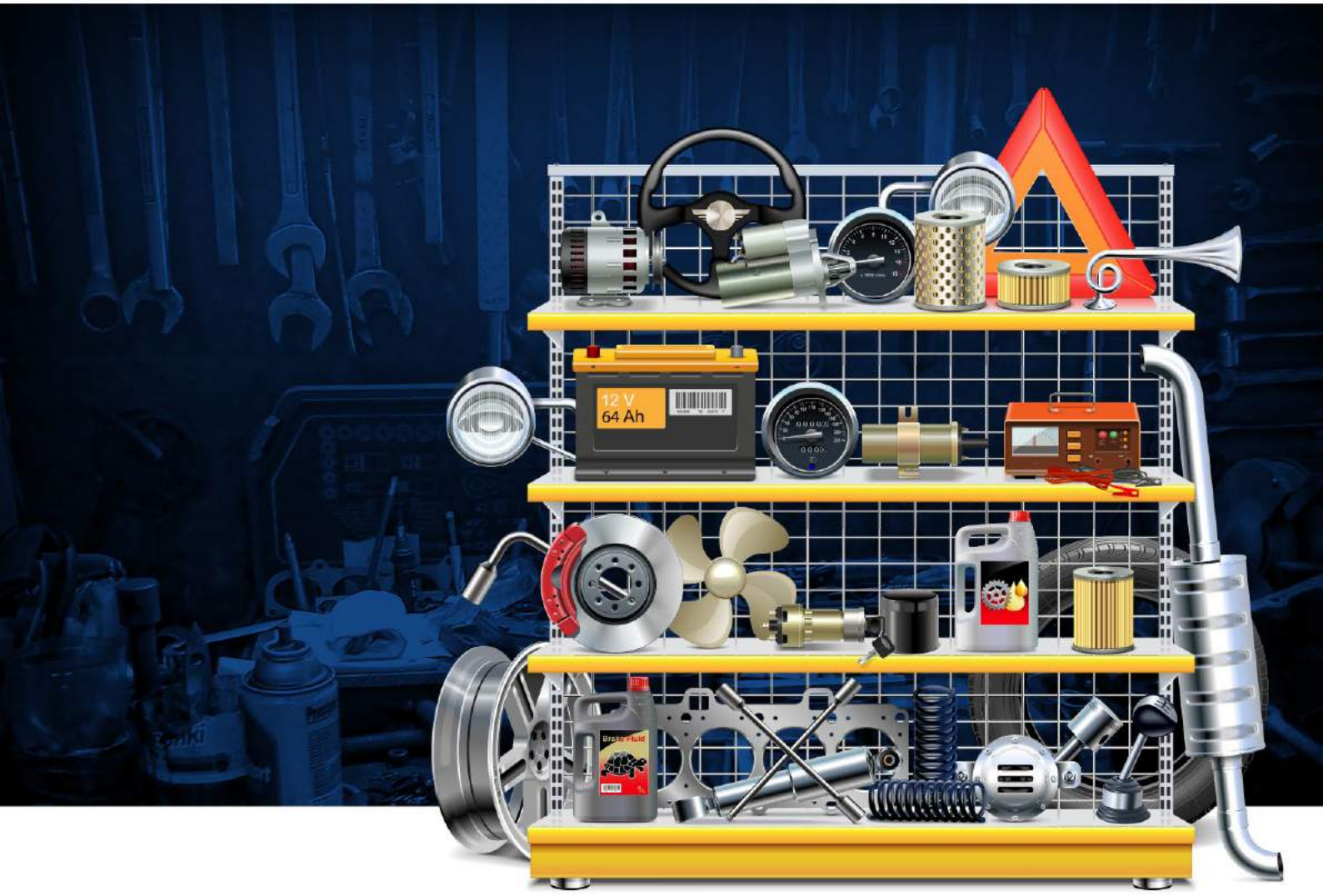
Diagnostic Study

Cluster Development Initiative



AUTO PARTS CLUSTER LAHORE

The CDI is Jointly Implemented by PSIC and UNIDO

Cluster Development Initiative

Diagnostic Study
Auto Parts Cluster Lahore

Muhammad Arslan, Cluster Manager
Tariq Mahmood, Deputy Cluster Manager
Faisal Nadeem, Cluster Facilitator

The CDI is Jointly Implemented by PSIC and UNIDO

Acknowledgement

This diagnostic study has been carried out as part of the Cluster Development Initiative Project (CDI), conceived, funded and executed by Punjab Small Industries Corporation (PSIC). The Government of Punjab, under a Trust Fund Agreement, engaged United Nations Industrial Development Organization (UNIDO) as the implementing partner for capacity building of the cluster teams, planning and executing Competitive Reinforcement Initiatives (CRIs).

The completion of the diagnostic study is an important milestone achieved so far and is a result of the combined efforts and support of various individuals and institutions. We would like to thank the international experts on Cluster Development, Mr. Vedat Kunt and Mr. Nima Bahramalian, engaged by UNIDO, for training of the cluster teams and supervision of the Diagnostic Study Report. We are also thankful to Mr. Badar-Ul-Islam, National Project Coordinator and Mr. Qasar Wasique Ahmad, National Technical Expert, UNIDO for their support and assistance.

The Cluster team is grateful to Dr. Muhammad Mujtaba Piracha, Secretary Industries, Commerce & Investment Department, Government of Punjab and Mr. Khalid Saleem, Managing Director, PSIC for their continued support and guidance in the execution of the project. We are also obliged to the CDI Project Director, Mr. Fazal ur Rehman and Additional Project Director, Mr. Hamid Malhi, along with the support staff, for facilitating the cluster teams in every possible way.

The Auto Parts Cluster team would also like to thank Pakistan Association of Automotive Parts and Accessories Manufacturers (PAAPAM), Pakistan Automotive Manufacturers Association (PAMA), Industry Owners Association-Baghbanpura Lahore, Pakistan Foundry Association (PFA), Pakistan Plastic Manufacturers Association (PPMA), Auto Parts Manufacturers, Original Equipment Manufacturers (OEMs), Business Development Service Providers, Training Service Providers, Backward and Forward Linkages and Sector Experts for their timely response and kind support towards the CDI project.

