

INNOVATION AND TECHNOLOGY IN EXPORTING AND NON- EXPORTING FIRMS IN THE AUTOMOBILE SECTOR OF PAKISTAN

2022



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RESULTS AT A GLANCE

Who was surveyed?

25%

Of the surveyed firms were exporting their output abroad, while 75% of the surveyed firms were non-exporters.



50%

Of exporting firm in the sample were large-sized firms, while a majority of non-exporting firms were small-sized firms (53%).



85%

Of exporting firms were selling up to 40% of their output abroad.



53%

Of exporting firms reported that they were exporting their output to Asia, while 32% of firms reported that they exported their output to Europe.



Nature of Innovation

100%

Of exporting firms and 89% of non-exporting firms in the sample said that they innovated i.e. purchased new machinery/equipment in the last 10 years.



Innovation

62%

Of exporting firms innovated recently i.e. during the last 1-5 years. Similarly, 61% of non-exporting firms in the sample innovated between 5 and 10 years ago.



26%

Of the exporting firms bought CNC Machinery, which was most commonly bought machinery among exporting firms in the automobile sector. Whereas, 15% of non-exporting firms bought Kherad Machines which was the most common purchase among non-exporting firms.



Characteristics of Innovating firms

82%

Of surveyed exporting firms claimed to have purchased their technology/equipment from abroad. Whereas, half (55%) of non-exporting firms purchased their last four technologies from Pakistan.



44%

Of the exporting firms reported that adopted state of the art machinery/software and technologies. Whereas, 70% of the non-exporting firms adopted already established machinery/software and technologies.



40%

Of exporting firms reported that they preferred developing their own technology/innovation. Whereas, 62% of non-exporting firms reported that they preferred buying already established technologies.



65%

Of exporting firms claimed that they were planning to introduce a new technology in the next 12 months. While, only 49% of non-exporting firms were planning to introduce a new technology again in the next 12 months.



53%

Of exporting firms reported that their organization itself was responsible for introducing new innovations/technologies. Whereas, 48% of non-exporting firms reported that they initiated innovations themselves and also took help from other organizations/institutions.



Drivers of Innovation

47%

Of exporting firms reported that pressure to increase quality was one of the most significant drivers of initiating innovation, followed by the desire to gain/increase market share (26%). Whereas, 33% of non-exporting firms reported that pressure to increase quality, followed by desire for market leadership (20%) and competitive pressure to reduce prices (20%) were the greatest drivers for initiating innovations.



Barriers Faced by Innovating Firms

74%

Of surveyed exporting firms and 90% of non-exporting firms were significantly affected by financial barriers while trying to perform technological innovations.



68%

Of exporting firms said that the lack of opportunities was a second most important barrier faced by firms while trying to innovate. While, 90% of non-exporting firms said that the lack of opportunities was one of the most important barriers to innovation.



65%

Of exporting firms said that retraining employees to adopt to a new technology was the third most important barrier faced by firms while trying to innovate. While, 85% of non-exporting firms said that retraining employees was the fourth most important barrier to innovation.



53%

Of exporting firms said that resistance to change among employees to adopt new technology was the fourth most important barrier faced by firms while trying to innovate. While, 88% of non-exporting firms said that resistance to change among employees to adopt new technology was the third most important barrier faced by firms while trying to innovate.



Sources of Funding Innovations Expenditures

60%

Of exporting firms reported that their innovation related expenditures were financed using their internal resources (equity funds). While, 82% of non-exporting firms reported that their innovation expenditures were financed by their own equity funds/internal resources.



Types of Innovations

95%

Of exporting firms reported that they innovated in the areas of Process, 85% innovated in Technology/Equipment, 70% innovated in Product , 60% in Marketing and 61% innovated in Business Model at least some of the time. While, 80% of non-exporting firms reported that they innovated in the areas of Product, 65% in Process, 63% in Technology/Equipment, 50% in Marketing and 35% innovated in Business Model at least some of the time.



Results of Innovation

95%

Of exporting firms reported that quality of product improved as the result of innovation. While, 82% of non-exporting firms said that their quality of output improved as the result of innovation.



75%

Of exporting firms reported that they had to retrain their employees to adopt to new technologies. While, 82 % of non-exporting firms said that they had to retrain their employees as a result of innovation.



75%

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



63%

Of exporting firms reported that their cost of production decreased as a result of innovation. While only 39% of non-exporting firms said that their cost of production decreased as a result of innovation.



55%

Of surveyed exporting firms and 52% of non-exporting firms said that their prices remained unchanged as a result of innovation.



75%

Of exporting firms and 59% of non-exporting firms reported that they did not face resistance from employees while trying to introduce innovation.



Impact of Innovation on Profitability

30%

Of exporting firms reported that technological innovation and 39% of non-exporting firms reported that product innovation led to the greatest increase in profitability



INTRODUCTION

Productivity growth is critical for long term economic growth. A critical component of productivity growth is innovation and this is usually a major problem in developing countries.

The Innovation and Technology Centre (ITC) of the Lahore School of Economics conducted its third survey on the Automobile firms of Pakistan in the year 2020/2021. The purpose of the survey was to compare the growing trends in the field of innovation and technology upgradation among exporting and non-exporting firms from the automobile sector of Pakistan. The survey also aimed to observe the extent, quality and impact of innovation activities on the performance and profitability of the innovating firms. Moreover, the survey also looked at the barriers faced by the innovating exporting and non-exporting firms.

The data was collected from 77 firms from the automobile sector from the 6th July 2020 to the 12th of September, 2021. The firms were characterized in terms of exporters and non-exporters in order to see the innovative behavior in each category dealing in automobiles.

Some basic information on the surveyed firms is given below:

Sample Statistics:

Category	Total Firms	Innovators	Non-Innovators	Exporters	Non-Exporters	Small	Medium	Large
Number of firms	77 (100%)	71 (92%)	6 (8%)	20 (26%)	57 (74%)	31 (44%)	22 (28%)	24 (31%)

Category	Total Firms	Innovators	Non-Innovators	Exporters	Non-Exporters	Small*	Medium*	Large*
Exporters	20 (25%)	20 (100%)	0 (0%)	N/A	N/A	1 (5%)	9 (45%)	10 (50%)
Non-Exporters	57 (75%)	51 (89%)	6 (11%)	N/A	N/A	30 (53%)	13 (23%)	14 (24%)

*Size: 1-49 (Small scale), 50-249 (Medium scale), 250 & above (Large scale)

Analysis of Innovation Behavior in Automobiles' Exporting Firms

Table 1: Top 4 with 1 being the most important; 2 being the second most important and so on

	#1	#2	#3	#4
Most Recently Purchased Machinery / Software	CNC Machinery	Dye Casting/Dye Related Machines	Automation of Processes	Miscellaneous Presses/ Kherad Machines
Barriers to Technology Adoptions	Financial Barriers	Lack of Innovation Opportunities	Retraining Employees	Marketing
Different Areas of Innovation	Process	Technology/Equipment	Product	Marketing
Sources of Technological Developments	Organization itself	Organization itself along with other organizations and institutions	Organization itself by adapting or modifying processes originally developed by other institutions	Other Enterprises or institutions
Sources of Funding for Innovations	Internal Resources (Equity Funds)	Internal Resources (Equity Funds) and Banks/Financial Institutions	Bank/Financial Institutions	
Drivers of Innovations	Pressure to Improve Quality	To Gain/Increase Market Share	Desire for Market Leadership	Competitive Pressure to Reduce Prices
Results of Innovations	Quality of Output Improved	No Need to Retrain Employees to adopt Innovation/ Revenues	Revenues Increased	No Resistance from Employees to Adopt Innovation
Most Impactful type of Innovations on Firm's Profitability	Technological Innovations	Product	Process	Marketing/ Business Model

Analysis of Innovation Behavior in Automobiles' Non-Exporting Firms

Table 1: Top 4 with 1 being the most important; 2 being the second most important and so on

	#1	#2	#3	#4
Most Recently Purchased Machinery / Software	Kherad Machines	CNC Machines	New Softwares/ Verma Machines, Welding Machines	Management Systems/ Drill Machines/ Unit
Barriers to Technology Adoptions	Financial Barriers	Lack of Innovation Opportunities	Resistance to Change in Employees	Retraining Employees
Different Areas of Innovation	Product	Process	Technology/ Equipment	Marketing
Sources of Technological Developments	Organization itself along with other organizations and institutions	Organization itself	The Organization itself by adapting or modifying processes originally developed by other institutions	Other Enterprises or institutions
Sources of Funding for Innovations	Internal Resources (Equity Funds)	Internal Resources (Equity Funds) and Banks/Financial Institutions	Government	
Drivers of Innovations	Pressure to Improve Quality	Desire for Market Leadership/ Desire for Market Leadership	To Gain/ Increase Market Share	Other
Results of Innovations	No Need to Retrain Employees to adopt Innovation/ Revenues	Quality of Product Improved	Revenues Increased	No Resistance from Employees to Adopt Innovation
Most Impactful type of Innovations on Firm's Profitability	Product	Technological Innovations	Process	Marketing

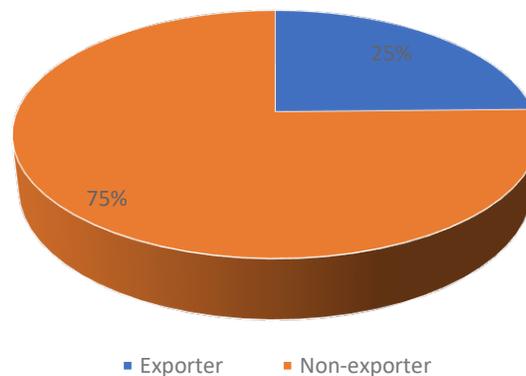
1. REVIEW OF TECHNOLOGICAL INNOVATIONS

1.1. Exporter or Non- Exporter

25% of the surveyed firms were exporting their output abroad, while 75% of the sample firms were non-exporters.

