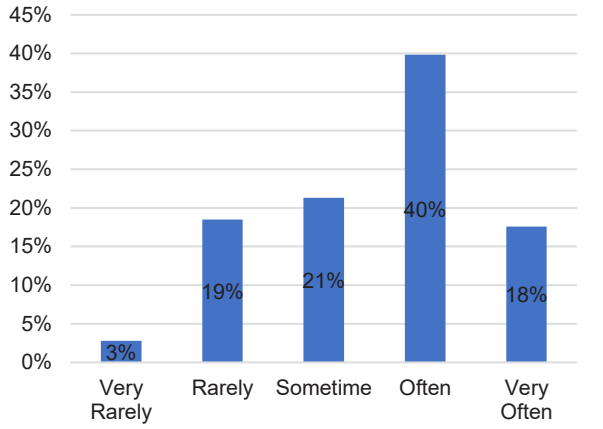


Figure 3.1 d: 79% of non-exporting firms innovated in the area of marketing at least some of the time

How often did you innovate in the area of Marketing over the last 3 years?



When asked about how often they innovated in the area of marketing, comparatively a greater percentage of non-exporting firms as compared to exporting firms reported that they innovated (sometimes, often and very often) in this type of innovation.

Figure 3.1 e: 43% of the exporting firms innovated in the are of process at least some of the time

How often did you innovate in the area of process over the last three years?

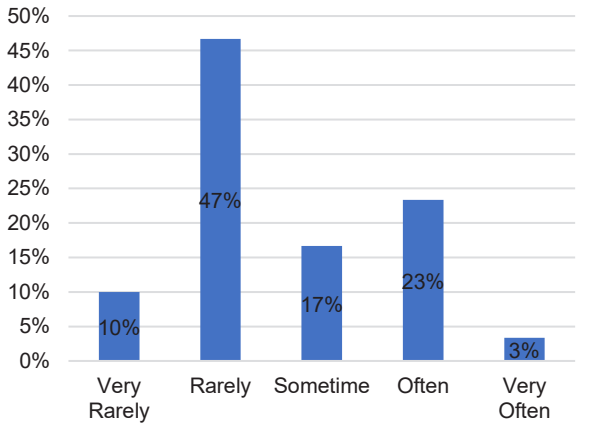
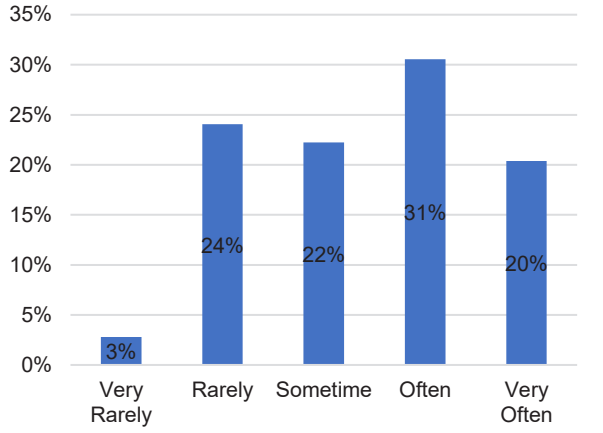


Figure 3.1 f: 73% of non-exporting firm innovated in the area of process at least some of the time

How often did you innovate in the area of process over the last 3 years?



When asked about how often they innovated in the area of process, comparatively a greater percentage of non-exporting firms as compared to exporting firms reported that they innovated (sometimes, often and very often) in this type of innovation.

Figure 3.1 g : 56% of exporting firms innovated in the area of technology at least some of the time

How often did you innovate in the area of technology / equipment over the last three years?