Table of Contents

Table of Contents

Table of Abbreviations

Abbreviation	Description
ABS	Acrylonitrile Butadiene Styrene
APSC	Auto Parts Support Centre
BOI	Board of Investment
CAD	Computer Aided Design
CBT&A	Competency Based Training & Assessment
CCP	Competition Commission of Pakistan
CDI	Cluster Development Initiative
CNC	Computer Numerical Control
CPI	Centre for the Promotion of Imports
EDB	Engineering Development Board
ESCOs	Energy Saving Companies
FBR	Federal Board of Revenue
FPCCI	Federation of Pakistan Chambers of Commerce & Industry
GIZ	Deutsche Gesellschaft Fur Internationale Zusammenarbeit (Giz) GMBH
GTDMC	Gujranwala Tools, Dies and Molds Centre
IATF	International Automotive Task Force
IGC	International Growth Centre
ICI&W	Industries, Commerce & Investment Department, Government of Punjab
IQTM	Institute of Quality & Technology Management
ISO	International Organization for Standardization
IT	Information Technology
JICA	Japan International Cooperation Agency
KPIs	Key Performance Indicators
LCCI	Lahore Chamber of Commerce & Industry
MIRDC	Metals Industry Research and Development Center
MoC	Ministry of Commerce
MoENT	Ministry of Federal Education & Professional Training
MoF	Ministry of Finance
MoI&P	Ministry of Industries & Production
MoST	Ministry of Science & Technology
NAVTTC	National Vocational & Technical Training Commission
NCPC	National Cleaner Production Centre
NPO	National Productivity Organization
NUST	National University of Sciences and Technology
NVQF	National Vocational Qualifications Framework
NSS	National Skills Strategy
OEMs	Original Equipment Manufacturers
OHS	Occupational Health & Safety
PAAPAM	Pakistan Association of Automotive Parts and Accessories Manufacturers
PAMA	Pakistan Automotive Manufacturers Association
PBIT	Punjab Board of Investment & Trade
PBTE	Punjab Board of Technical Education
PC	Poly Carbonate
PCSIR	Pakistan Council of Scientific & Industrial Research
PIM	Pakistan Institute of Management
PITAC	Pakistan Industrial Technical Assistance Centre
PNAC	Pakistan National Accreditation Council
PP	Polypropylene
PSDF	Punjab Skill Development Fund
PSIC	Punjab Small Industries Corporation

Table of Abbreviations

Abbreviation	Description
PSQCA	Pakistan Standards & Quality Control Authority
PVC	Polyvinyl Chloride
PVTC	Punjab Vocational Training Council
QC	Quality Control
R&D	Research and Development
SBP	State Bank of Pakistan
SDC	Standards Development Centre
SECP	Securities & Exchange Commission Pakistan.
SLMIS	Skilled Labour Market Information/ Placement System
SME	Small & Medium Enterprises
SMEDA	Small & Medium Enterprises Development Authority
SOPs	Standard Operating Procedures
TBS	Tariff Based System
TDAP	Trade Development Authority of Pakistan
TEVTA	Technical Education & Vocational Training Authority
TSC	Technical Services Centre
TVET	Technical Education and Vocational Training
UET	University of Engineering & Technology
UMT	University of Management Technology
UNIDO	United Nations Industrial Development Organization
UoL	University of Lahore
WeBOC	Web Based One Customs

List of Tables

List of Figures

List of Figures

Executive Summary

The cluster concept has gained prominence as an economic policy tool aimed to foster innovation and the growth of a competitive private sector in developing as well as developed countries. Clusters play a critical role in generating employment, income, increasing exports, fostering innovation and opportunities for the local community and becoming drivers of broad-based local economic development.

The Government of Punjab has recently adopted the "Punjab Growth Strategy", which incorporates a target of 8% annual GDP growth within the Province. The Industrial Sector Development Plan, an element of the Growth Strategy, is oriented to increase private sector investment, thereby increasing job creation and exports. As part of the development plan, the Government has introduced a Cluster Development Initiative (CDI) to support the growth and competitiveness of key manufacturing clusters through the Punjab Small Industries Corporation (PSIC). This initiative is part of a larger cooperation on "Jobs and Competitiveness" programme with the World Bank.

In the framework of the Punjab Jobs and Competitiveness Programme, the Government of Punjab has signed a cooperation agreement with United Nations Industrial Development Organization (UNIDO) to provide technical assistance for the development of industrial clusters in Punjab province and to support their further integration into global value chains.

The Auto sector contributes to a major chunk in Pakistan's economy adding approx. 6 billion US$ every year, which is approximately 16% of the manufacturing sector of Pakistan. Being the 6th largest manufacturing sector with a share of 2.3% in GDP, the auto parts sector contributes only 45 million US$ in exports. The local industry is still not able to manufacture high tech dynamic components, such as engine precision components. However, auto parts manufacturers have localized a large number of low tech automotive parts including sheet metal, rubber, plastic and aluminum parts. The industry has witnessed a handsome average annual growth rate of 7%~8% in the past five years. With the advent of new assemblers entering the automotive sector of Pakistan, it is expected to demonstrate a healthy growth pattern in the future. The auto sector of Pakistan currently produces 150,000 cars, 35, 000 tractors, 1.7 million 2/3 wheelers annually.

This study addresses the factors that have contributed to the development of the cluster and the barriers that hinder its growth and helps understand the comparative socio-economic environment of the cluster, identify the most effective leverage points for intervention, provide a baseline for future monitoring and evaluation, and help build initial trust with and among the stakeholders. The study also entails potential intervention areas to overcome the prevailing issues vis-à-vis possibilities of joint actions on the part of cluster actors.

In view of the data analyzed using a number of analytical tools such as PESTLE, Porter's Five Forces & Diamond Model, Cluster Map & Cooperation Matrix and SWOT, a number of recommendations addressing short to long term challenges of the cluster have been identified. Some of the key issues identified during this study are presented hereunder:

- **Business Environment:** Although the sector has been showing a healthy growth trend for the last five years, the auto parts manufacturers are still facing critical issues in terms of access to finance, availability of inputs at competitive prices, level playing field at par with informal component producers, access to latest technology and support infrastructure required to embark on R&D and innovation. As a result, the auto parts producers are witnessing cut throat competition in terms of price for their products on one hand and rising cost of production on the other hand.

- **Quality and Compliance:** In order to produce auto parts at par with international competitors in order to enter global value chains, sector and product specific compliances are mandatory for the auto parts manufacturers in Pakistan. In order to meet the demand of the OEMs as well as after sales market, no stringent compliance requirements are necessary, thereby leading to lesser significance related to compliance conformance for the component producers. A huge gap therefore prevails in terms of awareness and capacity to meet such compliance requirements on the part of component producers as well as BDSPs.

