PIDE
Pakistan Institute of Development Economics

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Engineering Horizons:

Unraveling the State of Industry

in Pakistan

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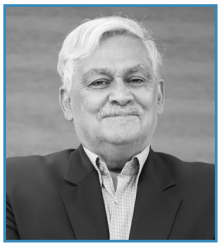
Preface

This report was prepared by researchers (enumerated below) of the Pakistan Institute of Development Economics (PIDE) as part of a Research Team tasked with presenting a report on the state of the engineering industry in Pakistan, keeping in mind the experiences of engineering firms and the ground realities of Pakistan.

Pakistan Institute of Development Economics (PIDE) Research Team composition:



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The research team is indebted to their colleagues and staff at PIDE for their invaluable contributions, help, and support in helping prepare this report. The research team is responsible for any errors or omissions in this report.

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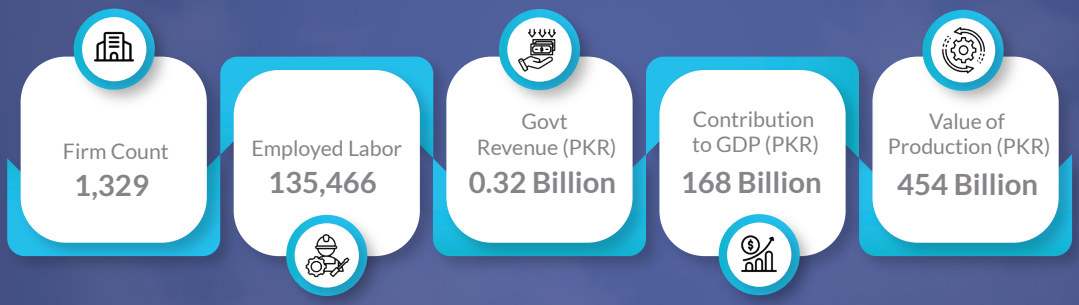
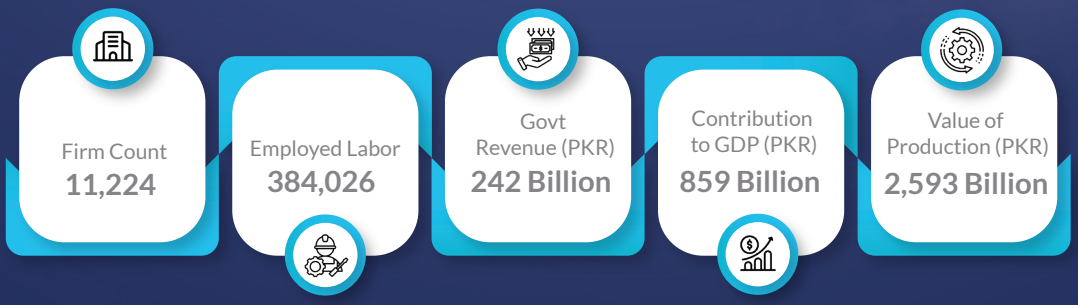
Engineering Industry Contribution To The Economy

2005



2015

2023



Note: projections for 2023 are based on CMI data from 2005 and 2015, using GVA approach.

Executive Summary

Contribution to GDP ⤻ 0.86%

1. "Little is Enough" Mindset

Limited Access to Finances	Sole Proprietor Centralized System	Business Expansion	Staying Under Tax Radar
95% No Access	**66%** Sole	**63%** No Plans	**59%** Withheld Data

2. Power Shortage

Loadshedding Hours	Per Hour Cost Loadshedding	Alternative Backup	Overall Cost of Loadshedding
48% 3-7 Hours	**1042 /** Firm	**44%** No Backup	**1M /** Day

3. R&D

Pakistan R&D Share in GDP	Firm Level Budget
0.16%	**88%** No Budget

4. Business / Government Relations

Compliance with Govt Regulations	Average Compliance Cost	Total Compliance Cost	Average Time to Obtain Operating License
3 Months	**153 /** Day	**2.9 million /** Year	**1 - 3 Months**

Introduction

According to the Pakistan Institute of Development Economics, Pakistan's long-term GDP or output growth is faltering at best and declining at worst (PIDE, 2021).
The economy's structure, in terms of sectoral shares of GDP, indicates that the industrial sector is declining prematurely. In addition, indications are that productivity levels across various sectors of the economy are declining (Faraz et al., 2023).

Industrialization is a critical element of long-term economic growth and development, which can be expounded through various seminal economic theories (Cassen & Lall, 1996). Industrialization leads to increased productivity and efficiency, diversification of the economy, and improved living standards for citizens. These concepts are supported by various major economic theories, which underscore the significance of industrialization as a catalyst for economic growth and development.

To put the economy back on track for sustainable, long term equitable growth, it is necessary to assess the state of the industrial sector and identify the key issues that hinder its progress. An unstable policy environment has created problems for the sector in the country, as reflected in the recent closures of plants. Therefore, it is essential to analyze the nature of crises that the industry faces and to identify measures essential to gain efficiency, which this study aims to do.

Such an analysis naturally requires data on the industrial sector, particularly the engineering industry, which is sparse and considered outdated. A case in point is the latest Census of Manufacturing Industries (CMI), conducted in 2015-16 and only released last year. There is no other readily available comprehensive dataset or report on the engineering industry in the country. It is difficult to devise effective policy interventions and proposals without research and the data required to undertake them. In contributing 12.4% to GDP and employing 14.9% of the economy's labor force , the manufacturing sector has a vital role in the domestic economy (PES, 2022). Therefore, it warrants the attention of researchers and policymakers alike. Considering this fact, generating a snapshot of the industrial sector or undertaking a "deep dive" into a sub-sector, such as the engineering industry is advisable.

As part of the industrial sector, the engineering industry is a critical component of the economy with backward and forward linkages to other sectors of the economy. It fulfils the demand for its products in the economy and also creates a demand for inputs from the rest of the economy, as well as downstream economic activities. Thus, it has a significant impact on various industries, including manufacturing, construction, and transportation. As such, it is an essential driver of economic growth and development (ACEC, 2020; PWC, 2020).

The engineering industry is at the forefront of rapid pace of technological change in the economy. This creates a growing demand for skilled workers who possess the necessary knowledge and expertise to operate and maintain complex equipment and systems (OECD, 2017). The development of new materials and manufacturing techniques has also led to significant improvements in the performance and efficiency of various infrastructure and systems, such as bridges, buildings, and transportation networks (Chen et al., 2021).

One of the major challenges facing the engineering industry is the rapid pace of technological change. This has led to a growing demand for skilled workers with the necessary knowledge and expertise to operate and maintain complex equipment and systems (OECD, 2017). Developing new materials and manufacturing techniques has also led to significant improvements in the performance and efficiency of various infrastructures and systems, such as bridges, buildings, and transportation networks (Chen et al., 2021).

Technological advancements, such as automation and Artificial Intelligence (AI) in the engineering industry, are another area of significant interest. Research has shown that integrating AI technologies can help improve the efficiency and accuracy of various engineering processes, such as design, planning, and maintenance (Pan & Zhang, 2021). However, concerns have also been raised about the potential impact of automation on employment and job security for workers in the engineering industry (Frey & Osborne, 2017).

In addition to technological change and advancements, the engineering industry is also influenced by broader economic and political factors. For example, the impact of global economic trends and geopolitical events can have a significant impact on the demand for engineering services and the availability of skilled labor (Engineering UK, 2021). Furthermore, regulatory frameworks and policies related to environmental protection and sustainability also play an increasingly important role in shaping the direction of the engineering industry (Mihelcic et al., 2003).

Pakistan's engineering industry covers a broad range of activities, including civil, mechanical, electrical, and electronic engineering, among others (PCST, 2020). The industry faces significant challenges related to infrastructure challenges, lack of skilled labor, and limited R&D capabilities. However, there are also opportunities for growth and development in the sector, ranging from the country's strategic location, availability of natural resources, and a young and growing population. These attributes can provide a solid foundation for the sector's expansion, which can be realized through continued investment in education and training, R&D, and the development of new technologies and processes.

Considering the discussion above, several areas need to be explored in depth in the engineering sector of Pakistan, and this research is only possible if a survey of engineering firms is conducted. This detailed report covering a range of key areas related to the engineering industry provides evidence-based policy interventions for enhancing the competitiveness and export potential of the industry in Pakistan.

Research Design

Three hundred and twenty-eight engineering firms in Pakistan were surveyed from the Golden Triangle of Lahore, Gujrat, and Gujranwala. Key engineering activities were covered, ranging from Automotive Parts, Steel, Pumps and Motors, Fans, Home Appliances, Knives, Cutlery and Household Utensils, Ceramic, and Sanitaryware to even Furniture. The details of the industries covered city-wise in the sample are given in Table 1.