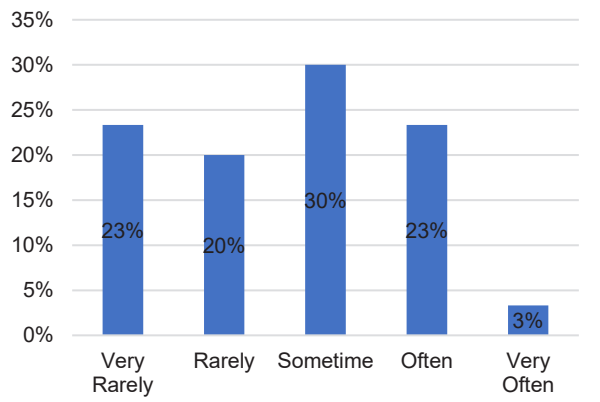
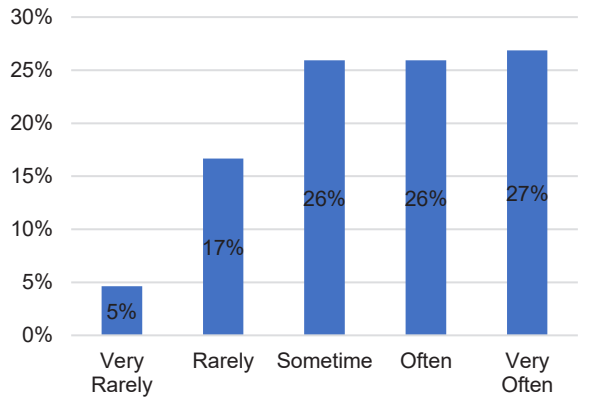


Figure 3.1 f: 79% of non-exporting firms innovated in the areas of technology at least some of the time

How often did you innovate in the area of technology/ equipment over the last 3 years?



When asked about how often they innovated in the area of technology, comparatively a greater percentage of non-exporting firms as compared to exporting firms reported that they innovated (sometimes, often and very often) in this type of innovation.

Figure 3.1 e: Only 23% of exporting firms innovated in the area of product at least some of the time

How often did you innovate in the area of product over the last three years?

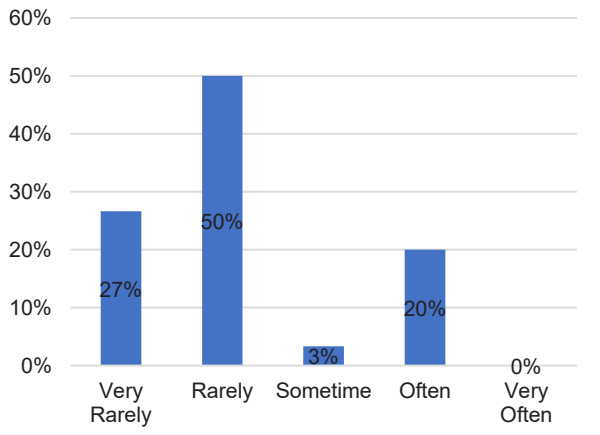
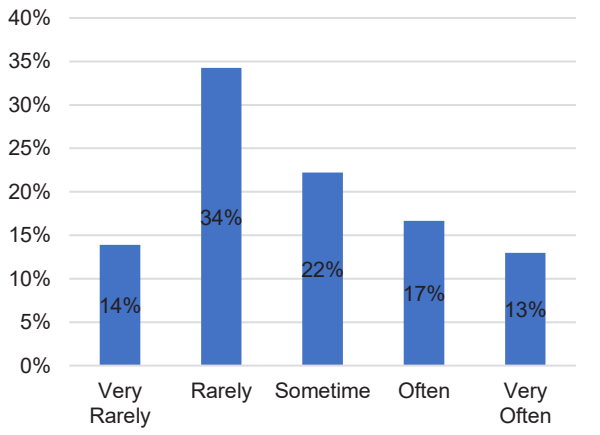


Figure 3.1 f: 52% of non-exporting firms innovated in the area of product at least some of the time

How often did you innovate in the area of product over the last 3 years?



When asked about how often they innovated in the area of product, comparatively a greater percentage of non-exporting firms as compared to exporting firms reported that they innovated (sometimes, often and very often) in this type of innovation.

3.2 Collaborations for New Technology

In response to the question about who was responsible for introducing new technologies, a majority of exporting firms reported that their organization with other organizations/institutions were responsible for these developments. Whereas, a majority of non-exporting firms said that they initiated innovations themselves.