- **Productivity and Production Management Systems:** Auto parts manufacturers, especially vendors of the local OEMs, are operating at lower labor productivity level and are not able to comprehend the production wastages incurred due to absence of effective performance management systems. Most of the companies are being operated by the owners, who neither have the competency to envision this aspect, nor the desire to engage professionals to overcome this challenge. Therefore, presence of professional managers in the cluster companies is rare. In addition to this, the technical knowledge base about a manufacturing process cannot be perceived as a substitute to the performance management system. This anomaly has resulted in poor labor productivity levels of mere 30-40%, thereby deteriorating all the Key Performance Indicators at the firm level in terms of Cost, Quality and Delivery (CQD). Since the cluster is competing on price basis, there exists a significant potential to reduce cost of production by eliminating non-value-added activities in the auto parts cluster supply chain.

- **Strengthening Business Development Service Providers-BDSPs:** The industry has limited access to quality business development services regarding designing of production tools (dies and molds), 3D printing/prototyping, precision machining facilities which includes CNC, finishing and polishing of production tooling (dies and molds), and heat treatment facilities, which consequently impedes the growth of the industry in terms of availability of design and development, and quality production tooling. The industry hence, has to opt for imported substitutes. Few initiatives have been taken by the Federal and Provincial governments, but have proved to be futile due to various reasons.

- **Energy Efficiency and Energy Management System:** Auto parts manufacturing is an energy intensive industry utilizing a mix of gas, electricity and petroleum products. On one hand, enterprise level consumption of energy mix is sub-optimal, whereas on the other hand, the increasing cost of the energy mix further exacerbates affordability and competitiveness. The lack of awareness and capacity constraints on the part of manufacturers to adopt best practices in energy management along with limited support from the government to increase energy efficiency consciousness in the cluster are contributing significantly to increased costs of production for the cluster enterprises.

In order to address the challenges faced by the auto parts cluster, Lahore including the above mentioned issues, this study contains a set of recommendations in certain areas such as innovation, performance management system and labor productivity, quality and compliance, energy management systems, import substitution and image building of PAAPAM, etc.

1. Introduction

The manufacturing sector has always proved to be at the core of economic development[1]. Since the first-time mass production was successfully introduced in the automotive sector of US, which not only revolutionized the industry, but the country and eventually the world, the automotive industry has demonstrated time and again that it can channelize accelerated development of countries.

As per five-year sales data[2], the average growth rate of Pakistan's automotive sector is 6% ~ 7%. Considering the state of the industrial sector, which Pakistan inherited at the time of independence, the automotive sector has grown by leaps and bounds in almost half a century.

Considerable growth and capacity was developed in the earlier stages when the industry was initially set up under government guidance and support, but technological prowess and competitiveness has eluded the industry for the most part.

A handful of firms have managed to achieve a measure of global competitiveness (in terms of establishing export markets) and developing local technological capabilities (primarily in terms of locally designed and produced components, parts and products). At present, competitiveness can be achieved in late developing countries such as Pakistan through a process of learning and evolution, rather than innovation. According to Lundvall[3], this is an interactive process that cannot be properly understood without taking into account the institutional and cultural context.

This gives a strategic advantage and continuity to the local parts manufacturing industries, which in turn develop their capabilities in their respective fields.

The fortune of the automotive components segment is inextricably linked to the performance of its dominant customer i.e. Automotive Sector. Apart from demand, this business critically impacts the industry structure of auto parts.

1.1 Objective of the Study

The objective of this study is to assess the competitiveness of the Auto Parts sector, understand the dynamics of the supply and demand factors, support mechanisms as well as the linkages between the backward and forward industries and cluster actors. Principal firms of the cluster, companies with backward and forward linkages, support institutions and business development service providers were met and interviewed as well as data and information gathered from secondary sources were analyzed in order to understand the common problems, advantages and disadvantages of the cluster.

This study addresses the factors that have contributed to the development of the cluster and the barriers that hinder its growth and helps understand the comparative socio-economic environment of the cluster, identify the most effective leverage points for intervention, provide a baseline for future monitoring and evaluation and help build initial trust with and among the stakeholders. The study also entails potential intervention areas to overcome the prevailing issues vis-à-vis possibilities of joint actions on part of cluster actors.

---

[1] (Qadir 2016)
[2] PAMA
[3] (Ibid)

1.2 Jobs & Competitiveness Programme & the Cluster Development Initiative

Keeping in view the stagnant growth of the manufacturing clusters in Punjab, the Government of Punjab has recently adopted the "Punjab Growth Strategy" which incorporates a target of an annual 8% GDP growth within the Province. The Industrial Sector Development Plan, an element of the Growth Strategy, is oriented to increasing private sector investment, thereby increasing job creation and exports. As part of the development plan, the Government has introduced Cluster Development Initiative (CDI) to support the growth and competitiveness of key manufacturing clusters in particular through interventions of the Punjab Small Industries Corporation (PSIC). This initiative is part of a larger cooperation on "Jobs and Competitiveness" programme with the World Bank.

In the framework of the Punjab Jobs and Competitiveness programme, the Government of Punjab has signed a cooperation agreement with UNIDO (United Nations Industrial Development Organization) to provide technical assistance for the development of industrial clusters in Punjab province and to support their further integration into global value chains.

The purpose of CDI is to create an enabling environment for growth and prosperity of industries, to create better quality of life through economic uplift in Punjab and to up-grade technology and enhance productivity quality and profitability of local industries. The lead on the implementation of the CDI for the Government of Punjab is with the Punjab Small Industries Corporation (PSIC) as a government institution.

In consultation with UNIDO, clusters with high potential for growth in Punjab were identified and four prominent clusters were selected as the pilot clusters;

- ✓ Readymade Garments
- ✓ Auto parts
- ✓ Leather Footwear
- ✓ Surgical Instruments

1.3 Cluster Development

The cluster concept has gained prominence as an economic policy tool aimed to foster innovation and the growth of a competitive private sector in developing as well as developed countries.