Figure 1.1: Majority of the surveyed firms were non-exporters

Is your firm an exporter of products?

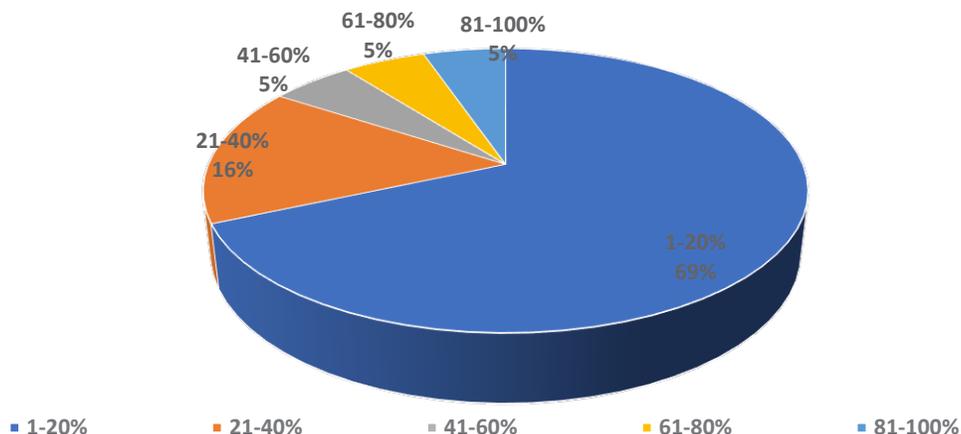


1.2. Percentage of Output Exported:

When asked about the percentage of output exported, 69% of exporting firms said that they were selling 1-20% of their output abroad, while only 5% of exporting firms were selling almost 80-100% of their output abroad.

Figure 1.2: Majority of the surveyed exporting firms exported 1-20% of their output

If Yes, what percentage of your output is exported?

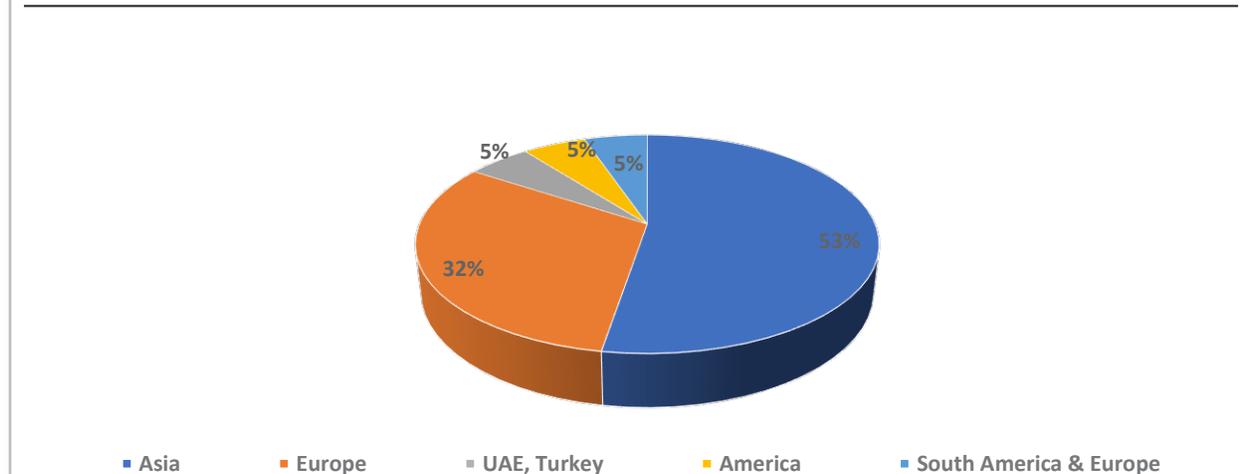


1.3. Export Destinations:

When asked about the export destinations, 53% of exporting firms in the sample were exporting their output to South America Europe while 30% said they the export worldwide.

Figure 13: Half of the surveyed exporting firms exported their output to Asia

If yes, then which region does your firm mostly export to?



1.4. Size of Firms:

When asked about their size of firms, a majority of exporting firms were large-sized firms, while a majority of non-exporting firms were small-sized firms.

Figure 1.4a: Half of the surveyed exporting firms were large scale

What is the approximate number of employees in your firm?

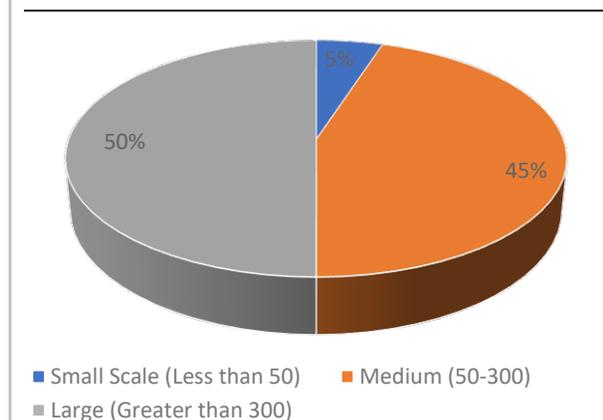
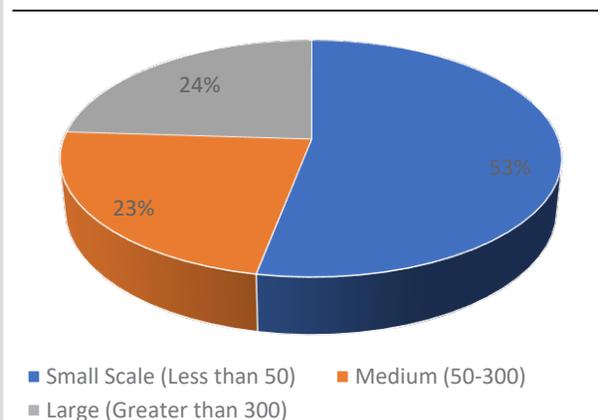


Figure 1.4b: Over half of the surveyed non-exporting firms were small scale

What is 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:

100% of exporting firms in the sample said that they innovated i.e. purchased new machinery and/or software in the last 10 years; whereas, 89% of non-exporting firms said that they innovated during the last 10 years.

Figure 1.5a: 100% of surveyed exporter firms said that they purchased new machinery or software

Have you purchased any new equipment and/or Software in the past 10 years?

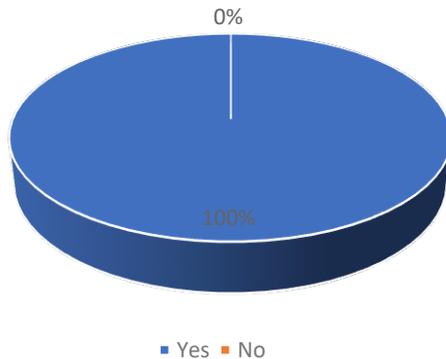
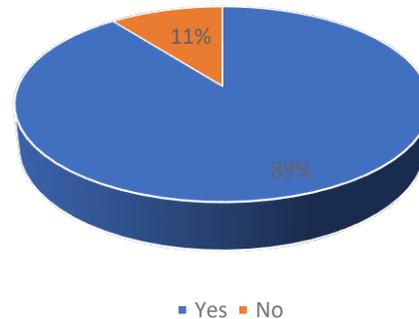


Figure 1.5b: 89% of surveyed non-exporter firms said that they purchased new machinery or software

Have you purchased any new equipment and/or Software in the past 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 exporting firms purchased CNC machines (5 firms), followed by Dye-casting machines (4 firms), and Automation of processes, Kherad machines and different types presses (2 firms each). Whereas, a majority of non-exporters firms bought Kherad machines (9 firms), followed by CNC machines (6 firms), Software upgradation, Verma machines and Welding machines (5 firms each).

Figure 1.6a: CNC Machinery was the most common among exporting firms

List down up to 4 of your most recently acquired Equipment/Software?