Table 1: Sample Distribution of Product Clusters by Geographical Location

Geography	Industry
• Lahore	Automotive Parts Steel industry Pumps and Motors
• Gujrat	Fans Cutlery Home Appliances Knives Steel
• Gujranwala	Pumps and Motors Cutlery and Household Utensils Furniture Ceramic and Sanitaryware Steel

Looking at the distribution of the sample according to engineering product cluster, ceramic and sanitary firms are limited in the Golden Triangle of Lahore, Gujranwala, and Gujrat. Firms manufacturing cutlery, utensils, and knives are the most common, followed by automotive parts, pumps, motors, and home appliances. This suggests that the engineering industry is not concentrated on just the lower end of value addition but is positioned further up the value ladder. Table 2 provides a detailed breakdown of the sample according to product clusters.

Table 2: Sample Distribution of Firms by Product Cluster

Industry Cluster	Firm Count	Share (%)
 Fan	46	14%
 Automobile Parts	49	15%
 Steel	46	14%
 Pumps & Motors & Electrical Home Appliances	65	20%
 Cutlery, Utensils & Knives	61	19%
 Furniture	50	15%
 Ceramic & Sanitary ware	11	3%
Total	**328**	**100%**

This firm level survey has been planned to be carried out in phases. In the first phase, the survey was launched in the cities of Gujrat and Lahore, covering a hundred firms from each city (Table 3). Firms in two industrial estates (Sundar and Quaid-i-Azam) of Lahore have not been included in the survey yet but will be incorporated in the next phase. In the second phase, the survey was conducted in the city of Gujranwala and covered another hundred and twenty-eight firms.

Table 3: Sampling Distribution of Firms by Geographical Area

Firm Size	Count	Share (%)
• Lahore	100	30.5
• Gujrat	100	30.5
• Gujranwala	128	39.0
Total	**328**	**100.0**

According to a report prepared for the European Union (EU), the criteria given in the definition of Small and Medium-sized Enterprises (SMEs) are based on the number of employees in the establishment (CSES, 2014). According to this criterion, a micro firm has between 1 to 9 employees; small firms have 10 to 49, medium firms employ between 50 and 249 staff, and large firms employ more than 250 persons. Applying this criterion to the sample of engineering firms in this survey, micro firms are 35% of the firms, while 59% are small, 5% are medium, and 1% are large firms (Table 4). This indicates that micro and small firms are widespread in the sample area.

Table 4: Sampling Distribution of Firms by Size

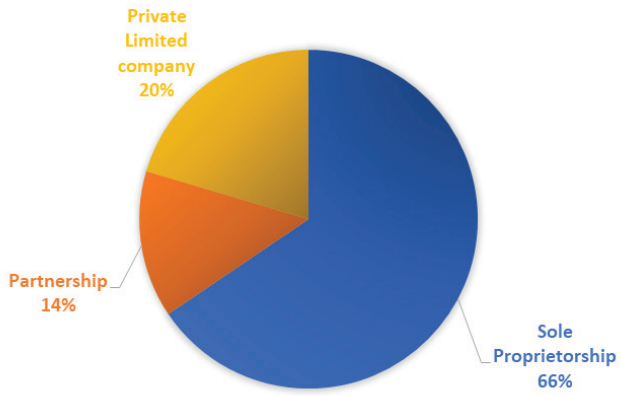
Firm Size	Size Criterion (Staff Headcount)	Firm Count	Share (%)
• Micro	1-9	115	35
• Small	10-49	196	59
• Medium	50-249	15	5
• Large	250+	2	1
Total		**328**	**100**

Mapping The Engineering Industry

Basic Profile of Firms

Three hundred twenty-eight engineering firms in Pakistan have been surveyed so far, and the results indicate that 66% of them are sole proprietorships, 20% are private limited, and 14% are partnerships (Figure 1).

Figure 1: Firms by Type of Ownership

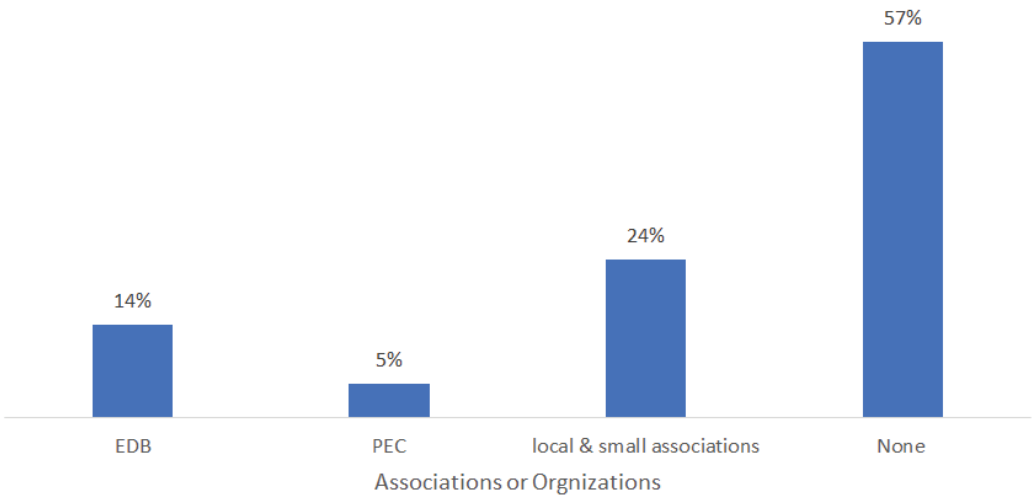


Most of these firms specialize in manufacturing items such as auto parts, fans, steel, kitchen accessories, electrical & electronic equipment, machines (water pump/laundry), and sanitary products.

Additionally, it was found that 57% of the companies surveyed are not members of any professional body, with 14% being members of the Engineering Development Board (EDB), 5% being members of the Pakistan Engineering Council (PEC), and 24% of firms are members of other local or small associations (Figure 2).

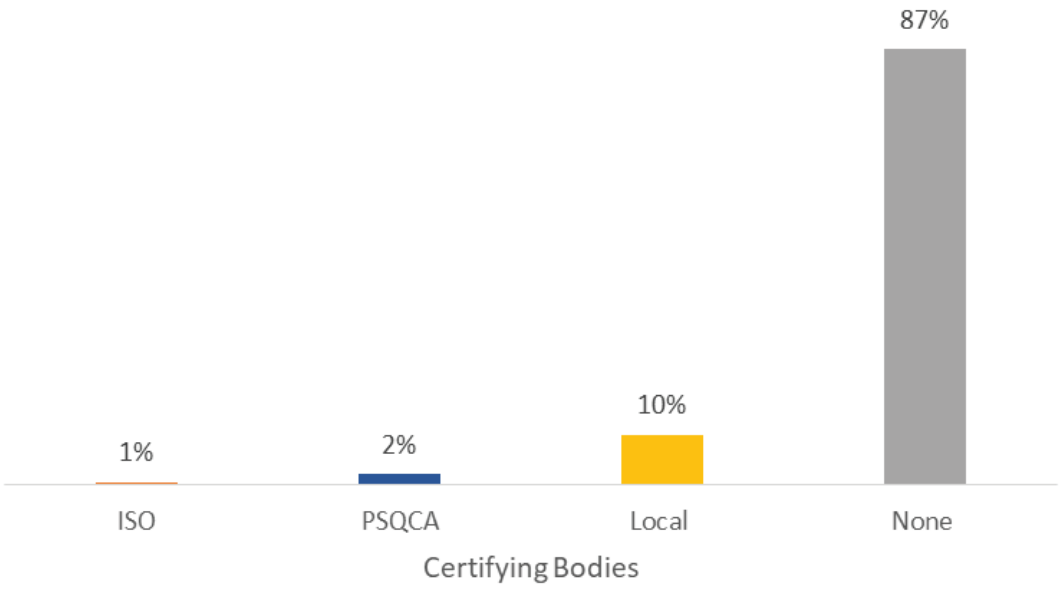
Most of the surveyed firms are sole proprietorships, suggesting they lack the necessary resources and expertise to operate at a larger scale.

Figure 2: Membership in Associations and Industry Organizations



When it comes to quality standards, only 1% firms are International Standard Organization (ISO) certified, merely 2% of the surveyed enterprises have certifications from Pakistan Standards & Quality Control Authority (PSQCA) and around 10% firms have local certifications. Astonishingly, around 87% firms have no quality certifications (Figure 3).