Figure 3.2: A majority of exporting firms themselves alongwith other organizations/ instituitions were responsible for these developments

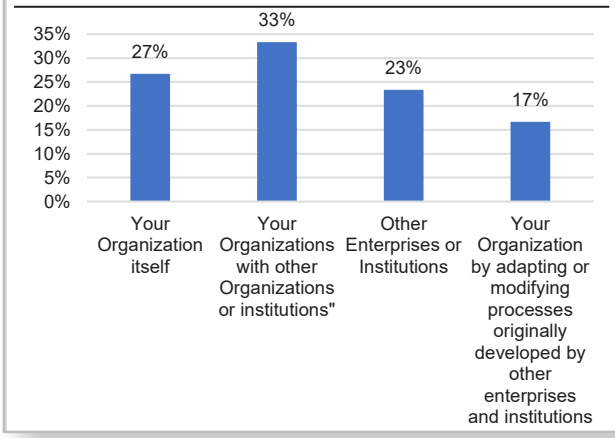
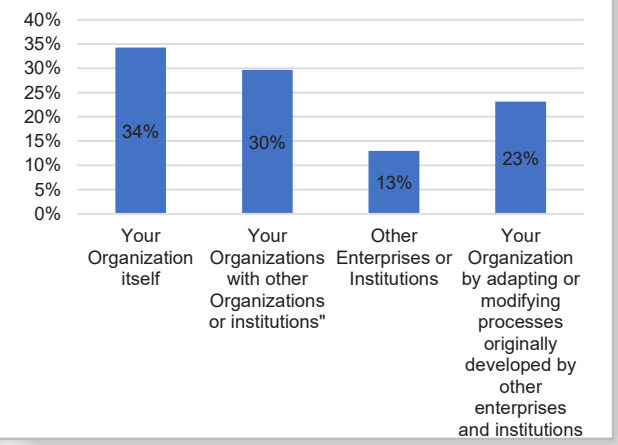


Figure 3.2 b: A majority of non-exporting firms themselves were responsible for innovation developments



3.3 Sources of Innovation Funding

Funding of innovation can be a major issue for firms. In our sample, when asked about the sources of funding for innovations, a larger percentage of both exporting and non-exporting firms said that their innovation activities were financed by their internal resources (equity funds) only.

Figure 3.3 a: 73%of exporting firms used their internal resources to fund their innovation expenditures

Which sources of funding do you rely on for your innovation expenditure?

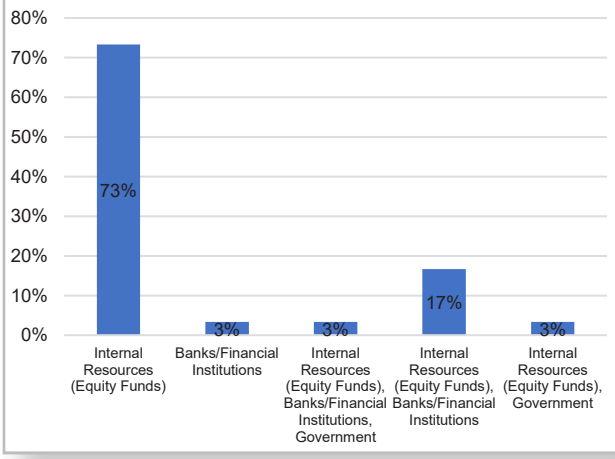
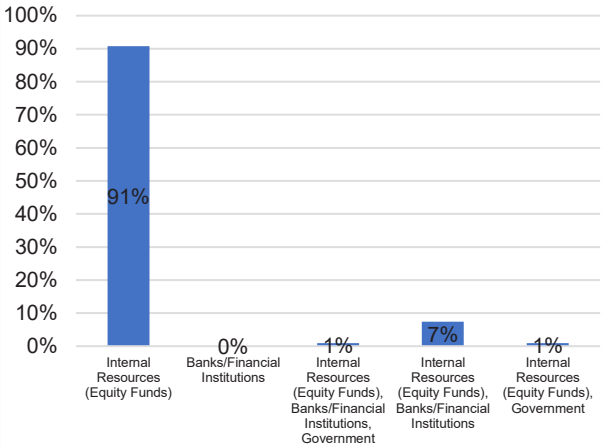


Figure 3.3 b: 91% of the non-exporting firms used their internal resources to fund their innovation expenditures

Which sources of funding do you rely on for your innovation expenditure?



3.4 Reasons for Innovating

The incentives to innovate are important for firms. In our survey, when asked about the most significant driving innovation in their industry, a majority of exporting firms (50%) reported pressure to increase quality was one of the most significant drivers of initiating innovation followed by the desire to increase market share (30%). Whereas, a majority of non-exporting firms also pointed pressure to increase quality (41%) as the major driver of initiating innovation followed by the desire for market leadership (24%).