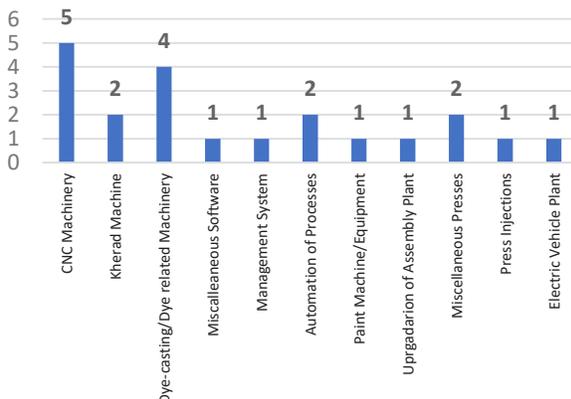
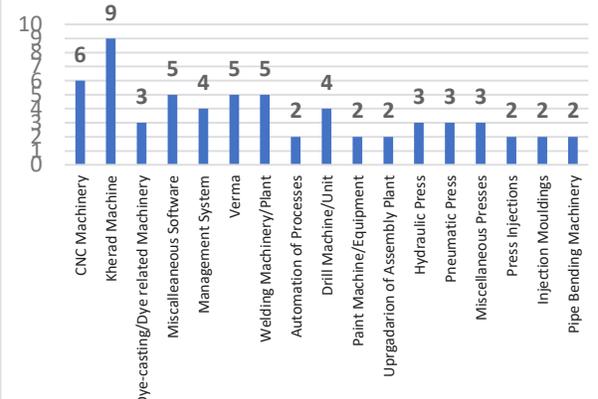


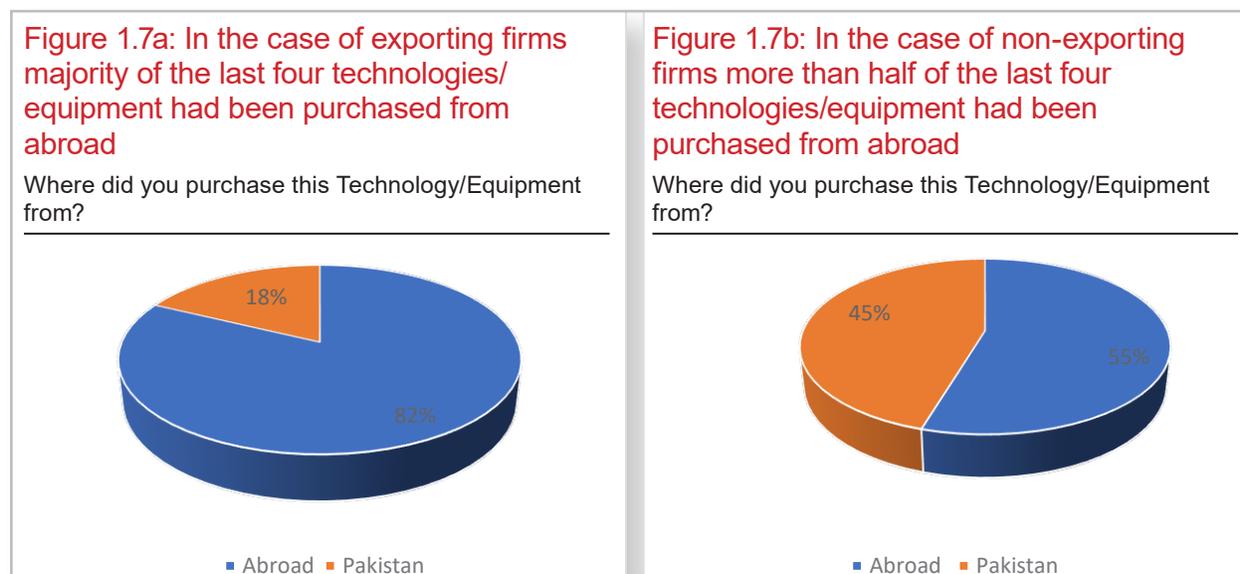
Figure 1.6b: Kherad Machinery was the most common in non-exporting firms

List down up to 4 of your most recently acquired Equipment/Software?



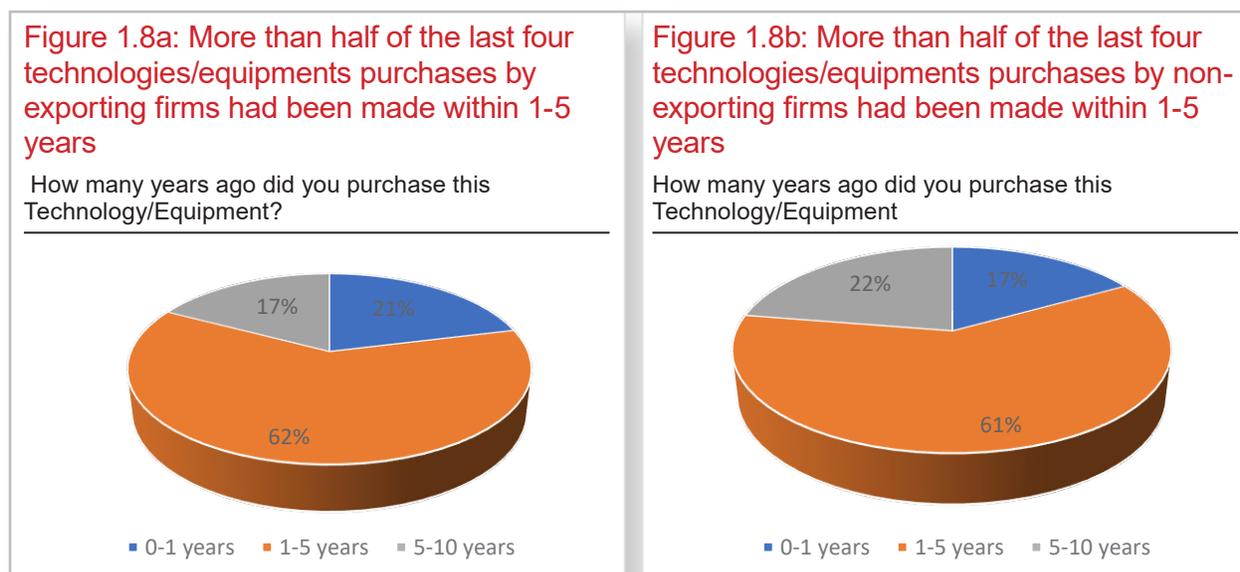
1.7. Purchased Locally or from Abroad

82% of exporting firms claimed to have purchased the last 4 technologies/equipment from abroad. Whereas, only 55% of non-exporting firms purchased their last 4 technologies/equipment from abroad.



1.8. Age of Technology

The timing of innovation is also important. In our sample, 62% of exporting firms innovated in the last 1-5 years. Similarly, 61% of the non-exporting firms innovated in the last 1-5 years.

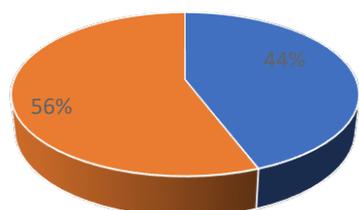


1.9. State of the Art or Already Established

In our sample, a significant percentage of exporting firms (44%) reported that they adopted state of the art machinery/software. Whereas, only 30% of non-exporting firms adopted state of the art technologies/equipment.

Figure 1.9a: In the case of exporting firms, 44% of the last four technologies/equipments that had been purchased were State of the Art

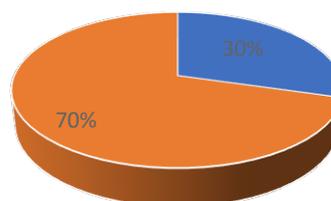
Was your technology state of the art or already established?



■ State of the Art ■ Already Established

Figure 1.9b: In the case of non-exporting firms, a majority of the last four technologies/equipments that had been purchased were already established

Was your technology state of the art or already established?



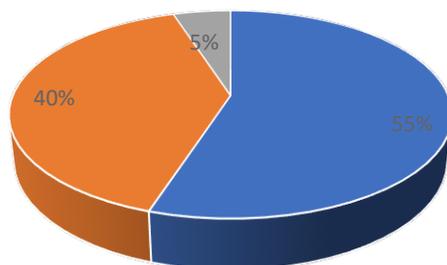
■ State of the Art ■ Already Established

1.10. Created vs Bought technology

When firms were asked if they preferred making or buying new innovations, almost half of exporting firms (55%) reported that preferred buying innovation, while only 40% of exporting firms preferred developing their own innovations. Looking at the non-exporting firms, 62% of firms preferred buying already established technologies, while only 22% of firms preferred developing their own innovations.

Figure 1.10a: 40% of the surveyed exporting firms reported that they prefer developing their own technology/innovation

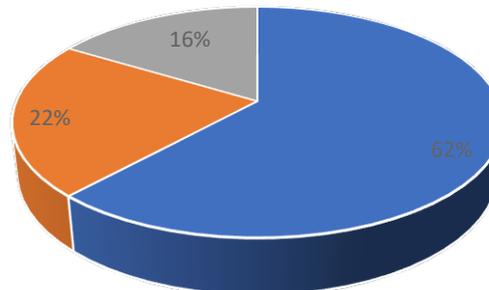
Do you prefer making or buying innovation?