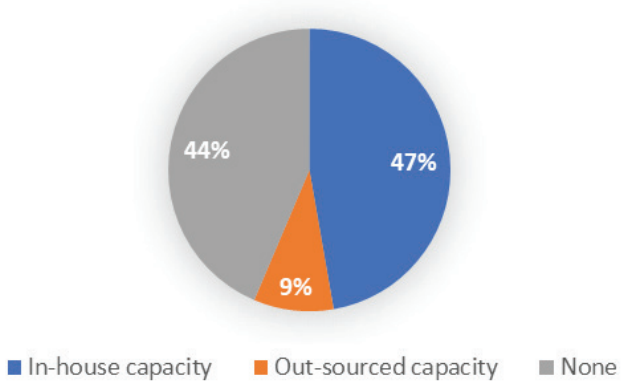
Figure 3: Award of Certifications



Inputs

Electricity Infrastructure

Figure 4: Firms Access to Alternate Power Supplies



Consistent availability of electricity is essential in the manufacturing industry, as power shortages can significantly impact daily production. As a result, many firms opt for an alternate power supply for production to mitigate this risk. In our research, we found that 47% of firms have in-house power generation capacity, while 9% outsource power supply, and the rest of the 44% of SMEs have no alternative power supply due to low demand for production and less capital investment (Figure 4).

In 2016, net idle factor cost of one hour per annum was estimated at PKR 180,000 for small and medium sized firms (IPP-BNU, 2016). Converting this to cost per day, it approaches PKR 493 per hour. Adjusting inflation for the first quarter of 2023, the cost per hour increases from PKR 493 to PKR 1,042 per hour.

In our sample, 52% of firms reported 1 to 2 hours of load-shedding on daily basis, 38% stated 3 to 5 hours of load-shedding and 10% firms reported they face 6 to 8 hours of load-shedding per day. Using IPP-BNU approach, 52% firms bear minimum cost of PKR 1,042 per day, 38% firms borne minimum PKR 3,126 per day and 10% of the firms endure minimum PKR 6,252 per day (Table 5).

Figure 5: Distribution of firms by Hours of Load-shedding on Daily Basis

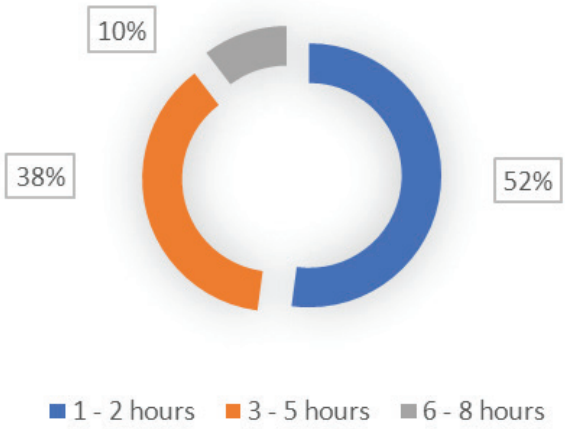


Table 5: Load-shedding Costs Borne by Engineering Firms Per Hour

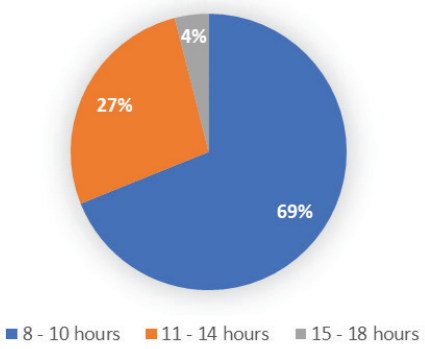
(PKR)

Time In Hours	No. of Responses (%)	Cost Per Firm			Avg. Time	Firms Costs	
		Per Hour	Minimum	Maximum	(Hrs.)	Average	Total
1 – 2	52	1,042	1,042	2,084	1.5	1,563	267,273
3 – 5	38		3,126	5,210	4.0	4,168	512,664
6 – 8	10		6,252	8,336	7.0	7,294	247,996
TOTAL	**100**		**10,420**	**15,630**	**12.5**	**13,025**	**1,027,933**

Source: Author's Calculations

Around 69% of the sampled firms operate 8 to 10 hours a day, while 27% of firms operate 11 to 14 hours per day, and approximately 4% operate 15 to 18 hours a day. On average, firms operate 13 hours per day and are subject to an average load-shedding of 5 hours daily. This allows firms to operate only 8 hours a day if they do not have an alternate power supply (Figure 6).

Figure 6: Daily Operational Hours of Firms



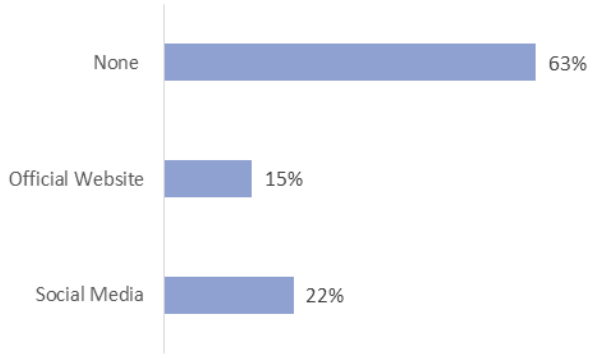
The unavailability of electricity causes hurdles in achieving daily production targets, creating a gap between demand and supply for the industry. At the same time, it hinders the firm's efficiency, where economies of scale need to be achieved. In addition, load-shedding and voltage fluctuations increase the stakes of malfunctions and damage to production machinery, which adds an extra

burden on firms' operations. Generator cost is another major cost associated with load-shedding, around PKR 71,000 per unit annually (IPP-BNU, 2016). Our survey also shows that most firms express serious concerns about operating costs related to generators or alternative backups being used for electricity. To forestall malfunctioning machinery, creating a backup alternate power supply significantly affects firms' profit margins.

Each hour of load shedding costs PKR 1.03 million for 328 firms.

We live in the fourth and fifth industrial revolutions involving connectivity, advanced analytics, automation, robotics, artificial intelligence, and advanced manufacturing technologies transforming global businesses. In Industry 5.0, businesses with no online presence have deleterious effects on businesses (Fuller et al., 2022). One of the major drawbacks of Pakistan's small and medium size engineering enterprises is lack of an adequate online presence and proper engagement with their customers. Based on the survey, more than half of the firms (63%) have no online presence, while the rest of the firms have some online presence on social media and their official websites (Figure 7).

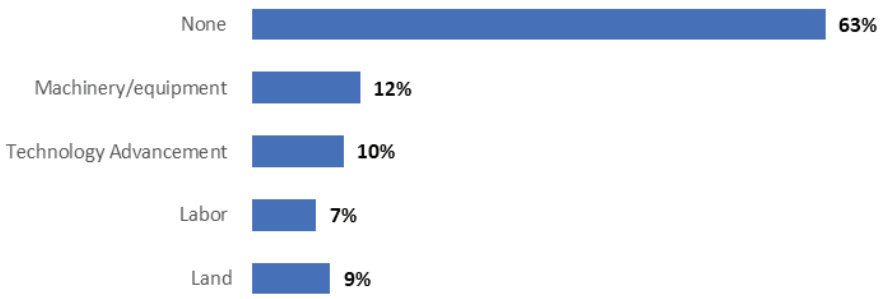
Figure 7: Firms Online Presence



Physical Capital

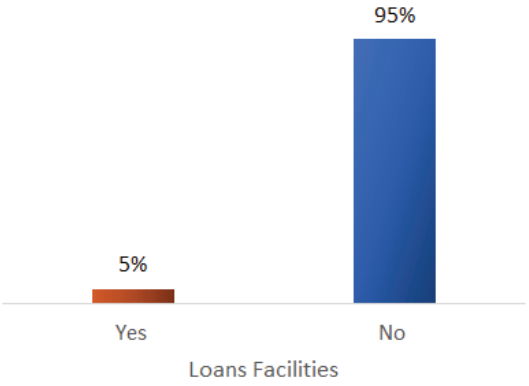
Around 63% of the surveyed firms reported they have no intention of expanding their business in the coming years. However, the remaining firms, in contrast, are actively planning to invest in advanced technology, machinery, land, and labor to improve their business operations and expand their market share (Figure 8).

Figure 8: Firms Business Expansion Plans



Another interesting aspect is that 95% of the firms reported not having a Line-of-Credit (LoC) or loan from any financial institution. Moreover, only 5% of firms having a loan or LoC for their business operations suggests that the industry is not exhibiting much dynamism and growth (Figure 9).