Figure 3.4 a: Pressure to improve quality and to gain market share were the major reasons for innovation for exporting firms

What factor is most significant for your industry as a driver for initiating innovation?

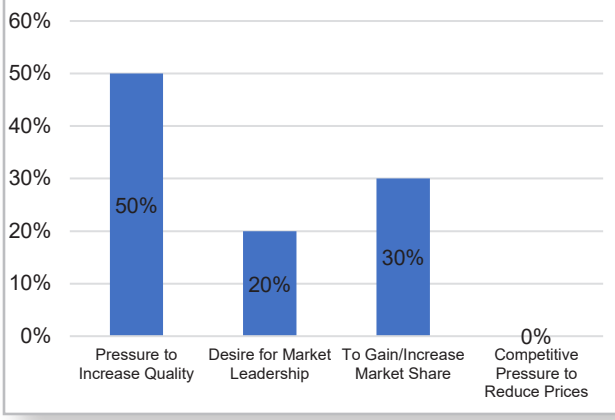
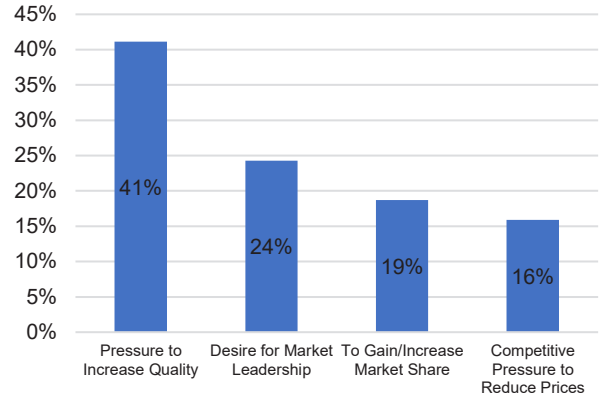


Figure 3.4 b: Pressure to increase quality and desire for market leadership were the major reasons to innovate for the non-exporting firms

What factor is most significant for your industry as a driver for initiating innovation?



4. RESULTS OF INNOVATION

In this section of the survey, the innovating firms were asked about the impact of their innovation related activities on their revenues, costs of production, quality of product and prices.

4.1 Impact on Revenues

It is also important to understand the impact of firm level innovation. In our survey, in response to the question asked about the impact of firm level innovations on firm's performance, a greater percentage of exporting firms claimed that innovation led to increase in revenues.

Figure 4.1 a: 90% of exporting firms claimed that their revenues increased as a result of innovation

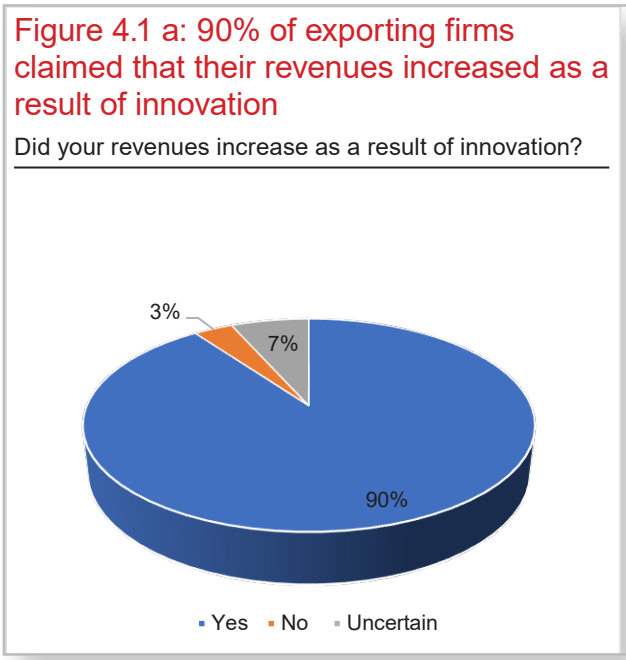
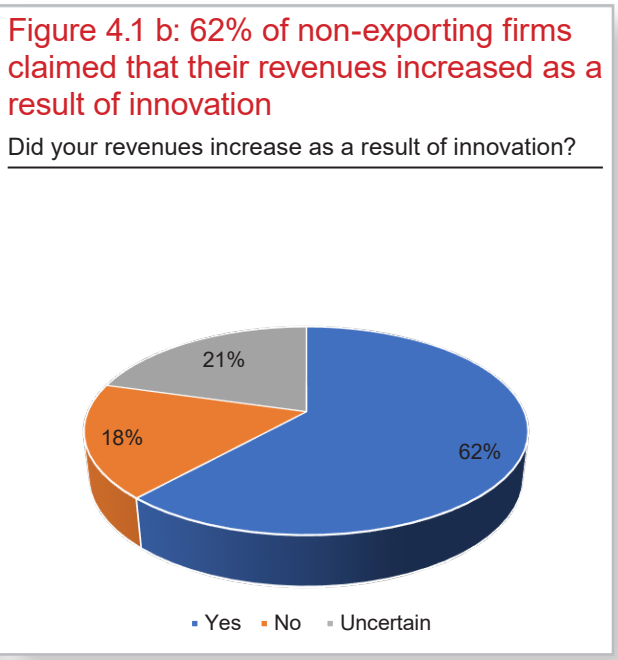