Clusters play a critical role in generating employment, income, increasing exports, fostering innovation, and opportunities for the local community and become drivers of broad-based local economic development.
The foundations of this paradigm can be traced back to the work of the economist Alfred Marshall, who in Principles of Economics (1890) described the phenomenon as "the concentration of specialized industries in particular localities" and noted that these agglomerations of small-scale businesses enjoyed economies of scale comparable to those of large firms. More recently, Michael Porter popularized the concept of industry clusters in his book The Competitive Advantage of Nations (1990). Thereafter, there has been a surge of interest in clusters as drivers of economic growth and hubs of innovation, and during the last two decades, the cluster development approach was introduced all around the world in different industrial, agriculture, services and tourism sectors in developed and developing economies, yielding successful results in competitiveness of the SMEs.

As a starting point for cluster development, it is imperative that a thorough diagnostic study needs to be carried out on the cluster strategy and an action plan built upon the main findings of the study, in consultation and most importantly in consensus with the cluster stakeholders.

1.4 Limitations of the Study

It is important to stress that, in a complex socio-economic environment and in a micro and small enterprise cluster environment, no one-off study can be expected to identify all relevant issues and their remedies. The diagnostic study provides an entry framework, a snapshot of the existing business environment with current possible opportunities and threats and the cluster's advantages and disadvantages, which need to be regularly fine-tuned and revised with the stakeholders and supplemented with specialized studies, on a need basis, at later stages.

1.5 Sampling Plan

- ✓ 11 Large (with 250 or more employee strength) auto parts manufacturers were visited.
- ✓ 24 Small & Medium (with 50 to 250 employee strength) units were visited.
- ✓ 1 micro unit was visited.
- ✓ 5 Business Development service providers, 9 support institutions including 1 from private and 8 from government sectors were interviewed.
- ✓ 8 input/raw material suppliers were also interviewed.
- ✓ In order to identify key problems of the buyers/forward linkages, 6 Original Equipment Manufacturers of 2/3 wheelers segment were also interviewed.
- ✓ 3 associations other than PAAPAM were also met
- ✓ Principal firms visited were both from formal and informal sectors, in order to gather information from every perspective.
- ✓ The corresponding sample mix has been adopted to ensure an acceptable coverage of SMEs in overall sample size.

1.6 Overview of The Industry

1.6.1 Global Scenario

The automotive industry has been growing rapidly in the past few years. New trends have made their way and new markets have opened up, a major cause of which is disruptive innovation. Considering the fast-paced environment and innovations that take place daily, business models and industries are subject to rapid growth, disruption and changes[4].

Fig. 1- Buyouts of Automotive Companies 2002-2015
Source: International Organization of Motor Vehicle Manufacturers

[4] (Ispirit 2016)

In the past decade, the automotive industry has come up to be an active sector and forecasts show much more to come. The globalization of the automotive industry has greatly accelerated after 1990s due to the construction of important overseas facilities and establishment of mergers between giant multinational automakers[5] as depicted in figure-1.

About 68.56 million cars, 55 million motorcycles, 18.4 million LCVs, 3.4 million Trucks, 2.1 million tractors and 0.321 million busses and coaches were produced in 2015 (figure-2).[6] The United States became a key automotive market when Ford introduced assembly line car production in the early 1900s to mass-manufacture its Model T. Today, the Ford Motor Company still ranks among the leading manufacturers of passenger cars[7].

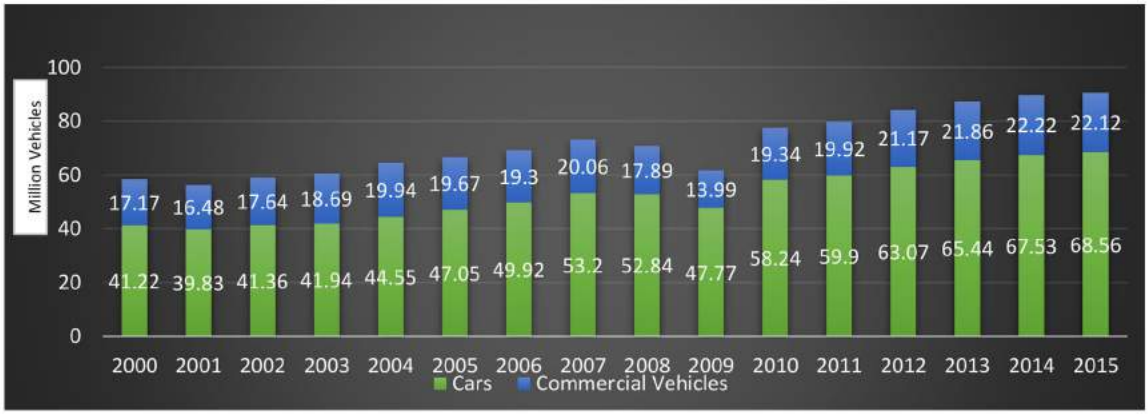


Fig. 2- Number of Vehicles Produced Worldwide
Source: International Organization of Motor Vehicle Manufacturers

The auto parts and equipment manufacturing industry has companies that produce vehicle parts and accessories that are used in assembling cars, SUVs, LCVs and HCVs for the automotive manufacturing industry. The products include transmissions, airbags, turbo chargers, air-conditioning systems, ball bearings, filters, wheels, gears, tires and several other auto parts and equipment. Auto parts are defined as either Original Equipment (OE), or aftermarket parts. Aftermarket parts are divided into two categories: replacement parts and accessories.

The global motor vehicle parts and accessories manufacturing industry depends principally on motor vehicle production for demand. Over the past years, the motor vehicle manufacturing industry has been plagued with a string of issues, including skyrocketing fuel and metal prices and a series of stringent emissions and fuel economy regulations that have slowed demand for new vehicles, parts and accessories. After slashing production in an attempt to reduce inventory in 2009 and slowly getting back on their feet in 2010 and 2011, carmakers around the globe are back in business. Demand in emerging economies will increase at a faster rate than demand in Western economies. The demand for truck transportation will also rise over the next five years, backed by international trade and rising business activity globally.

The global auto parts and accessories manufacturing industry cannot exist without motor vehicle production. Over the past years, motor vehicle production has been supported by furious growth in China and other developing economies. A rise in the number of vehicles in use globally also supported the aftermarket parts segment.

[5] (Hiraoka 2001)
[6] International Organization of Motor Vehicle Manufacturers
[7] (Ispirit 2016)

Few of the key trends that can be seen in global automotive industry are:

1.6.1.1 Changes in Customer Demand

A large number of consumers are inclined towards green, fuel efficient and sustainable vehicles. With the introduction of e-vehicles & alternative fuels such as shale gas, CNG and others, gone are the days when the design and style were the major decision-making factors. After the Volkswagen emissions scam, consumers are more cautious towards more green and fuel-efficient cars.