Figure 9: Firms Access to Loan Facilities



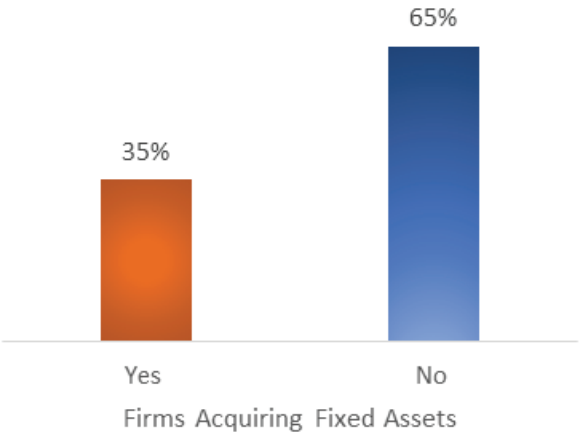
This is primarily because banks require collateral in the form of land, buildings, equipment, personal assets, account receivables, inventory, and machinery. Most small and medium-sized firms do not possess or are unwilling to tie up such assets to secure loans, which means they are reluctant to apply for loans. This makes it challenging for these firms to access the funds they need to expand their business.

In contrast, well-known companies with brand value are reportedly not scrutinized as much, and it is easier for them to raise finance from the market. This is one of the prominent grievances of small and medium-sized firms, as they feel that financial institutions do not entertain them adequately, which hinders their business expansion plans.

Family-owned, small businesses with modest growth goals struggle to secure loans due to limited collateral, discouraging lenders. Complex procedures hinder credit access and industry growth.

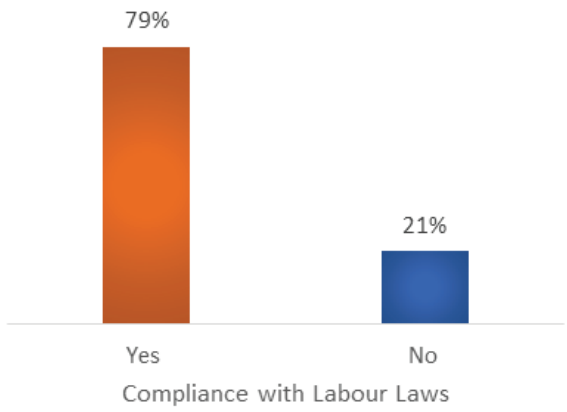
Given the above scenario, access to finance is one of their serious concerns. As a result, 65% of them have not acquired any fixed assets, such as machinery, equipment, land, or buildings, to expand their business (Figure 10).

Figure 10: Firms Engaged in Acquiring Fixed Assets



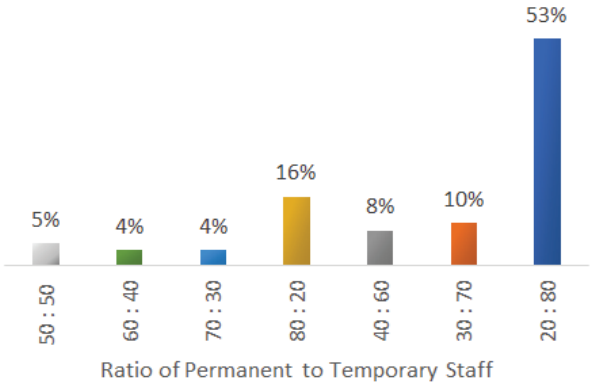
Labor

Figure 11: Firms Complying with Labor Laws



The human resource department of an organization is responsible for developing, reinforcing, and changing its culture to help it grow. The labor force is a crucial component for the business's success in the manufacturing industry. The survey showed that 79% of firms in Pakistan comply with labor laws (Figure 11). This indicates that the importance of adhering to legal regulations is well-known to local businesses.

Figure 12: Proportion of Permanent to Temporary Staff

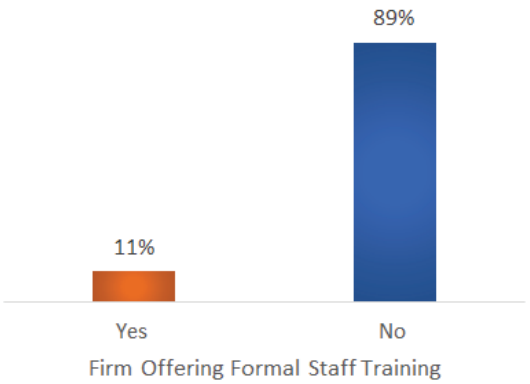


The proportion of permanent employees to temporary employees varies among firms, with some having a 20/80 ratio of permanent to temporary employees while others have an 80/20 ratio. However, 53% of firms in the sample reported having a 20/80 ratio, 16% had an 80/20 ratio, 8% had a 40/60 ratio, 10% had a 30/70 ratio, 5% had a 50/50 ratio, 4% had a 60/40 ratio and 70/30 ratio (Figure 12). These statistics suggest that small engineering firms generally prefer to keep only limited core staff employed permanently and hire additional workers to fulfill an order based on the size of the production run.

Firms prefer to have a limited number of permanent workers and outsource temporary workers to meet the demand, in order to reduce costs.

In addition to complying with labor laws and managing the workforce, firms must invest in Training & Development (T&D) to keep their employees up to date with current market trends. Unfortunately, the survey found that a significant number of firms, approximately 89%, do not provide any formal training to their labor force (Figure 13). This lack of training can lead to operational accidents and inefficiencies in processes, which can adversely impact the firms' profitability and pose a bottleneck for expansion and growth.

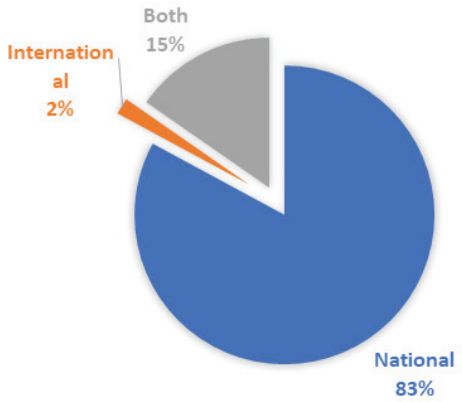
Figure 13: Firms Providing Formal Training for Employees



Despite these challenges, most of the surveyed firms in Pakistan claim to abide by labor laws and do not consider them an obstacle to their operations. This suggests that by focusing on developing and training their workforce, firms can create a positive organizational culture that benefits the employees and contributes to the business's success.

Sales and Supplies

Figure 14: Firms Clients

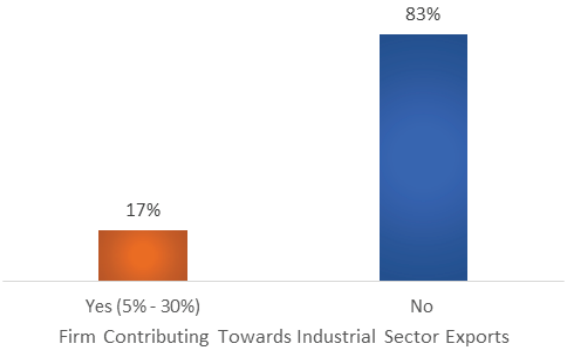


Manufacturing companies in the engineering sector produce various products, but some of them specialize in certain well-known core products. The survey reveals that popular items produced by these companies include fans, electrical equipment (such as pumps, machines, plugs, generators, stabilizers, cables, motors, circuit boards, UPS, and solar panels), electronic equipment, cutlery, auto parts, kitchen accessories, medical equipment, and sanitary products.

Most of these firms are not certified by national or international bodies, meaning their clients are primarily domestic. Around 83% of their clients are national, 15% have both national and international clients, and only 2% have international clients exclusively (Figure 14).

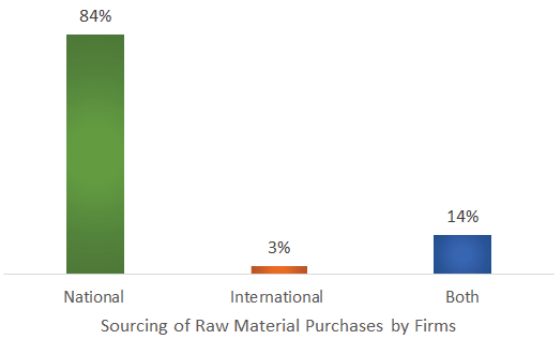
This skewed distribution can be attributed to the low-quality standards of output produced by these companies, as evidenced by the fact that only 2% of the firms have PSQCA certifications. This lack of commitment to quality standards leads to fewer certifications and, ultimately, fewer international clients, resulting in an export deficit in the engineering sector. Regarding external sector engagement, over 83% of these firms do not contribute to industrial exports, while 17%

Figure 15: Contribution by Firms to Industrial Sector Exports



reported that they contribute towards industrial exports between 5% to 30% (Figure 15).

Figure 16: Sourcing of Raw Materials by Firms



Companies exporting to international markets face several hurdles, including tax implications, product quality, brand equity, and pricing. Although raw materials and supplies are essential ingredients for final products, around 84% of these firms purchase their raw materials from the domestic market, 14% purchase from national and international markets, and only 3% purchase exclusively from international markets (Figure 16).