■ Buying ■ Making ■ Neither

Figure 1.10b: Majority of the surveyed non-exporting firms reported that they prefer buying technology/innovation

Do you prefer making or buying innovation?



■ Buying ■ Making ■ Neither

1.11. Planning to Introduce New Technology

The survey also analyzed the future innovation plans of firms. A greater percentage of exporting firms (65%) claimed that they were planning to introduce new technology again in the next 12 months; while only 49% of non-exporting firms responded that they were planning to innovate in the next 12 months.

Figure 1.11a: 65% of the surveyed exporting firms reported that they do plan on introducing new technology in the next 12 months

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

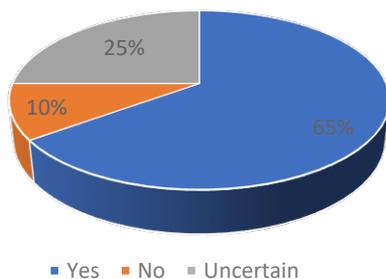
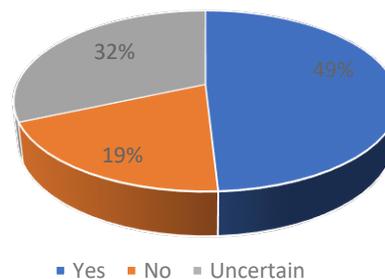


Figure 1.11b: Almost half of the surveyed non-exporting firms reported that they do plan on introducing new technology in the next 12 months

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



2. BARRIERS TO TECHNOLOGY ADOPTIONS

The firms were asked to rate the barriers 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 affected 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 lack of innovation opportunities.

Figure 2a: All categories were perceived as barriers by a majority of the exporting surveyed firms

How would you rate the barriers (1 to 5) you faced while trying to perform Technological Innovations?

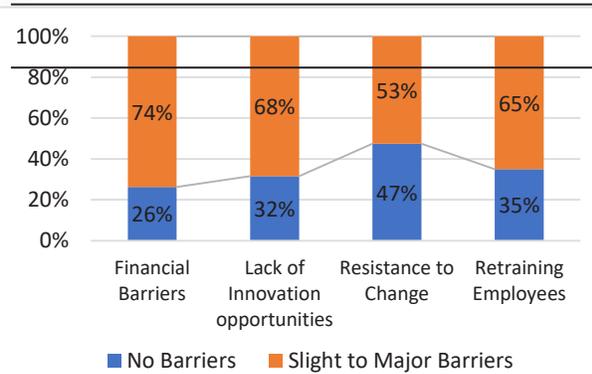
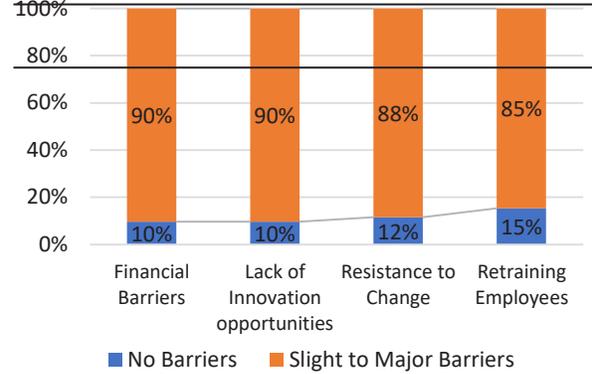


Figure 2b: All categories were perceived as barriers by a large majority of the non-exporting surveyed firms

How would you rate the barriers (1 to 5) you faced while trying to perform Technological Innovations?



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 both exporting and non-exporting firms was lack of financing. 11% of exporting firms rated this as a major barrier, while 35% of non-exporting firms reported it a major barrier while trying to perform technological innovations.

Figure 2.1a: 11% of 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 barrier)

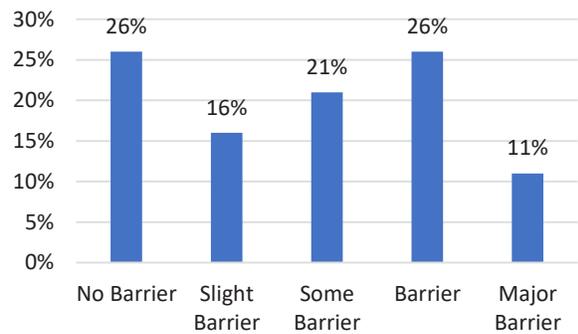
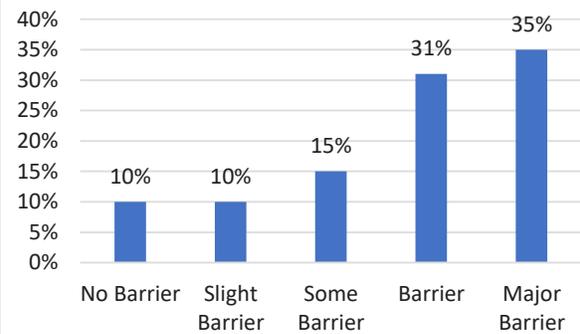


Figure 2.1b: 35% of non-exporting firms faced major financial barriers while trying to innovate

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



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 the lack of innovation opportunities.

Figure 2.2a: 5% of exporting firms found lack of innovation opportunities as a major barrier to innovate

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

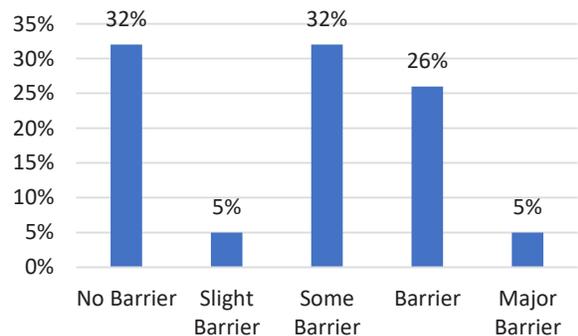
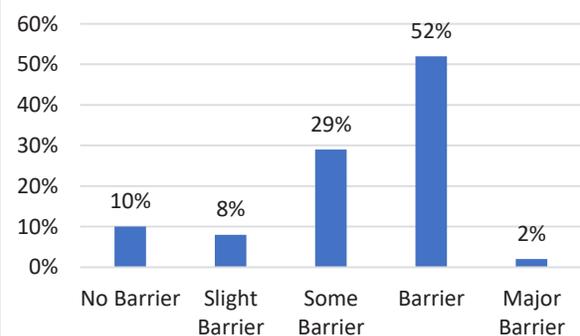


Figure 2.2b: 2% of non-exporting firms found lack of innovation opportunities as a major barrier while trying to innovate

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 of non-exporting firms rated resistance to change in employees as a major barrier to innovation.

Figure 2.3a: 21 % of exporting firms faced resistance to adopt a new technology as a major barrier while trying to innovate

How would you rate Resistance to Change as a barrier while trying to perform Technological Innovations?

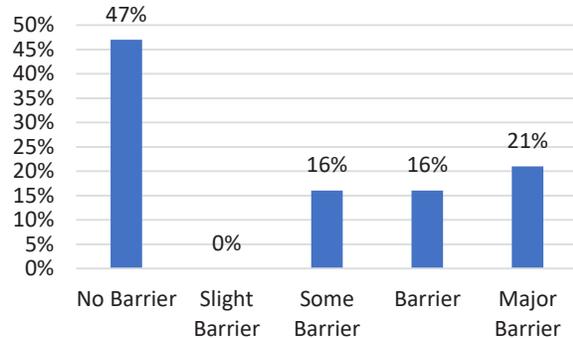
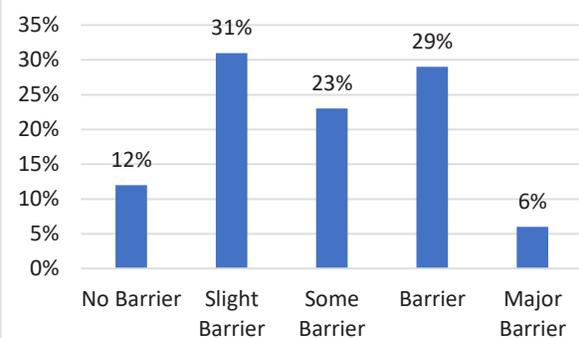


Figure 2.3b: 6% of non-exporting firms resistance to adopt to a new technology as a major barrier while trying to innovate

How would you rate Resistance to Change as a barrier while trying to perform Technological Innovations?



2.4. Retraining of Employees

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

Figure 2.4a: 35% of surveyed exporting firms faced no barrier while retraining of employees while innovating

How would you rate Retraining of Employees as barrier while trying to perform Technological Innovations?