1.6.1.2 Changes in Brand Loyalty

Even the brand loyal customers are now rethinking their buying decisions as a result of surplus choices in the market. Impressing the customer remains harder than ever.

1.6.1.3 Changes in Mobility

Nowadays, efficient and inexpensive means of transportation are of utmost importance. Driverless cars are not the only trend challenging the automotive industry. Views about mobility, about what we can do with a car, about the status of owning a car are all in transition and becoming more important. The number of female buyers is increasing and becoming more and more common.

1.6.1.4 Technological Advances

The global automotive industry has undergone a serious transformation in the last two decades with the digitization of vehicles. Linking mobile devices to the vehicle creates many options. One can easily check how much fuel is left, the condition of the brakes, when maintenance is needed, etc. It can also be used as a car key or for applying personal settings in a car you rent. Cars just might be the next big platform for application developers in coming years. McKinsey predicts up to 15% of new cars sold in 2020 could be fully autonomous[8]. The concept of 'connected vehicles', which focuses on connecting vehicles with the outside world and enhancing on-board experience, combines telecommunication and informatics to provide various services such as live traffic updates, smart routing and tracking, roadside assistance in case of accidents, automatic toll transactions, automatic parking / parking management, on-board entertainment and much more.

Increase in smart cars and ride sharing are having a two-fold impact on the automotive industry. The smart cars and ride sharing apps are on one side increasing the demand for personal cars to be used for applications like Uber and Lyft and on the other hand, is also decreasing the sales as people are relying more on ride sharing rather than their own cars. Verizon acquired Telogis, a cloud-based location intelligence platform provider, to gain a foothold in the Smart Car market. Apple's announcement of $1 billion in-vestment in Didi, China's largest ride-sharing company and Uber's acquisition of tech start-ups Otto and Geometric Intelligence are combining technology with ride-sharing.

1.6.1.5 Resource Scarcity

According to recent growth figures, battery electric vehicles sales grew by 60% from last year. This is roughly equivalent to the growth forecasted by Tesla Motors, where production is expected to increase from 50,000 in 2015 to 500,000 in 2020. Assuming Tesla can meet their forecasts, and their current electric vehicle market share remains the same at 10%, if each electric vehicle roughly displaces 15 barrels of oil a year, the next oil crash could occur as early as 2023[9].

The worldwide automotive sector is forecast to grow to 114 million vehicles by 2024, according to the latest Alix Partners Global Automotive Outlook[10]. In particular, Brazil and Russia are showing signs of recovery and growth has continued in China, whereas the US is expected to continue to decline in the short term. Although slightly below GDP expectations, this overall growth is on the back of another year of healthy volumes of 92 million vehicles during 2016 reveals the global business advisory firm.

[8] (Mohr, Müller et al. 2013)
[9] (Ispirit 2016)
[10] (Maynard 2017)

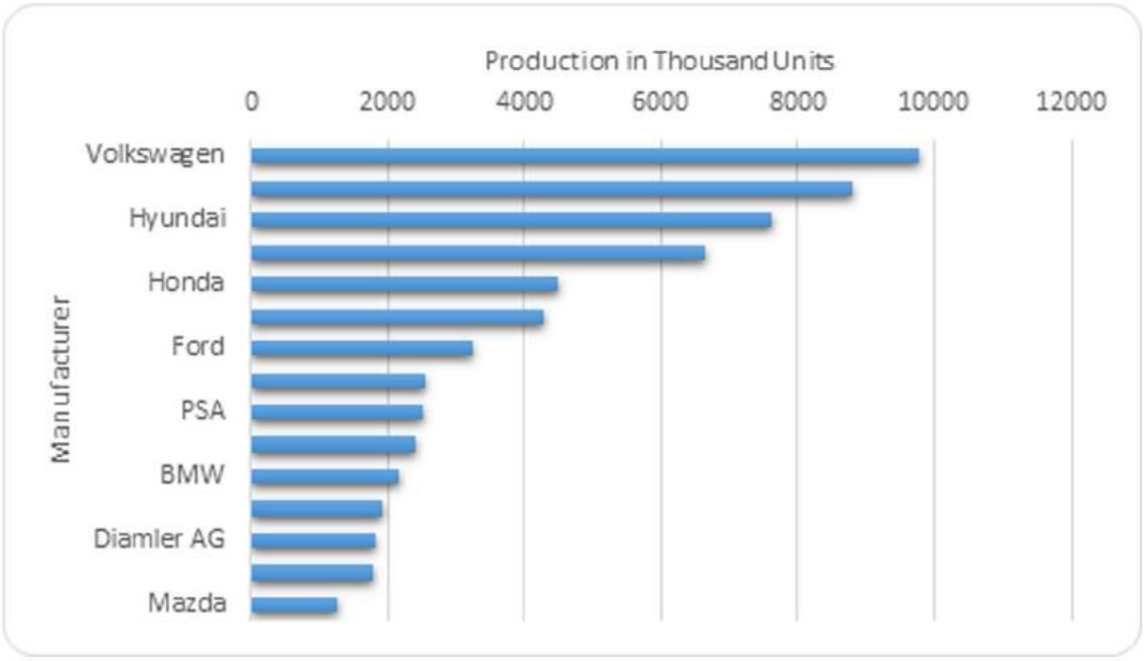


Fig. 3- Leading Passenger Car Manufacturers Worldwide in 2014, Based on Production
Source: International Organization of Motor Vehicle Manufacturers