As previously pointed out, these firms primarily cater to domestic clients who demand cheaper products, so they prefer to purchase raw materials from the domestic market. The reason for this can be attributed to the desire to source materials that will allow them the greatest profit margins. The mindset of small and medium-sized firms, who believe that a little is enough (*thora or thoray ki zarorat*), inhibits them from improving quality standards, competing in international markets, and contributing to export surpluses.

There are only a few companies that deal with the international market, and customs clearance is a matter which requires significant attention from them. Most of these companies experience around one-month duration in export clearance. Most of the firms experience one to two months in import clearance.

Mindset of entrepreneurs in small & medium-size firms is a hurdle in their growth. Less industrial output → fewer industrial products → less Pakistan's exports.

Production Practices

The surveyed firms have several key performance indicators, which vary depending on their size. The firms focus on quantity & quality of output produced, production target achievement, profit margins, utilization rate, number of new and existing clients attained, maximum capacity utilization, and engineering process efficiency.

Companies with international clients reported prioritizing quality over quantity and aiming to retain existing clients over attracting new clients to increase their profit margins and process efficiency. On the contrary, small-scale firms catering to the domestic market focus more on quantity of output, production attainment, and capacity utilization.

Annual production targets are based on production volume, product quality, production efficiency, product delivery on time, and quantity of waste generated, which means a firm generating less waste is considered more resource efficient. Large firms

emphasized production quality, on-time delivery, and production efficiency, while small and medium-sized firms prioritized production volume and waste reduction.

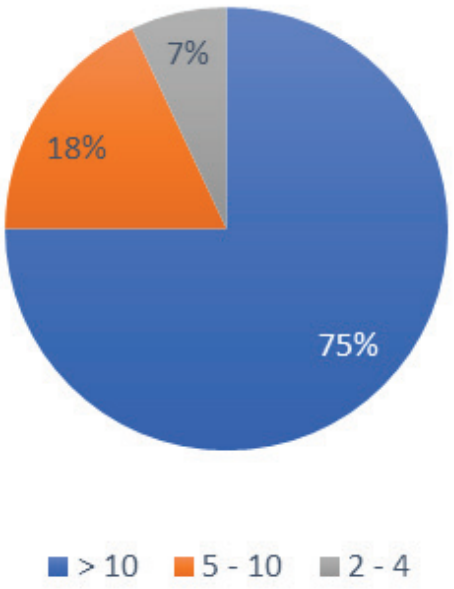
In the engineering industry, operational emergencies happen frequently and must be dealt with 70% of the surveyed firms reported that, in case of an emergency, staff fix the problem and take further actions to minimize such emergencies in the future. This allows them to minimize the impact on operational costs because when such incidents happen, it incurs two major costs; one for ceasing operations and the second for compensation normally paid to the emergency victim. The former can cost a substantial portion of the firm's earnings when a compound machine is stopped abruptly.

Around 14% of firms responded that they focus on fixing the problem without further action. Only 8% of the firms reported following an approach centered on fixing the problem and learning from the mistakes, improving their operational processes and trying to anticipate similar problems. 8% of the firms said no action was taken.

For achieving the production targets of a firm, the labor force naturally plays a significant role. 82% of the firms stated that their production targets are communicated to all managers and workers to ensure orders are delivered on time. However, 18% responded that only managers are informed about production targets.

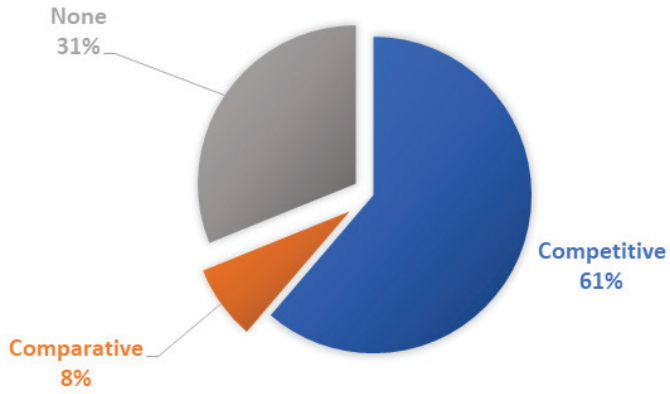
Competition

Figure 17: Competition in the Local Market



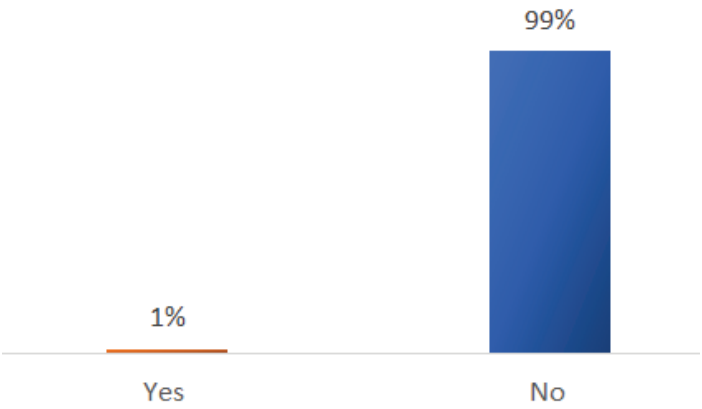
Economic theory posits that competition is crucial in business expansion and recession. As previously stated, many firms primarily serve domestic clients, leading to saturation of the local market and intense competition among domestic producers. Specifically, 75% of firms face more than 10 competitors in the local market, 18% reported having 5 to 10 competitors, and 7% have 2 to 4 competitors (Figure 17).

Figure 18: Source of Firm's Advantage



Competitive advantage refers to a company's ability to differentiate itself from its competitors, while comparative advantage refers to a business's ability to produce a cheaper product than other businesses. In response to these advantages, 61% of firms surveyed reported having a competitive advantage and competing against other firms in the domestic market (Figure 18).

Figure 19: Firms Using Foreign Licensed Technology



Conversely, 8% of firms have a comparative advantage and prefer to compete with international competitors. Surprisingly, about 31% of firms lack any advantage over their competitors.

Engineering firms rely on technology for producing products, and it is reasonable to assume that new technology will be more productive. Notably, only 1% of the surveyed firms utilize production technology licensed from foreign companies (Figure 19). The remaining companies use the technology of local origin or not requiring licensing (old equipment, for example).

This could be one reason why small and medium-sized firms in Pakistan's engineering sector have fewer international clients, fewer exports, more competitive advantage, and less advanced manufacturing technologies. The cost of licensing the technology and access to it will likely be two major contributing factors to this decision.

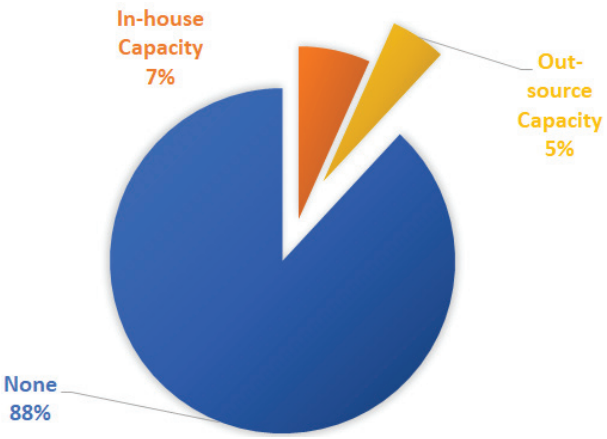
Majority of firms do not license production technology from foreign companies and end up using local origin equipment of dated design.

Research and Development

Research & Development (R&D) is a critical function of any organization that leads to the creation of new products, services, technologies, and innovative ways to interact with clients. These innovative ideas and products help companies to stay ahead of the competition, enhance their market share, and ultimately increase their profit margins. However, despite its importance, the general trend for firms in Pakistan has been to shy away from allocating any budget for R&D. Data collected as part of a UNESCO Institute of Statistics initiative suggests that at an aggregate, macro level, only 0.16% of Pakistan's GDP is invested in domestic R&D (UNESCO Institute for Statistics, 2023). A similar trend is observed in the responses collected for this survey, with 88% of firms reporting spending zero budget on R&D in the last year.

As a result of this lack of investment in R&D, firms face challenges in launching new products, gathering useful customer insights, adopting advanced manufacturing technologies, and improving processes. Many firms are unable to obtain new technologies or improved processes in manufacturing, and this insight is confirmed by the fact that majority of the firms reported they had not obtained any new technology or improved process in their manufacturing process in the last five years.

Figure 20: Budget Allocation for R&D



The firms that invest in R&D can either choose to conduct R&D in-house or outsource it from other specialist firms/organizations. Of the firms sampled, 7% reported having an in-house R&D department, while 5% preferred to utilize third-party providers of R&D services (Figure 20).