Figure 4.1 b: 62% of non-exporting firms claimed that their revenues increased as a result of innovation



4.2 Impact on Cost of Production

In response to the question asked about the impact of firm level innovations on firm's cost of production, only 37% of exporting firms claimed that innovation resulted in reduced cost of production, while only 35% of non- exporting firms (52%) reported that cost of production decreased as the result of innovation.

Figure 4.2 a: only 37% of exporting firms revealed that their cost of production decreased as a the result of innovation

Did cost of production reduce as a result of innovation?

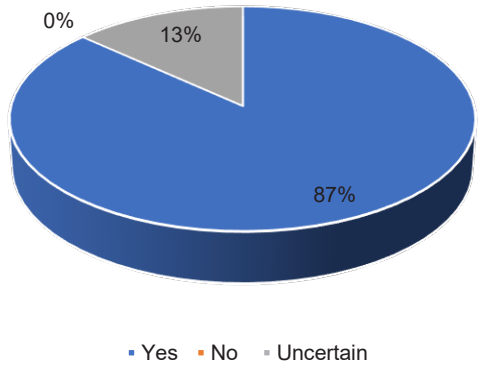
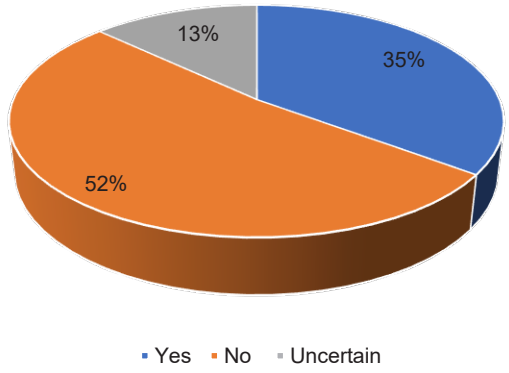


Figure 4.2 b: Only 35% of non-exporting firms revealed that their cost of production decreased as the result of innovation

Did cost of production reduce as a result of innovation?



4.3 Impact on the Quality of Output

When asked about the impact of firm level innovations on firm's quality of output, a greater percentage of exporting firms (87%) claimed that their quality of output improved as the result of innovation, while only 50% non-exporting firms experienced an improvement in their quality of output as the result of innovation.

Figure 4.3 a: 87% of exporting firms said that the quality of output improved as the result of innovation

Did your quality of output increase as a result of innovation?

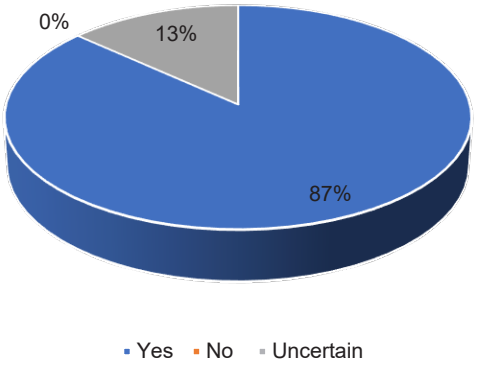
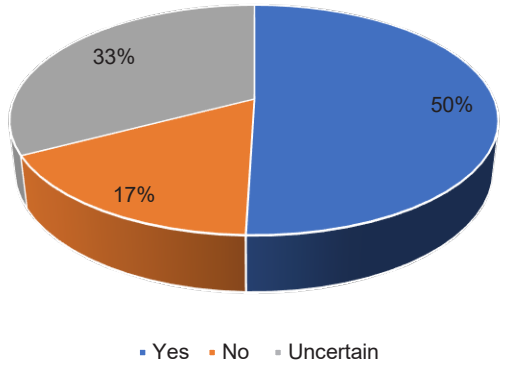


Figure 4.3 b: Only 50% of non-exporting firms said that their quality improved as the result of innovation

Did your quality of output increase as a result of innovation?