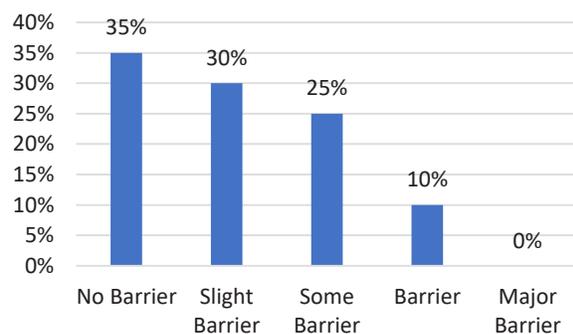
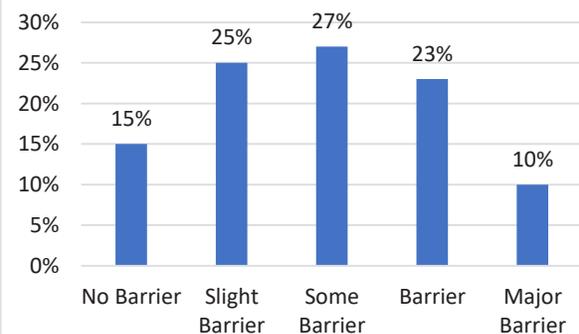


Figure 2.4b: Only 15% of surveyed non-exporting firms faced no barrier while retraining employees while innovating

How would you rate the barriers (1 to 5) you faced while trying to perform Technological Innovations?



3. COMPETITIVE INNOVATIONS

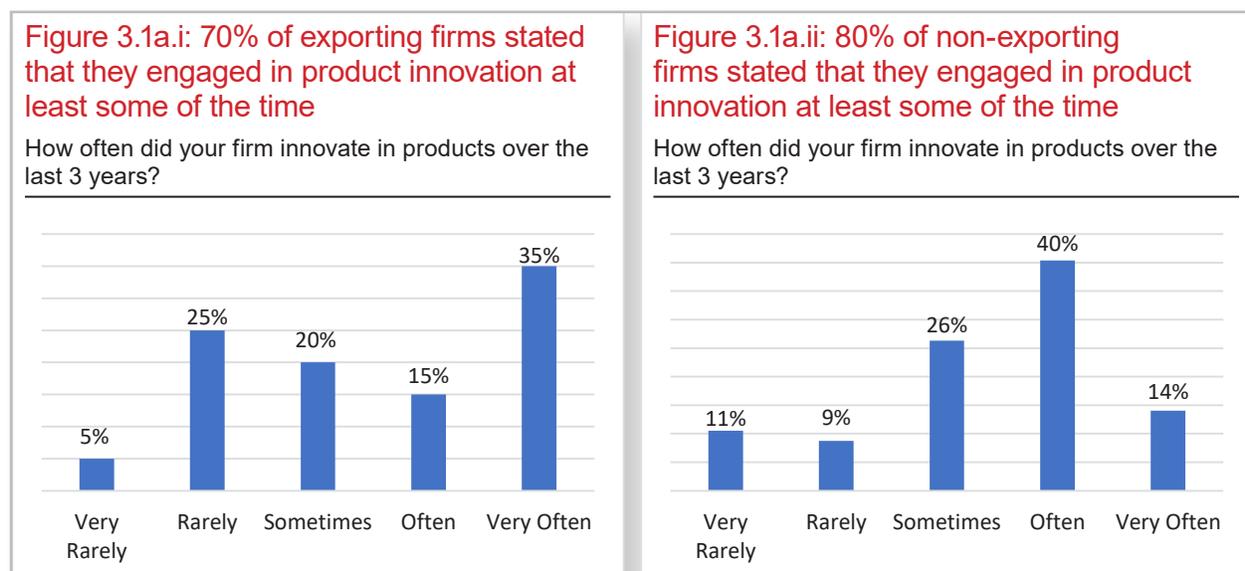
In this section of the survey, both exporting and non-exporting innovating firms were asked about their major areas of innovations, who were responsible for these technological developments, their sources of funding to finance their innovation activities and drivers of initiating innovations.

3.1. Frequency of Different Innovations

When asked about how often the firms innovated in different types of innovation in the last 3 years, exporting firms reported that they innovated in the areas of Product (70%), Marketing (60%), Process (95%), Technology/Equipment (85%) and Business Model (61%). While, non-exporting firms reported that they innovated in the areas of Product (80%), Marketing (50%), Process (65%), Technology/Equipment (63%) and Business Model (35%).

3.1a: Innovation in Product

When asked about how often they innovated in the area of product, a greater percentage of exporting firms as well as non-exporting firms reported that they were engaged in product innovation



3.1b: Innovation in Process

When asked about how often they innovated in the area of process, comparatively a greater percentage of exporting firms as compared to non-exporting firms reported that they were engaged in process innovation.

Figure 3.1b.i: 95% of exporting firms stated that they engaged in process innovation at least some of the time

How often did your firm innovate in process over the last 3 years?

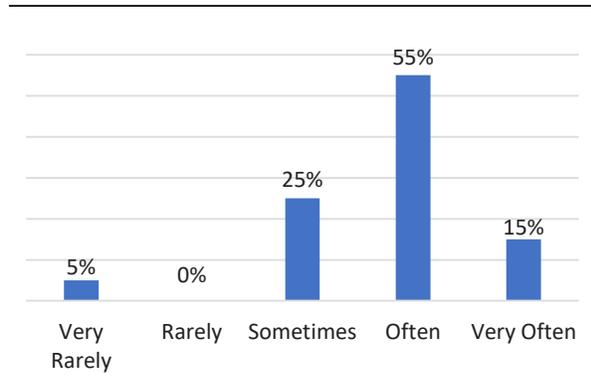
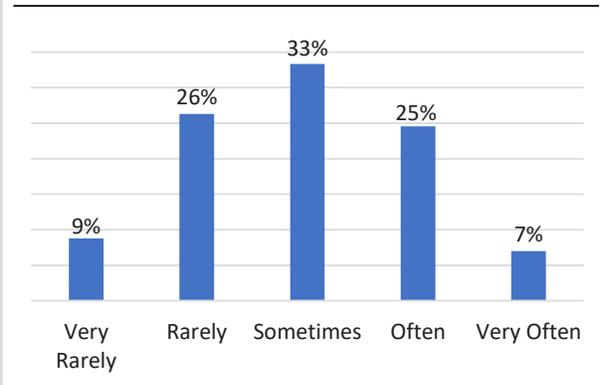


Figure 3.1b.ii: 65% of non-exporting firms stated that they engaged in process innovation at least some of the time

How often did your firm innovate in process over the last 3 years?



3.1c: Innovation in Technology

When asked about how often they innovated in the area of technology, a greater percentage of exporting firms as compared to non-exporting firms reported that they engaged in technological innovation.

Figure 3.1c.i: 85% of exporting firms stated that they engaged in technology/equipment innovation at least some of the time

How often did your firm innovate in technology over the last 3 years?

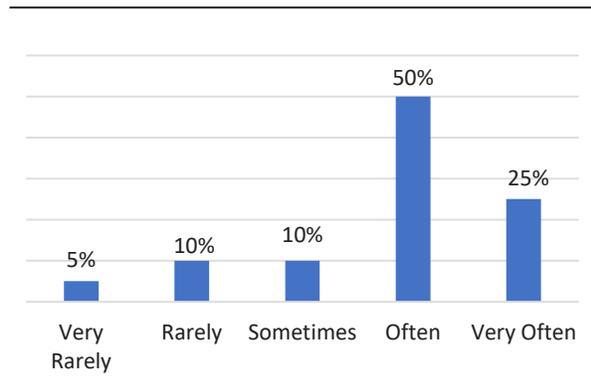
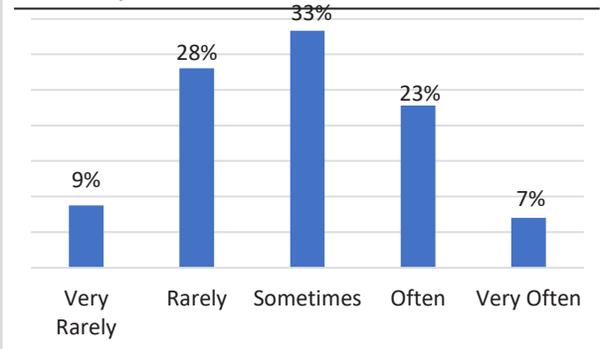