Among the firms that reported adopting improved processes, 34% responded that the improved processes significantly impacted operations, but few firms added improved processes have not shown drastic impact. The reason for weak absorption of improvements was attributed to either weak R&D or a lack of adequately skilled labor.

As a result of this lack of investment in R&D, firms face challenges in launching new products, gathering useful customer insights, adopting advanced manufacturing technologies, and improving processes. As a result, many firms cannot obtain new technologies or improved processes in manufacturing. For example, 66% of firms reported they had not obtained any new technology or an improved process in manufacturing in the last five years. However, 34% have adopted improved processes, which has significantly impacted operations. The firms that reported the negligible impact of new processes on their operations attributed the lack of absorption to either weak R&D or inadequate labor.

R & D is crucial for firms that want to stay ahead of the competition and increase their profit margins (Fagerberg, 1996; Kiselakova et al., 2018). However, the lack of investment in R&D is a major concern for the manufacturing industry, as it limits the ability of firms to innovate and adopt advanced technologies and processes. Firms must consider investing in R&D and hiring skilled labor to ensure that they can create new products and improve their operations.

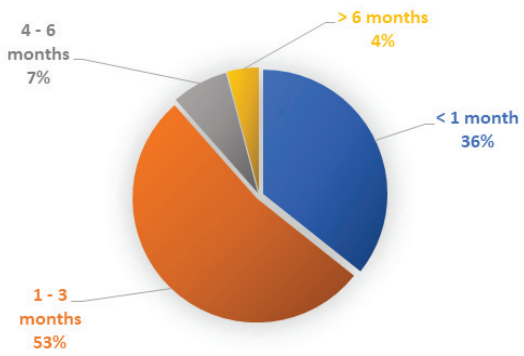
88% of surveyed firms prefer not to engaged in R&D activities.

Business - Government Relations

For a country to achieve economic prosperity, businesses and government must have a good working relationship. However, due to political instability and unfavorable economic policies in Pakistan, many business owners are dissatisfied with government procedures and perceive them as biased against the industry. The frequent changes in government increase the risk of doing business and create trust issues between firms and the government.

Economic and policy uncertainty, coupled with risk of doing business in Pakistan, also negatively impact firms, causing a decrease in productivity, an increase in operational costs, and a reduction in profit margins. This also affects the ability of businesses to attract national and international clients.

Figure 21: Time Expended on Compliance Issues

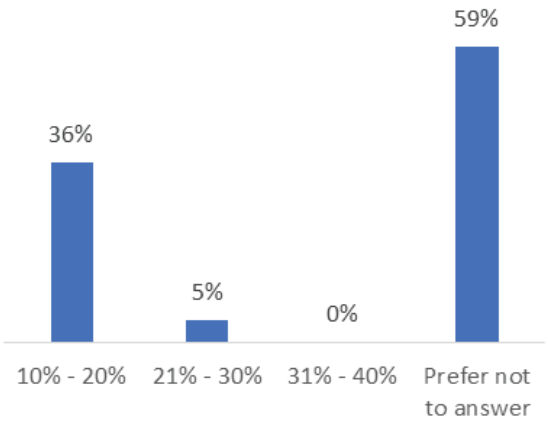


According to the survey, a significant number of firms in Pakistan spend a considerable amount of time on government compliance. In 2014, according to the Organization for Economic Cooperation and Development (OECD), the average annual regulatory compliance cost per firm was estimated at USD 200 per firm, which translates to USD 0.55 daily (OECD, 2014). Using the USD to PKR conversion rate of the first quarter of 2023, this translates to an estimated annual regulatory compliance cost of each firm around PKR 56,000. Therefore, firms can expect to bear a compliance cost of PKR 153 per day. Around 36% of firms in the sample reported spending less than one month on government compliance annually (Figure 21).

On the other hand, 53% of firms stated they spend one to three months on compliance per annum. Furthermore, 7% of firms claiming they spend 4 to 6 months on regulatory compliance annually. Lastly, 4% of firms reported spending more than 6 months on government compliance.

Additionally, 43% of firms reported interacting with tax officials at least once a year, 15% stated that tax officials visit their firms semi-annually, and 19% host tax officials quarterly. However, 23% of the firms reported that tax officials do not visit their factories, which is likely a contributing reason for the decision to operate informally.

Figure 22: Tax Paid by Firms



Due to the trust deficit between businesses and government bodies, 59% of firms stated that they would prefer not to disclose the amount of tax they pay to the government. Only 36% of firms reported paying 10% to 20% tax to the government, while 5% stated they pay 21% to 30% tax to the government (Figure 22).

In the engineering industry, obtaining an operating license is crucial for the commencement of operations. Over 42% of firms reported it takes them less than one month to obtain an operating license, while 45% stated spending between one to three months to obtain the license. Meanwhile, 9% and 4% of firms reported spending 4 to 6 months and more than 6 months on obtaining operating licenses, respectively.

For firms with international clients and suppliers, obtaining import/export licenses is essential to their operations. According to the survey, most firms reported that one to two months are required to obtain an import/export license. In addition, most firms believe complex government regulations are a major obstacle to their operations.

Issues in government compliance cost PKR 6.2 million per year for 328 firms.

Key Highlighted Issues

Based on the survey conducted, several prominent issues have come to light.

1. **Lack of professionalism and standardization in engineering firms of Pakistan.**
2. **Power shortages and load-shedding significantly impact daily production resulting in high net idle factor cost.**
3. **Majority of the firms have no/limited online presence.**
4. **Little is enough mindset inhibits firms from growth.**
5. **The inability to provide collateral makes firms less enticing to banks as potential recipients of financing, thereby constraining their ability to pursue business expansion initiatives.**
6. **Delays in custom clearance makes import and export cumbersome.**
7. **Many firms prioritize quantity over quality.**
8. **Firms lack comparative advantage over competitive advantage.**
9. **Lack of R&D investment keeps most firms from product and process development.**
10. **Limited access to finance limits firms from business expansion.**
11. **Political instability and unfavorable economic policies have created a trust deficit between businesses and government bodies.**
12. **Many firms spend a considerable amount of time on government compliance.**
13. **Lack of widespread training and development programs leads to inefficiencies.**

Recommendations

According to the underlining issues, some recommendations are given below:

- To ensure quality standards, engineering firms may comply with international and national quality standard certification organizations.

- The government may focus on improving electricity supply in industrial areas. In addition, small and medium-sized firms may explore options to acquire backup power supplies.

- Limited access to finance encourages informal credit lending which excludes banks from the lower end of the lending market. Banks may initiate special schemes to provide credit to small and medium enterprises on easy terms to encourage business expansion.

- To surmount the significant challenge posed by the "little is enough" mindset, firms must not retreat from competition, but rather wholeheartedly embrace it.

- EDB may coordinate with sector associations to develop a growth-oriented mind-set in local firms.

- Firms may focus on research & development and labor training programmes, which will aid them in adopting new technologies, advanced processes and skilled labor force.

- Firms can establish their online presence to reach out to a large client base.

- The government may focus on addressing the underlying bottlenecks that hinder business operations so that time spent on government regulation can be minimized. This will create a trust surplus between government and businesses.

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Sectoral Snapshots

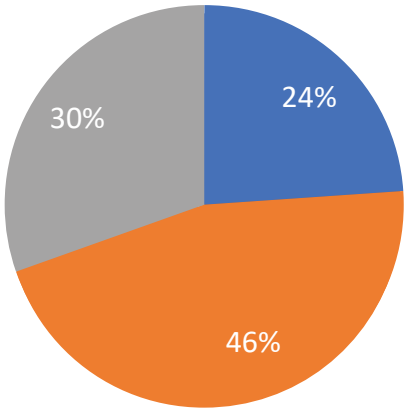
FANS

Surveyed Firms **46**

Daily Production (unit)
41,826

Total Labor Employed
836

Employed Labor
Mixed
(Temporary & Permanent)



Firms Average Age (years) **21**

Firm Ownership
- Private limited company
- Partnership
- Sole Proprietorship

	National	International	Both
Firms Clients	78%	2%	20%
Firms Purchasing Raw Material	48%	7%	45%