4.4 Impact on Prices

When asked if innovation resulted in lowering prices of their products, only 7% of exporting firms said yes, they lowered their prices and 12% of non-exporting firms said that they lowered their prices as the result of innovation.

Figure 4.4 a: only 7% of exporting firms said that they lowered their prices as the result of innovation

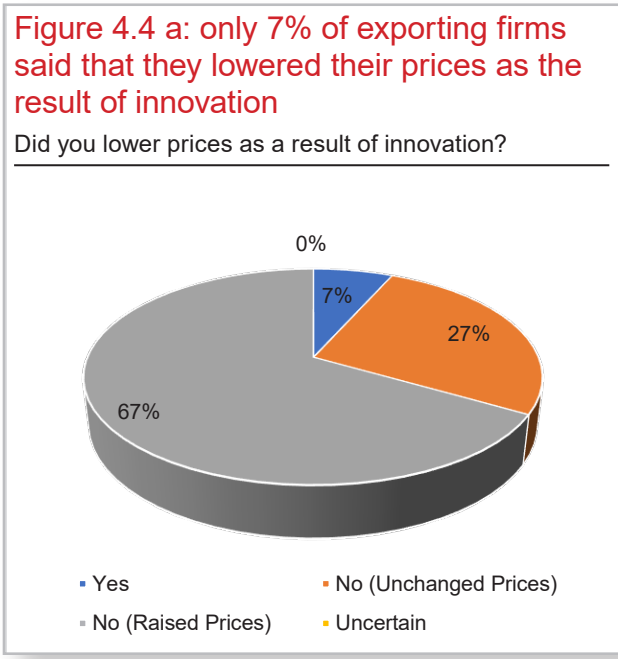
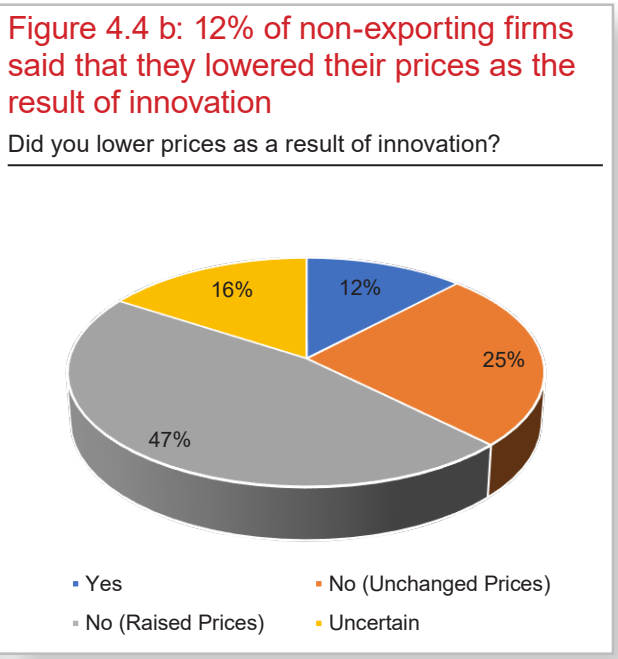


Figure 4.4 b: 12% of non-exporting firms said that they lowered their prices as the result of innovation



4.5 Impact on Retraining Employees

When asked if the firms had to retrain their employees as the result of innovation, 73% of exporting firms and 53% of non-exporting firms in the sample reported that their employed had to be retrained as the result of innovation.

Figure 4.5 a: 73% of exporting firms said that they have to retrain their employees as the result of innovation

Did you employees have to be retrained as a result of innovation?