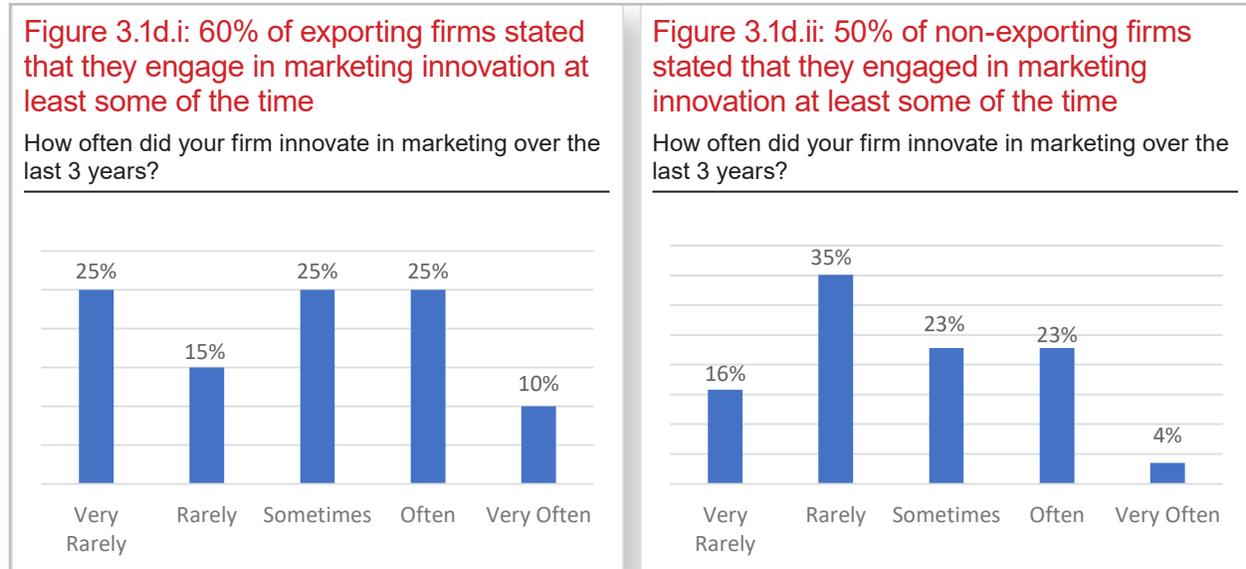
Figure 3.1c.ii: 63% of non-exporting firms stated that they engaged in technology/equipment innovation at least some of the time

How often did your firm innovate in technology over the last 3 years?



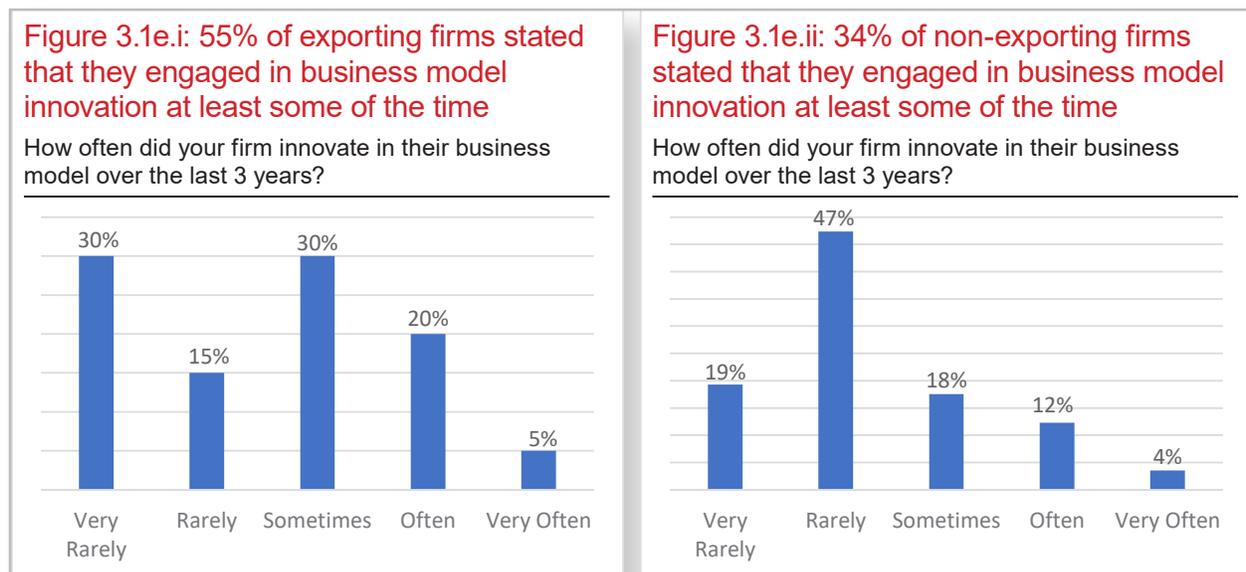
3.1d: Innovation in Marketing

When asked about how often they innovated in the area of marketing, comparatively a greater percentage of exporting firms as compared to non-exporting firms reported that they engaged in marketing innovation.



3.1e: Innovation in Business Model

When asked about how often they innovated in the area of business model, a greater percentage of exporting firms as compared to non-exporting firms reported that they were engaged in business model innovation.



3.2. Collaborations for New Technology

In response to the question about who was responsible for introducing new technologies, a greater percentage of exporting firms (53%) reported that their organization themselves were responsible for their innovations and

technological developments. Whereas, a greater percentage of non-exporting firms (48%) reported that their organization along with other organizations/institutions were responsible for introducing new innovations.

Figure 3.2a: Only 5% of the exporting firms stated that other enterprises or institutions were responsible for introducing new developments

In the majority of these innovations, who was responsible for introducing these developments?

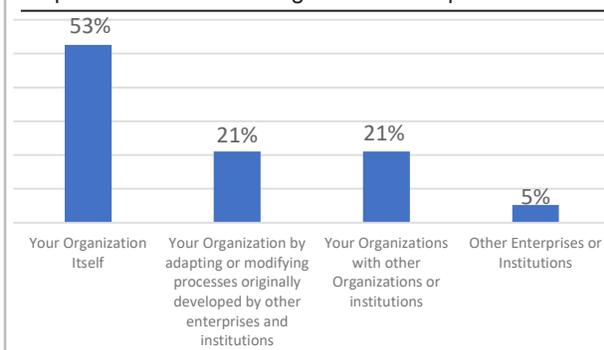
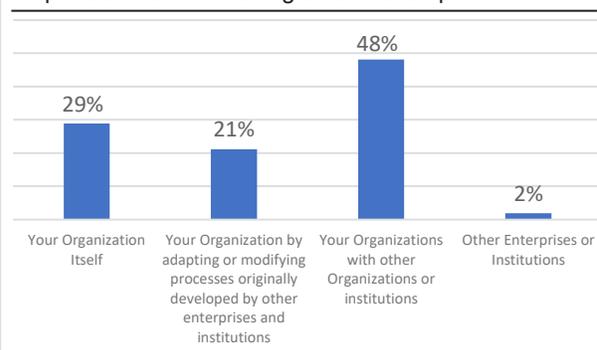


Figure 3.2b: Only 2% of the non-exporting firms stated that other enterprises or institutions were responsible for introducing new developments

In the majority of these innovations, who was responsible for introducing these 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 firms (60%) and non-exporting firms (82%) said that they used their internal resources to fund their innovation activities.

Figure 3.3a: Majority of the surveyed exporting firms relied on their internal resources for funding innovation

Which source of funding do you rely upon for your innovation expenditure?

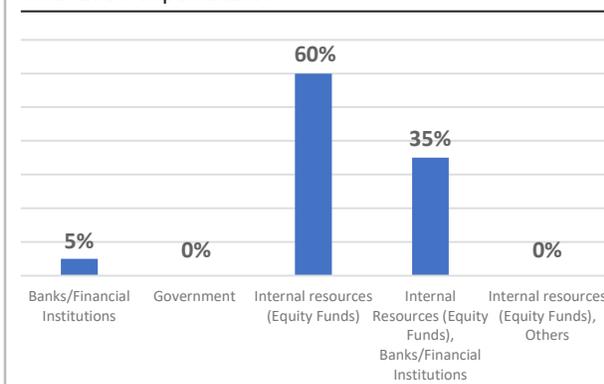
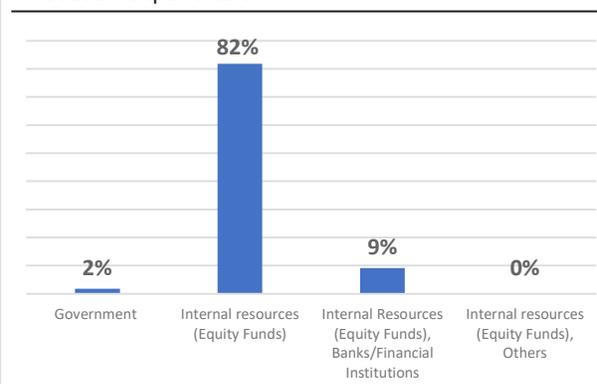


Figure 3.3b: Majority of the surveyed non-exporting firms relied on their internal resources for funding innovation

Which source of funding do you rely upon for your innovation expenditure?



3.4. Reasons for Innovations

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 (47%) reported pressure to increase quality was one of the most significant drivers of initiating innovation followed by the desire to gain/increase market share (26%). Whereas, a majority of non-exporting firms pointed to pressure to increase quality (33%) as the most significant driver of initiating innovation followed by the desire to for market leadership (20%) and competitive pressure to reduce prices (20%).