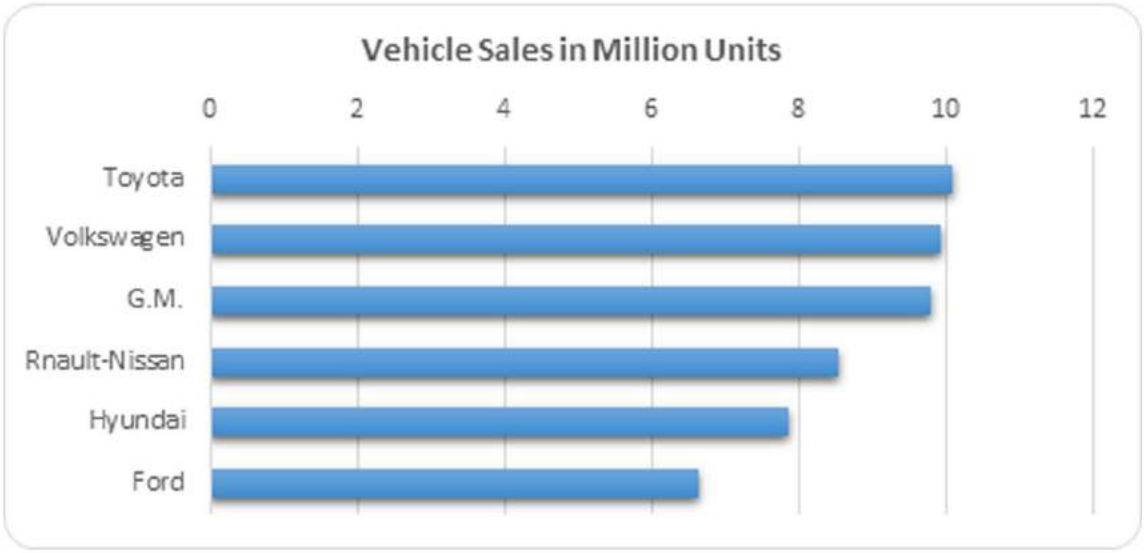


Fig. 4- Leading Automobile Manufacturers Worldwide in 2015, Based on Vehicle Sales
Source: International Organization of Motor Vehicle Manufacturers

Last year was an almost record year for OEMs globally, in terms of volumes, revenues and profit. In fact, it was the most profitable for more than a decade. OEMs have continued to work hard to reduce costs especially with labour efficiency, which is clear from figures-3 and 4 that large market players enjoy rising production and sales volumes.

Over the last five years they have reduced the number of employees it takes to build 1,000 vehicles per year to 45, a 6% improvement.

These efficiency savings have allowed OEMs to fund over €180 billion in Capex and R&D last year alone, equating to €2,000 - €2,500 per volume vehicle and €4,500 to €5,000 per premium vehicle. A large portion of this is on 'CASE' (Connectivity, Autonomous, Shared and Electrification) investments[12].

[11] (Maynard 2017)
[12] (AlixPartners 2017)

1.6.2 History of the Automotive Industry in Pakistan

1.6.2.1 Country Analysis

Pakistan emerged as an independent sovereign state on 14th August, 1947. Pakistan is strategically located at the crossroads of Asia, with China as its neighbor in the North, India in the East and Iran and Afghanistan in the West. Pakistan, connects almost all the Muslim countries of the world from the Atlantic Ocean to the Arabian Sea.

Pakistan is the sixth most populous country in the world. According to the population census of 2017, Pakistan has a total population of 207.7 million at a growth rate of 2.4%. The growth rate of the economy has experienced a smooth upward trend since 2013-14. As per economic survey, the GDP (PPP) of Pakistan is 1.060 trillion US$ showing growth rate of 5.28% in 2016-17, which is the highest in 10 years. It is widely acknowledged that Pakistan has immense economic potential. According to a report published by Price Water House Coopers in 2017, Pakistan is projected to become the world's 20th largest economy by 2030 and 16th largest by 2050.

1.6.2.2 Brief History and Turning Points of Automotive Industry in Pakistan

The first car ran on the roads of South Asia in 1897, and until the 1930s, cars were imported directly, but in very small numbers. They were used largely by the rich or the senior most civil servants belonging to the elite Indian Civil Service. This changed just after the start of the Second World War. In 1945 the Brothers Mahindra began assembling the Jeep CJ-3A utility vehicles under license from Willys and soon branched out into the manufacture of light commercial vehicles (LCVs) and agricultural tractors[13].

The history of the automotive sector can be divided into different phases which starts from 1947 until the assembly of trucks (the Bedford "Rocket") started. The next growth phase was from 1972 until the private sector was introduced. The third phase saw the introduction of tractor manufacturing. Fourth phase was when motor cycles began to be assembled. The fifth is when the private sector automobile assembly plants were established and the vendor industry began to make its presence felt. The latest phase is when exports have begun.

The following table gives the chronological history of the automotive sector[14].

Initial Phase

1949: Vauxhall Cars introduced by General Motors & Sales. Bedford Trucks introduced by General Motors & Sales. Ford Trucks introduced by Ali Automobiles.
1953: Exide battery started production.
1956: Dodge Cars introduced by Haroon Industries.
1958: Ford Angela Cars introduced by Ali Automobiles.
1959: Ford Pickups introduced by Ali Automobiles.
1960: Ford Combi introduced by Ali Automobiles.
1961: Precision auto parts manufacturing started at Allwin Engineering.
1962: Lamberate Scooter introduced by Wazir Ali Engineering. Jeep CJ 5, 6, & 7 introduced by Kandawala Industries. Bedford Truck assembling started at Ghandara Motors.
1963: Mack Trucks introduced by Hye Sons. General Tyres & Rubber Company started production in Karachi.
1964: Massey Ferguson Tractors introduced by Rana Tractors. Vespa Scooter and Rickshaw introduced by Raja Auto Cars. Honda Motor Cycle introduced by Atlas Autos. Ghandara Industries launched localisation plant for Bedford Trucks.

[14] (Pasha and Ismail 2012)

1965: Specialized Vehicles Production at Jaffer Industries.
1967: Toyota vehicles introduced by Monnoo Motors.

Growth Cycle

1972: Nationalization, Pakistan Automobile Corporation (PACO) formed. Ali Autos renamed Awami Autos, Wazir Ali Engineering renamed Sindh Engineering, Haroon Industries Renamed Republic Motors, Ghandara Motors renamed National Motors, Kandawala Industries renamed NayaDaur Motors, Hye Sons renamed Mack Trucks, Jaffer Industries renamed Trailer Development Corporation, Rana Tractors renamed Millat Tractors, Tractor Corporation of Pakistan formed.
1974: Yamaha Motor Cycle launched by Dawood Yamaha, Diesel Engines manufacturing started at Bela Engineering.
1976: Suzuki Motor Cycle introduced by Sindh Engineering.
1977: Kawasaki Motor Cycle introduced by Saif Nadeem Kawasaki. Suzuki Jeep introduced by Naya Daur Motors.
1978: Plastic parts manufacturing at SPEL Engineering
1980: Suzuki Pickups introduced by Awami Autos, Mazda Truck introduced by Sindh Engineering, project approved for production of wheel rims at Balochistan Wheels under TAA with GKN- Sankey.
1981: Wire Harness production at Ayenbee, production of specialized auto parts at Agriauto Industries.