65%
Firms Withheld Tax Information

Daily loadshedding Hours
4 to 6

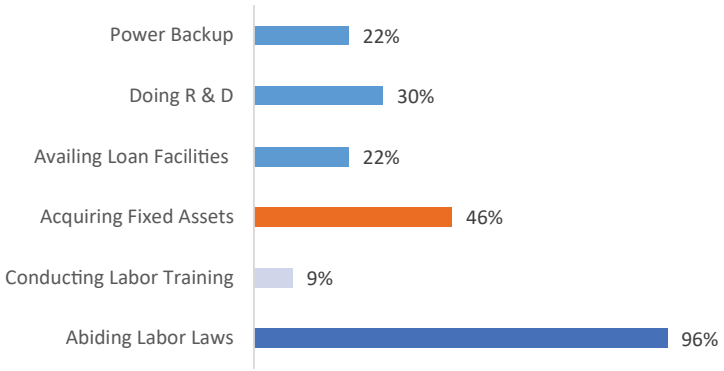
Market Competition
Local

Daily Operational Hours
8 to 10

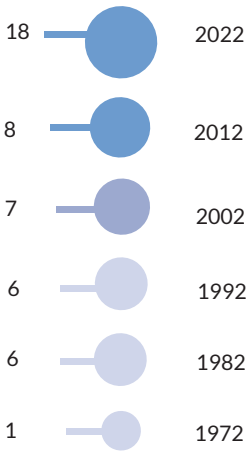
Obtaining Operating License Time
1 to 3 Months

Government Regulation Compliance Time
1 to 3 Months

Business Operations & Infrastructure



New Entrants



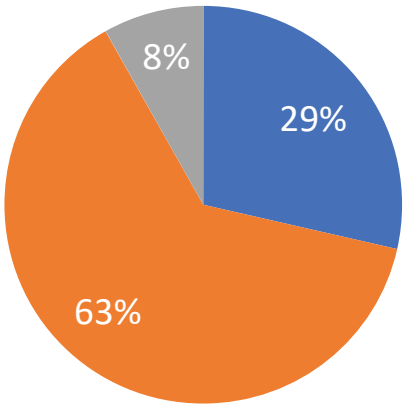
Automobile Parts

Surveyed Firms **49**

Daily Production (unit)
15,895

Total Labor Employed
2,380

Employed Labor
85%
(Temporary)



Firms Average Age (years) **25**

Firm Ownership

- Private limited company
- Partnership
- Sole Proprietorship

	National	International	Both
Firms Clients	84%	2%	14%
Firms Purchasing Raw Material	82%	2%	16%

40%
Firms Withheld Tax Information

Daily loadshedding Hours
2 to 4

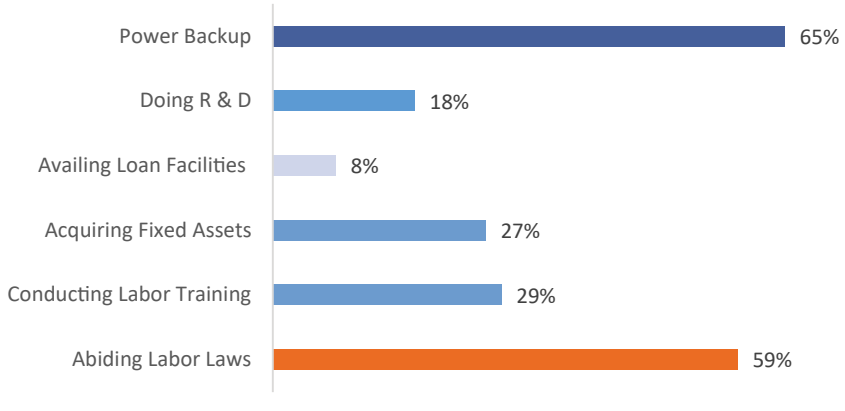
Obtaining Operating License Time
1 to 3 Months

Market Competition
Local

Daily Operational Hours
8 to 10

Government Regulation Compliance Time
1 to 3 Months

Business Operations & Infrastructure



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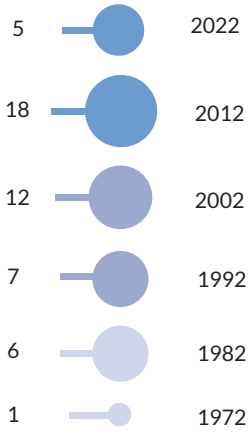


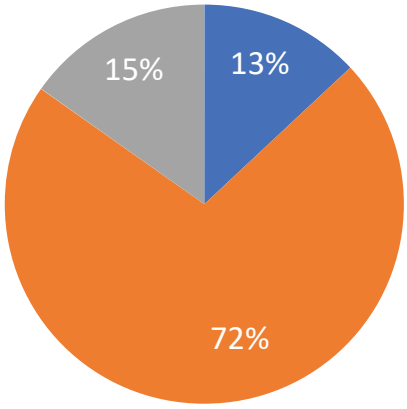
Steel

Surveyed Firms **46**

Daily Production (unit)
14,709

Total Labor Employed
2,109

Employed Labor
63%
(Temporary)



Firms Average Age (years) **19**

Firm Ownership

- Private limited company
- Partnership
- Sole Proprietorship

	National	International	Both
Firms Clients	93%	0%	7%
Firms Purchasing Raw Material	87%	2%	11%

58%
Firms Withheld Tax Information

Daily loadshedding Hours
2 to 4

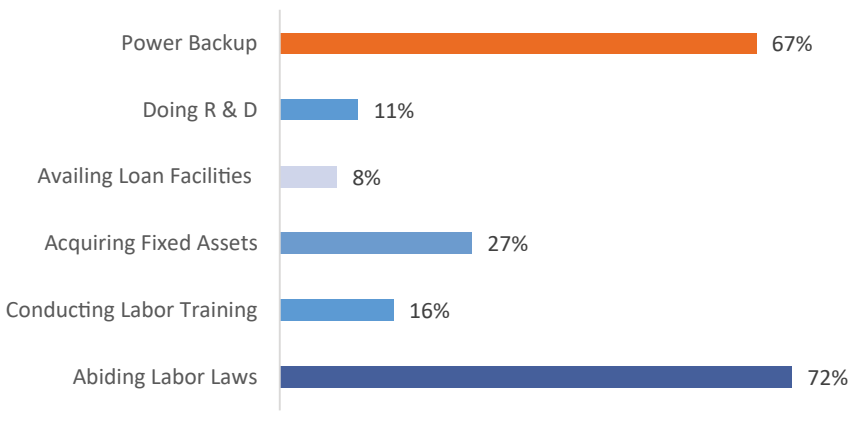
Obtaining Operating License Time
1 to 3 Months

Market Competition
Local

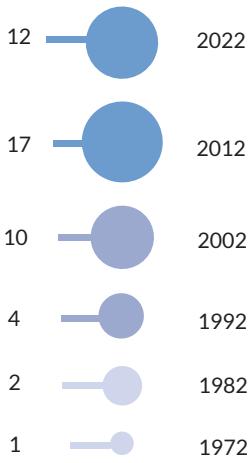
Daily Operational Hours
10 to 12

Government Regulation Compliance Time
1 to 3 Months

Business Operations & Infrastructure



New Entrants



Pumps, Motors, Home Appliances

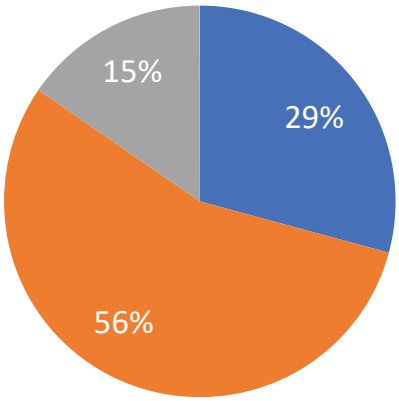
Surveyed Firms **65**

Firms Average Age (years) **24**

Daily Production (unit)
27,590

Total Labor Employed
1,068

Employed Labor
58%
(Temporary)



Firm Ownership

- Private limited company
- Partnership
- Sole Proprietorship

	National	International	Both
Firms Clients	78%	0%	22%
Firms Purchasing Raw Material	83%	3%	14%

49%
Firms Withheld Tax Information

Daily loadshedding Hours
2 to 4

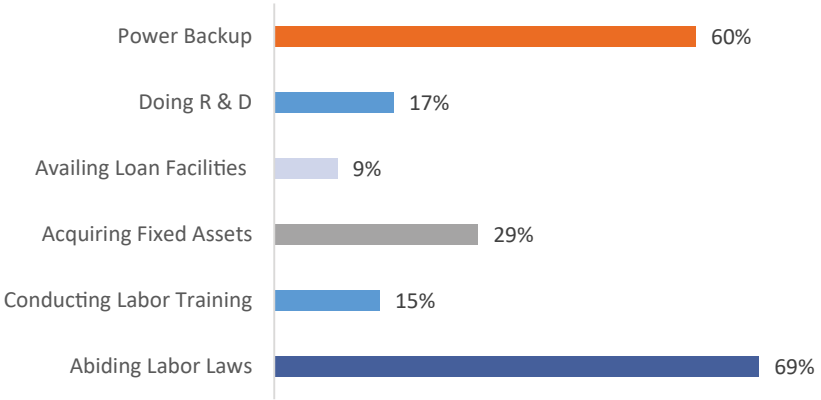
Obtaining Operating License Time
1 to 3 Months