Figure 3.4a: Pressure to increase quality was reported as the driver of innovation by the most number of exporting firms

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

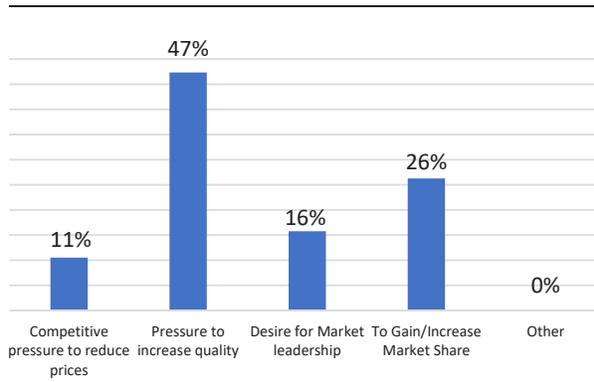
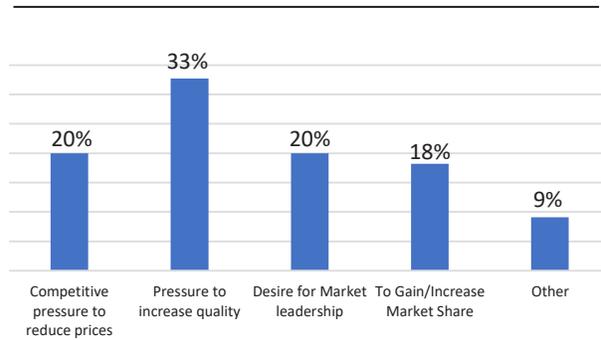


Figure 3.4b: Pressure to increase quality was reported as the driver of innovation by the most of non-exporting firms, followed by competitive pressure to reduce prices and desire for market leadership

Which factor is most significant for your industry?



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 the Quality of Output

When asked about the impact of firm level innovations on firms' quality of output, 95% of percentage of exporting firms claimed that their quality of output improved as the result of innovation, as compared to 82% of non-exporting firms who experienced an improvement in their quality of output as the result of innovation.

Figure 4.1a: 95% of surveyed exporting firms said that their product quality improved due to innovation

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

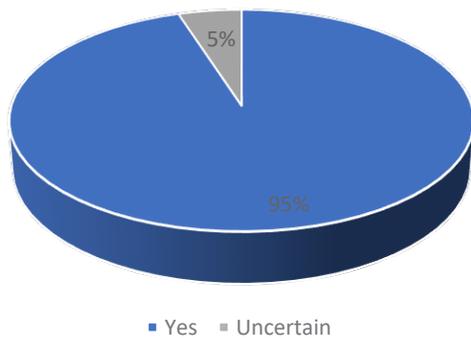
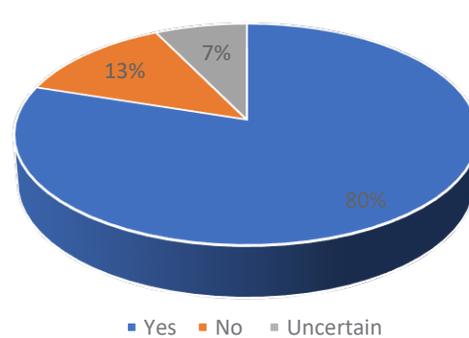


Figure 4.1b: 80% of surveyed non-exporting firms said that their product quality improved due to innovation

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



4.2. 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 majority of 75% of exporting firms claimed that innovation led to an increase in revenues as compared to 62% non-exporting firms.

Figure 4.2a: 75% of exporting firms said that their revenues increased because of innovation

Did your revenues increase as a result of innovation?

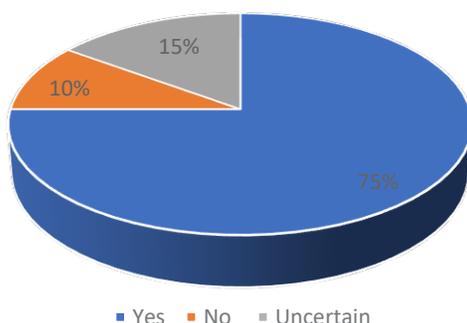
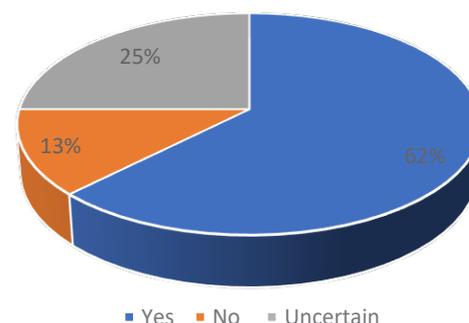


Figure 4.2b: 62% of non-exporting firms said that their revenues increased because of innovation

Did your revenues increase as a result of innovation?



4.3. Need to Retrain Employees

When asked if the firms had to retrain their employees as the result of innovation, 75% of exporting firms and 82% of non-exporting firms in the sample reported that they had to retrain their employees as the result of innovation.

Figure 4.3a: 75% of surveyed exporting firms said that they had to retrain their employees after innovation

Did your employees have to be retrained in order to adopt the innovations you invested in?

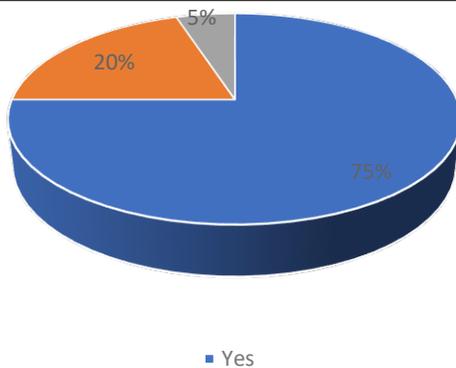
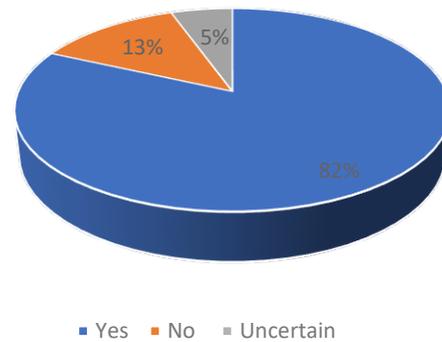


Figure 4.3b: 82% of surveyed non-exporting firms said that they had to retrain their employees after innovation

Did your employees have to be retrained in order to adopt the innovations you invested in?



4.4. Impact on Cost of Production

In response to the question asked about the impact of firm level innovations on firm's cost of production, 63% of exporting firms claimed that innovation resulted in reduced cost of production, while only 39% of non-exporting firms reported that their cost of production decreased as the result of innovation.

Figure 4.4a: 63% of exporting firms said that their cost of production decreased because of innovation

Did Innovating reduce your firm's Cost of Production?

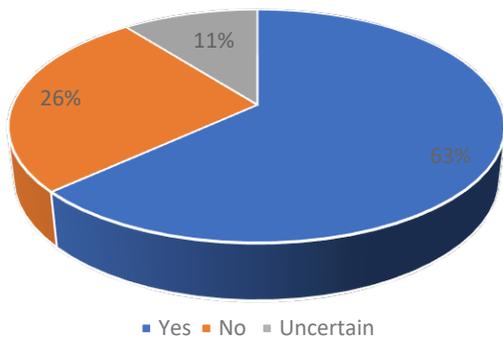
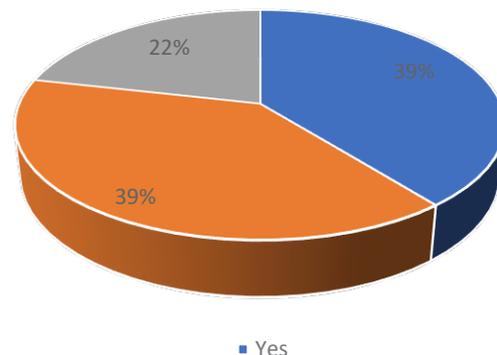