Accelerated Growth

1982: Suzuki Cars production started by Pak Suzuki. Bolan Castings started production, Belarus Tractors introduced by Fecto Tractors.
1983: Fiat Tractors introduced by Al-Ghazi Tractors, Vendor Development & Technical Cell (VDTC) formed.
1986: Hinopak Motors Limited formed as joint venture company between PACO, Al-Futtaim, Hino Motors & TTC.
1987: Production of Nissan Diesel Trucks by Ghandara Nissan.
1988: Pakistan Association of Auto Parts and Accessories Manufacturers (PAAPAM) formed.
1989: Second car plant sanctioned by the GoP (Indus Motor Company).
1992: Privatization of Pak Suzuki Motor Co.
1993: Production of Toyota Corolla by Indus Motor Company Limited. First export of Buses and Trailers by Hinopak Motors Limited.

Ready For Take-off

1994: Production of Honda Civic by Honda Atlas Cars Pak Ltd. Import of Vehicles under Yellow Cab Scheme. Pakistan Automotive Manufacturers Association (PAMA) formed.
1995: Engineering Development Board (EDB) organized the first PAP Show in Islamabad.
1996: First Industry Specific Deletion Program (ISDP) printed for the period up to 2001.
1997: VDTC renamed AT & TC. Second PAP Show held in Lahore. Aircon Systems production starts at San Pak Lahore. Production of Sohrab Motorcycle.
1998: Export of Light Commercial Vehicles by Pak Suzuki Motor Company. Saigol Quingqi starts production of motorcycles with Chinese collaboration.
1999: Dewan Farooque Motors starts production of Korean Pickup named Shehzore. Hinopak Motors Ltd. taken over by Hino Motors and TTC of Japan.
2000: 3rd PAP Show in Karachi. Raja Motors starts production of UNO Cars. Production of Daihatsu vehicles by Indus Motor Company Ltd & Cultus and Alto were launched by Pak Suzuki Motors.
2001: Molded interiors manufacturing starts at Procon Engineering.
2002: Adam Motors launches Chinese truck named Zabardast. Revised and updated ISDP for the period up to 2005 finalized.
2003: Sindh Engineering launches range of Chinese Trucks. Economy of the country is at take-off stage and so is the Auto Industry. 1st PAMA Auto Expo held in Islamabad (May 12, 13, 2003).

2002-2003 - Nexus Automotive signed Technical Agreement (TA) with General Motors Corporation to introduce Chevrolet cars at premises of Ghandhara Nissan Limited followed by manufacturing of Nissan Sunny by Ghandhara Group.
2005 - Adam Motors manufactured Revo, the first Pakistani car. In 2011, Al-Haj FAW Motors (AHFM) introduced Chinese 1000 cc FAW V2.
2015 – Yamaha started production of 125 cc motorcycles YBR 125G YBR 125.
2016-2017 – Transportation network companies like Careem and Uber started its operations in Pakistan, which further boosted the sale of cars in Pakistan.
2018 - United Motors will be launching the 1st local brand of passenger cars 800 CC & LCVs (Pickup).

1.6.3 Socio Economic Profile of Auto Parts Sector in Pakistan

The auto parts industry is mainly concentrated in Lahore and Karachi regions. The detail of location wise industrial units who are the members of PAAPAM is appended below:

Table-1 Geographical Location of Auto Parts Industry in Pakistan-geographical spread of industry in Lahore is depicted on Page 30.

Total members	**300**
Punjab	
Lahore	143
Gujranwala	12
Sheikhupura	5
Daska	2
Multan	2
Bahawalpur	1
Faisalabad	1
Muridke	1
Sahiwal	1
Wazirabad	1
Kasur	1
Sindh	
Karachi	125
KPK	
Peshawar	1
Capital	
Islamabad	3
Baluchistan	
Quetta	1

Source: PAAPAM

The spread of Original Equipment Manufacturers all over Pakistan is also appended below:

Table-2 Geographical Location of OEMs in Pakistan

Total members	22
Punjab	
Lahore	7
Kasur	1
Sindh	
Karachi	11
Hyderabad	1
Sujawal	1
Capital	
Islamabad	1

Source: PAMA

1.6.4 Socio Economic Profile of Automotive Sector in Pakistan

The automotive sector is the sixth largest manufacturing sector in Pakistan and is therefore of prime importance to the economy of Pakistan. It contributes 6 billion US$ to the national economy & contributes to 16% of the manufacturing sector of Pakistan. Tax payments added US$0.82 billion to the national exchequer in 2010. The automotive sector directly employs over 200,000 people. "The Engineering Development Board-EDB, in consultation with the industry has an estimated indirect employment of approximately 1.6 million (using a multiplier of 1:8). The economic multiplier of the auto/car industry provided in the AIDP (2008) is 1:3, implying that Rs.1 of direct revenue generates Rs.3 of revenues in the vending chain."[15]

Currently Pakistan's automotive sector produces a range of products, listed below.

Table-3: Production of Automobiles in 2015-16

Product Category	Annual Production in units 2015
Two/Three Wheelers	1.7 million
Cars	150,000
Tractors	35,000

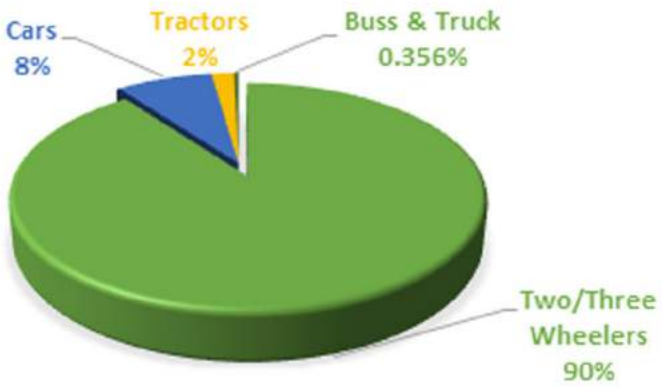


Fig. 5- Annual production of vehicles in Pakistan-2015
Source: PAMA

[15] (Bari, Afraz et al. 2016)

The average annual growth rate of product segments from 2011-2016 is appended below:

Table-4 Product Wise Annual Growth Rate[16]