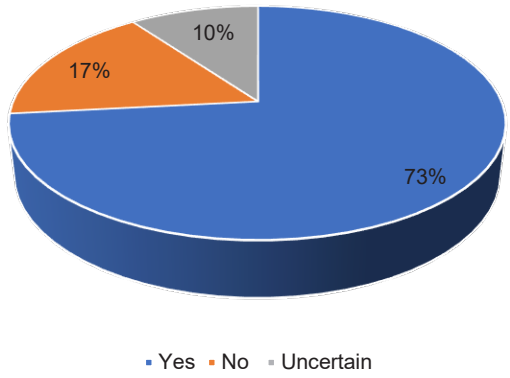
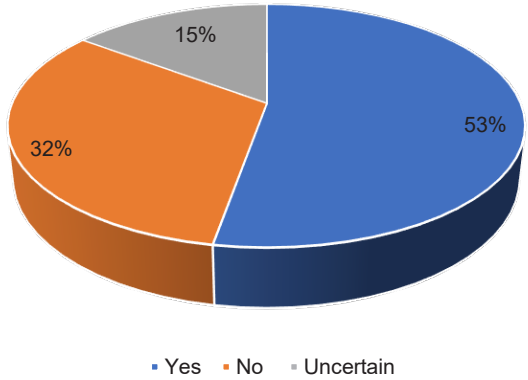


Figure 4.5 b: Only 53% of non-exporting firms said that they have to retrain employees as the result of innovation

Did you have to retrain employees in order to adopt the innovations?



4.6 Impact on Resistance from Employees While Introducing Innovation

When the surveyed firms were asked if they faced any resistance from their employees while trying to introduce innovation, almost half of exporting and non-exporting firms reported that they did face resistance from their employees while trying to introduce innovations in their firms.

Figure 4.6 a: Half of exporting firms said that faced resistance from employees the result of innovation

Did you face any resistance from employees while trying to introduce innovation?

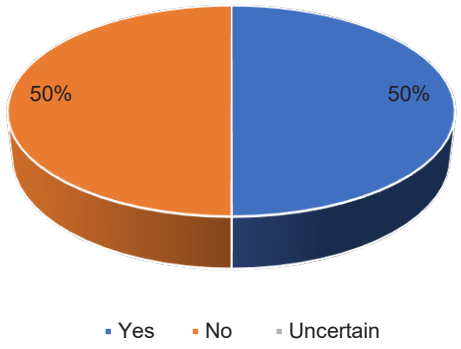
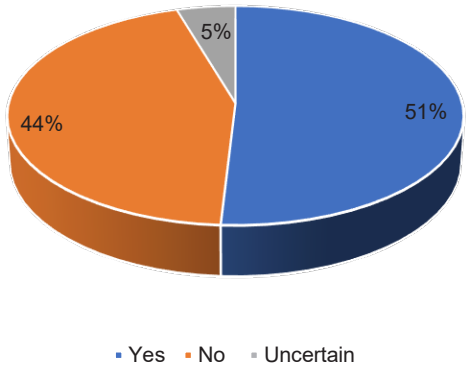


Figure 4.6 b:Half of non-exporting firms said that they faced resistance from employees as the result of innovation

Did you face resistance from your employees when tried to introduce innovation?



5. IMPACT OF DIFFERENT TYPES OF INNOVATIONS ON FIRM PROFITS

In this section of the survey, the innovating firms were asked how different types of innovations in product, process, technology, marketing and business model had the greatest impact on their profitability.

When asked about the impact of various types of innovations on firm's profits, a majority of exporting firms reported that innovation in product (43%) and innovation in technology/equipment (33%) resulted in higher profits. Similarly, a majority of non-exporting firms reported that innovation in product (49%), followed by innovation in technology/equipment (34%) led to greatest increase in profitability.

Figure 5 a: A majority of exporting firms reported that product innovation followed by innovation in technology/equipment led to greatest increase in profitability

Which innovations had most impact on firm's profitability over the 3 years?