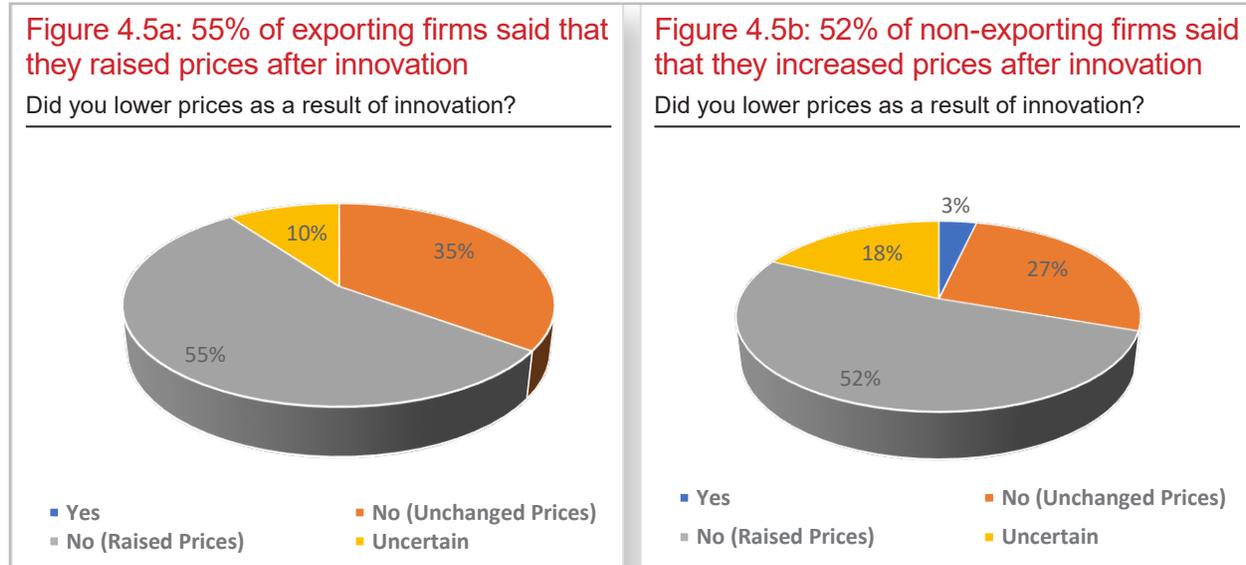
Figure 4.4b: 39% of non-exporting firms said that their cost of production decreased because of innovation

Did Innovating reduce your firm's Cost of Production?



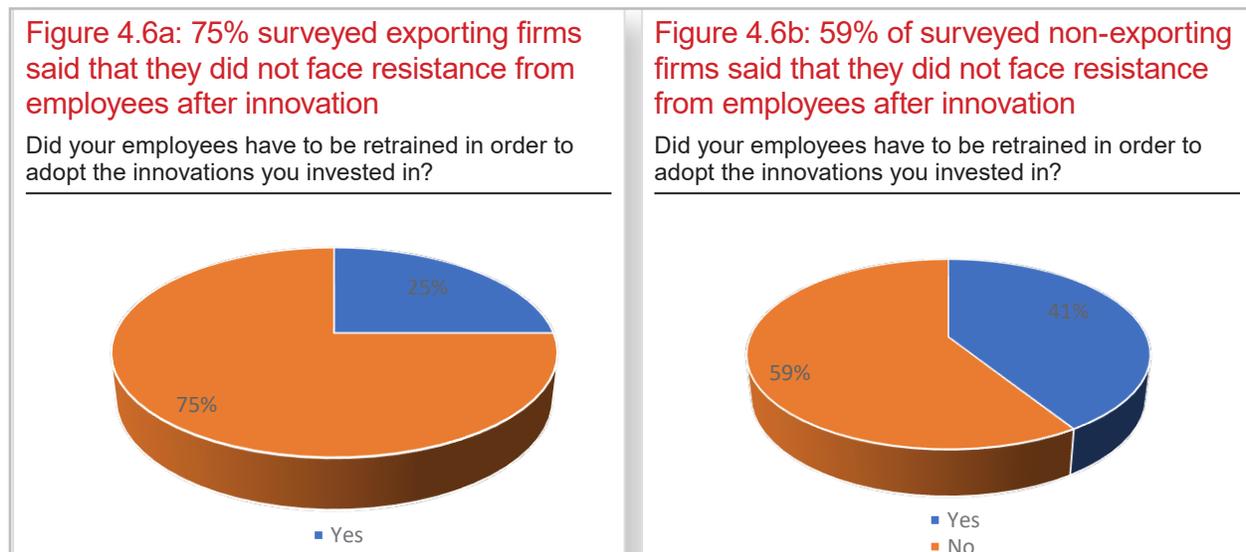
4.5. Impact on Prices

When asked if innovation resulted in lower product prices, 55% of exporting firms reported that their prices remained unchanged after innovation, whereas 3% of non-exporting firms said that they lowered their prices while 52% reported that their prices remained unchanged as the result of innovation.



4.6. Resistance from Employees While Introducing Innovation

When firms were asked if they faced any resistance from their employees while trying to introduce innovations, 75% of exporting firms and 59% of non-exporting firms reported that they did not face resistance from their employees while trying to introduce innovations in their firms.



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 profits, a majority of exporting firms reported that technological innovation (30%) followed by product innovation (25%), Process (15%), Marketing (15%) and Business Model (15%) resulted in higher profits. Whereas, for non-exporting firms, majority of firms reported that innovation in product (39%) followed by technological innovation (28%), Process (14%), Marketing (12%) and Business Model (7%) resulted in higher profits.

Figure 5a: Technology/Equipment innovation was thought to have the largest impact on profitability by the largest number of surveyed exporting firms

Which of the following innovations has had the most impact on your firm's profits over the last 3 years?

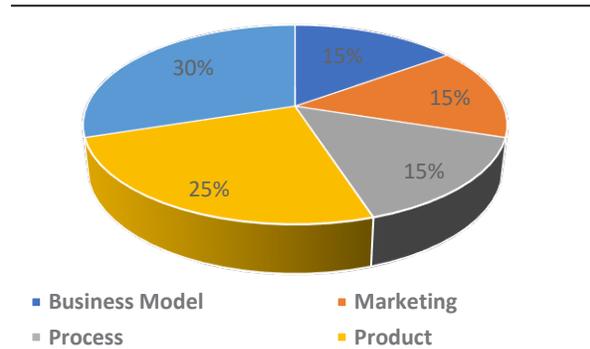
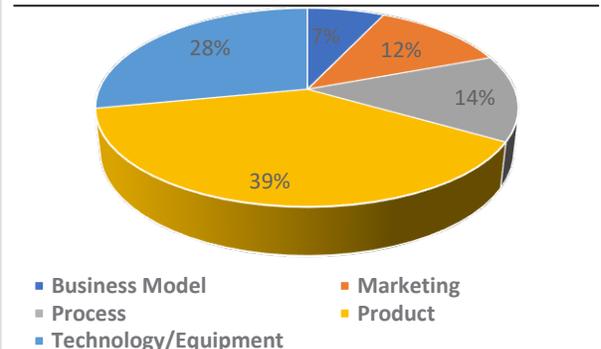


Figure 5b: Product innovation was thought to have the largest impact on profitability by the largest number of surveyed non-exporting firms

Which of the following innovations has had the most impact on your firm's profits over the last 3 years?



6. CONCLUSION

The Innovation and Technology Centre (ITC) of the Lahore School of Economics conducted its third survey in 2020/2021 to observe the growing trends in innovation and technology upgradation in the exporting and non-exporting firms from the Automobile sector of Pakistan. 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 77 firms involved in automobile, auto manufacturing and auto parts, including 20 exporting and 57 non-exporting firms, collected during the period of July 2020 to September 2021.

In the surveyed exporting firms, 85% of exporting firms were selling up to 40% 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 large sized and non-exporting firms were small sized firms, with 100% of exporting firms and 89% of non-exporting firms innovated i.e. purchased new machinery/equipment in the past 10 years. However, when asked whether those firms were planning to innovate in the next 12 months, a 65% of exporting firms and only 49% of non-exporting firms were planning to innovate again in the next 12 months.

Looking at the vintage of technologies, a majority of exporting firms innovated more recently during the last 1-5 years, whereas, the majority of non-exporting firms innovated between 5-10 years ago.

Also, the data revealed that a greater percentage of exporting firms had purchased their last 4 innovations from abroad while a greater percentage of non-exporting firms purchased their last 4 innovation from Pakistan. A majority of exporting firms bought CNC Machinery, while a majority of non-exporting firms bought Kherad Machines. Moreover, a majority of exporting firms preferred developing their own technology/innovations, whereas, a majority of non-exporting firms preferred buying already established machinery.

Looking at the sources of funding for innovations, a majority of both exporting and non-exporting firms said that their innovations related activities were funded utilizing their own internal resources (Equity Funds). Looking at the type of innovations adopted by firms, the data revealed that a large number of exporting firms innovated in process, followed by innovation in technology/equipment, whereas, a majority of non-exporting firms innovated in the areas of product and process.

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

The incentives to innovate are particularly important for firms. In our survey, when asked about the most significant factor driving innovation in their industry, a majority of exporting and non-exporting firms reported pressure to increase quality was one of the most significant drivers of innovation.

Looking at the results of innovation, most of surveyed exporting and non-exporting firms revealed that their quality of product improved, followed by their increase in revenues, and reduction in cost of production. Whereas, a majority of both exporting and non-exporting firms reported that they had to retrain their employees but did not face resistance from their employees as the result of innovation. Moreover, prices remained unchanged for both exporting and non-exporting firms 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.

INNOVATION AND TECHNOLOGY IN EXPORTING AND NON- EXPORTING FIRMS IN THE AUTOMOBILE SECTOR OF PAKISTAN

2022