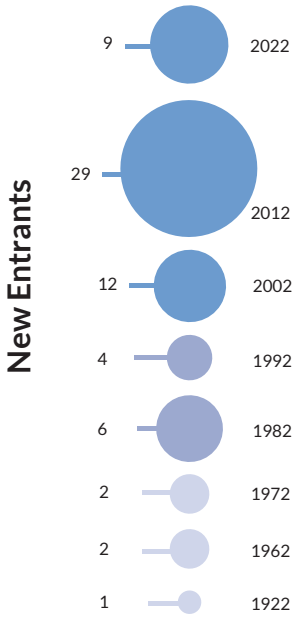
Market Competition
Local

Daily Operational Hours
8 to 10

Government Regulation Compliance Time
1 to 3 Months

Business Operations & Infrastructure





Cutlery, Utensils & Knives

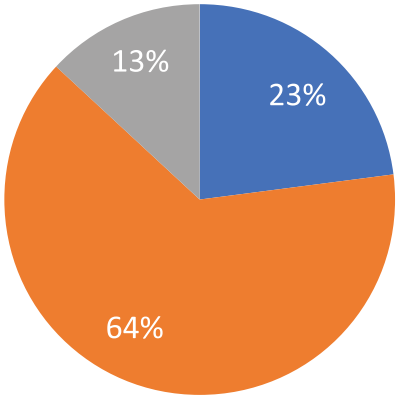
Surveyed Firms **61**

Firms Average Age (years) **19**

Daily Production (unit)
19,934

Total Labor Employed
858

Employed Labor
57%
(Temporary)



Firm Ownership

- Private limited company
- Partnership
- Sole Proprietorship

	National	International	Both
Firms Clients	72%	0%	28%
Firms Purchasing Raw Material	94%	3%	3%

45%
Firms Withheld Tax Information

Daily loadshedding Hours
2 to 4

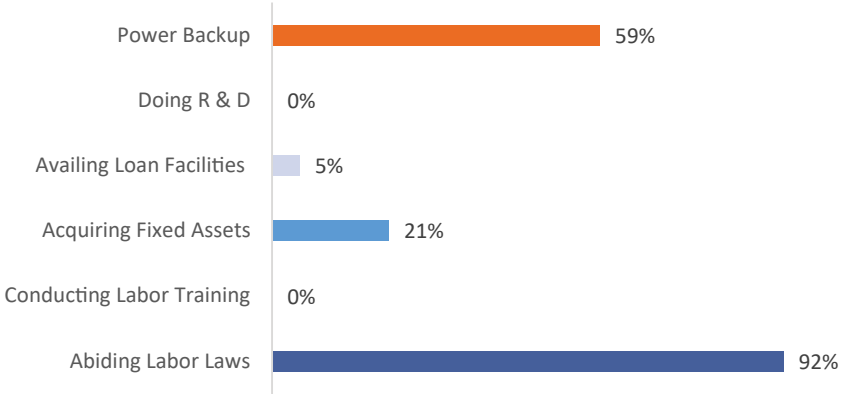
Obtaining Operating License Time
1 Month

Market Competition
Local

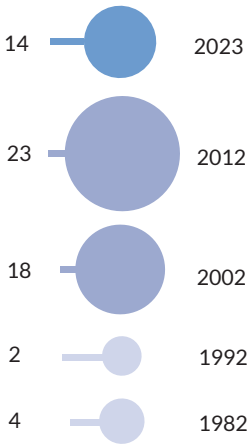
Daily Operational Hours
8 to 10

Government Regulation Compliance Time
1 to 3 Months

Business Operations & Infrastructure



New Entrants



Furniture

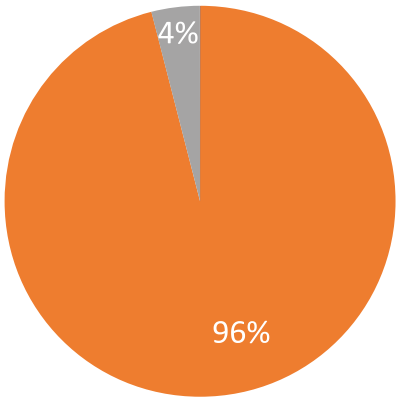
Surveyed Firms **50**

Firms Average Age (years) **6**

Daily Production (unit)
716

Total Labor Employed
266

Employed Labor
52%
(Permanent)



Firm Ownership

- Private limited company
- Partnership
- Sole Proprietorship

	National	International	Both
Firms Clients	100%	0%	0%
Firms Purchasing Raw Material	100%	0%	0%

100%
Firms Withheld Tax Information

Daily loadshedding Hours
1 to 2

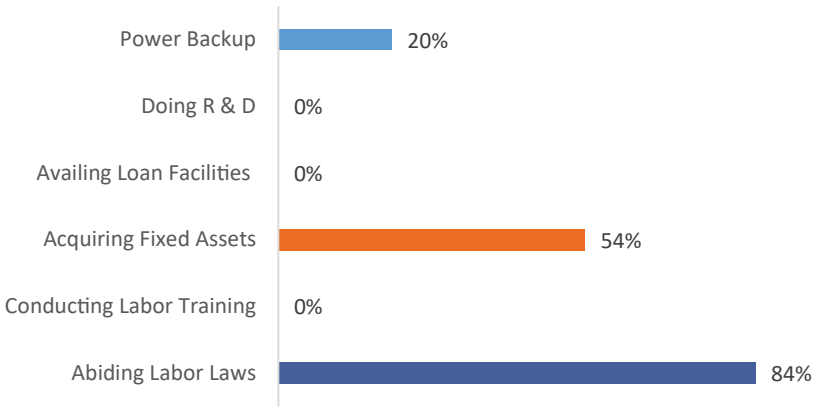
Obtaining Operating License Time
1 Month

Market Competition
Local

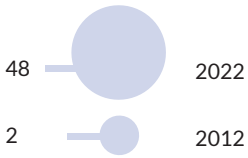
Daily Operational Hours
11 to 14

Government Regulation Compliance Time
1 Month

Business Operations & Infrastructure



New Entrants



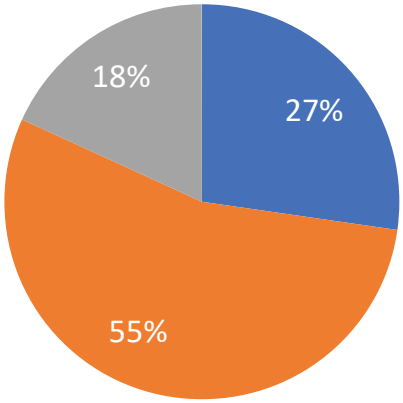
Ceramics & Sanitaryware

Surveyed Firms **11**

Daily Production (unit)
2,580

Total Labor Employed
223

Employed Labor
81%
(Temporary)



Firms Average Age (years) **20**

Firm Ownership
- Private limited company
- Partnership
- Sole Proprietorship

Daily Operational Hours
8 to 10

	National	International	Both
Firms Clients	100%	0%	0%
Firms Purchasing Raw Material	100%	0%	0%

64%
Firms Withheld Tax Information

Daily loadshedding Hours
2 to 4

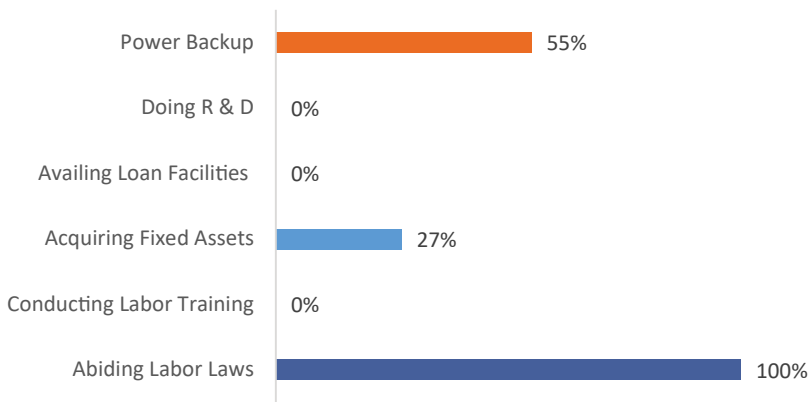
Obtaining Operating License Time
1 Month

Market Competition
Local

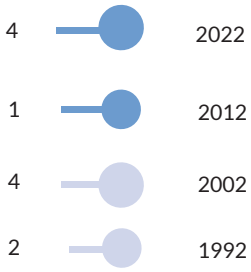
Daily Operational Hours
8 to 10

Government Regulation Compliance Time
1 to 3 Months

Business Operations & Infrastructure



New Entrants

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