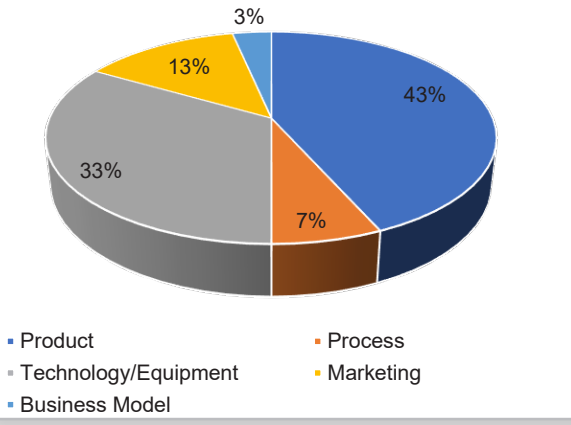
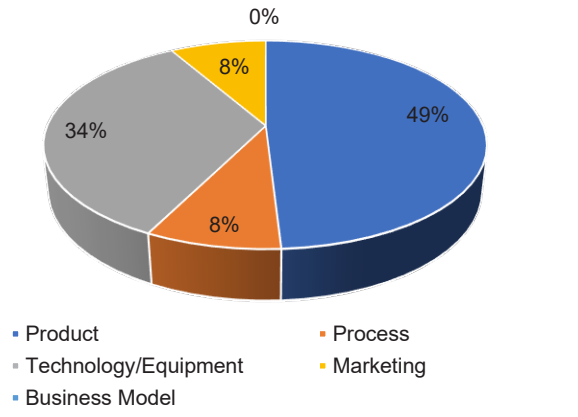


Figure 5 b: A majority of non-exporting firms reported that product innovation, followed by technology innovation led to greatest increase in profitability

Which innovations had most impact on firm's profitability over the last 3 years?



6. CONCLUSION

The Innovation and Technology Centre (ITC) of the Lahore School of Economics conducted a survey in 2019/2020 to observe the growing trends in innovation and technology upgradation in the exporting and non-exporting firms from the light engineering sector across 4 different cities in Punjab including Lahore, Gujrat, Gujranwala and Sialkot. The purpose of this survey was to observe the extent, quality and impact of innovation activities on the performance and profitability of the innovating exporting and non-exporting firms. The survey also looked at the barriers faced by the innovating exporting and non-exporting firms in this sector. The data consisted of 138 firms, 30 exporting and 108 non-exporting firms, collected during the period of October 2019 to May 2020. In the surveyed exporting firms, half of the firms were selling 50% to 100% of their output abroad, with majority of them exporting to Asia followed by Europe.

Data analysis of surveyed firms revealed that most of the exporting firms were medium sized and non-exporting firms were small sized firms, with majority of them innovated i.e. purchased new machinery/equipment. Looking at the vintage of technologies, a majority of exporting firms innovated more recently during the last 1-5 years while the majority of non-exporting firms innovated between 5-10 years ago. Also, the data revealed that a majority of exporting firms had purchased their last 4 innovations from abroad, whereas, a majority of non-exporting firms bought their last 4 innovation from Pakistan. A majority of both exporting and non-exporting firms said that the major source of funding for their innovations related activities was utilizing their own internal resources (Equity). The data also revealed that a large number of exporting firms innovated in the areas of business model and marketing, while a greater number of non-exporting firms exported innovated in the areas of business model, marketing and technology.

When asked about the impact of various types of innovations on firm profits, a majority of both exporting and non-exporting firms reported that innovation in products resulted in higher profits followed by innovation in technology/equipment.

The incentives to innovate are particularly important for firms. In our survey, when asked about the major drivers for initiating innovations, the majority of exporting firms reported pressure to improve quality and gaining market share were the greatest drivers, while the non-exporting firms reported pressure to increase quality and desire for market leadership as the greatest drivers for initiating innovations in their industry.

Looking at the results of innovation, most of surveyed exporting firms revealed that their revenues increased, cost of production did not decrease much quality of products improved, and need for retraining their employees increased as the result of innovation. Whereas, in case non-exporting firms, a majority of firms reported that their revenues increased, cost of production did not reduce much, quality of output improved as the result of innovation. Moreover, both exporting and non-exporting firms did not have to reduce their prices as the result of innovation.

The two greatest barriers faced by both exporting and non-exporting while trying to perform innovation were lack of financing and lack of innovation opportunities. Thus, it can be concluded that more incentives for innovations could be given by providing more sources of funding for the innovating firms in the form of aid from the government and with the assistance of financial institutions.

Lahore School of Economics

Innovation & Technology Centre

INNOVATION AND TECHNOLOGY IN EXPORTING AND NON-EXPORTING FIRMS FROM THE LIGHT ENGINEERING SECTOR IN LAHORE, SIALKOT, GUJRAT AND GUJRANWALA

2020

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