Product	Average Annual Growth Rate from 2011-2016
Pick-Ups	10%
Trucks & Buses	9%
2/3 Wheelers	7%
Cars	5%
Tractors	-20%

The automotive sector in Pakistan today consists primarily of several units producing original components for assembly (under license) under the deletion program - which was phased out by July 2006 under the WTO regime and replaced by the Tariff Based System - and other units producing reconditioned and original components for local use. The various units in operation can be categorized in one of three categories:

- ✓ Original Equipment Manufacturers
- ✓ Independent Manufacturers (who are not providing to any OEMs but to after sales market only)
- ✓ Tier 1-3 firms

The industry size reported by various sources is depicted below:

Table-5: Size of the Industry

Sr. No.	Source	Description
1.	Study prepared by ITC "The Automotive Parts Sector in Pakistan September 2007"	Total manufacturing units = 1250 Organized sector =500
2.	Study prepared by Anjum Asim Shahid Rahman, Chartered Accountants "Skill Sector Study-Auto Parts Sector, 2015" for PSDF	Total manufacturing units = 2283 Assemblers = 83 Auto parts manufacturers = 2200 Tier 1 = 450 Tier 2 = 425 Replacement market suppliers = 1325
3.	Diagnostic study prepared by EY "Diagnostic Study for Auto parts Manufacturing Cluster, Mandi Baha-ud-Din, 2015"	Total manufacturing units = 2000 Organized sector =500 Total units in Lahore cluster = 750 Large & Medium = 100 Medium & Small = 200 Small = 450
4.	Study Prepared by IDEAS-LUMS "Regional Competitiveness Studies: Research Study on Auto Sector, 2016"	Total manufacturing units = 2000 Organized sector =400-500
5.	ADP 2016-21	Total manufacturing units = 2000 Organized sector =400-500
6.	PAAPAM	Total manufacturing units = 3000 Organized & Tier 1 = 700 Tier 2 = 1000 Small and cottage = 1300 Lahore Tier 1 = 160
7.	Study Prepared by International Finance Corporation for State Bank of Pakistan "Motor Vehicles and Trailers Auto Parts Manufacturing, 2011"	Organized = 400 Unorganized = 1200

[17] Pakistan decided to introduce tariff based system (TBS) for local auto sector industry which replaced the deletion program under the agreement on Trade Related Investment Measures (TRIMs). The Engineering Development Board (EDB), Customs department along with vendors and auto-assemblers worked out a comprehensive tariff regime, it was applicable on import of parts and accessories for automobiles

The auto parts total investment in Pakistan exceeds USD 1.09 billion; these investors are mainly engaged in the manufacturing of original components for the assembly operation under the deletion Program (before it was replaced by the TBS system) , as well as producing reconditioned and original components for sale in the local market. The parts being manufactured for local supply include pistons, engine valves, gaskets, camshafts, shockabsorbers, struts, steering mechanism, cylinder head, wheel hubs, brake drums, wheels, bumpers, instruments, etc. In terms of the global automotive sector industry tiered supply chain, Pakistan entered the market at Tier 3 and the ancillary industry has been able to make limited progress up the value chain with a number of units reaching a Tier 1 status. In fact, the automotive industry of the country can be classified as a full-line producer of major automotive vehicles (including buses, tractors, trucks, 3-wheeler rickshaws and motorcycles). Local component manufacturers have not yet managed to reach international levels of operation, although a small number do manage to export. The majority of these manufacturers have the capability to supply only one component, and not an assembly of components as Tier 1 manufacturers do in other countries. In Pakistan, the Tier I function is done by vendor industry that have achieved the technological capabilities to provide complex assemblies of preassembled components for OEMs is currently being managed by OEMs themselves. Component manufacturers can be classified as OEM suppliers/vendors or aftermarket parts suppliers. Imports and exports trends of Pakistan in this regard are depicted below:

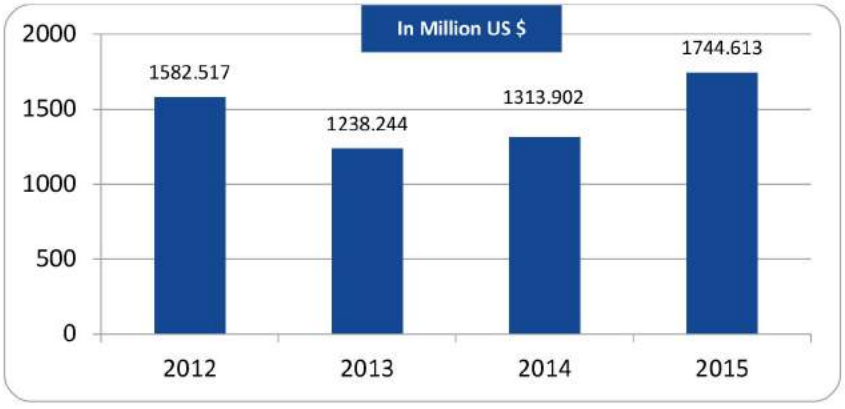


Fig-6 Import Trends of Automotive Sector – Pakistan
Source: Trade Map

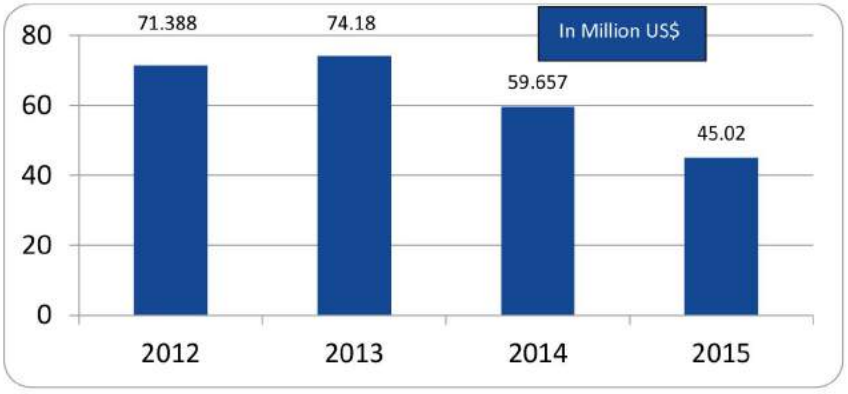


Fig-7 Export Trends of Automotive Sector – Pakistan
Source: Trade Map

It is clear from the figures above that exports of Pakistan have shown a downward trend, whereas imports are showing an upward trend.

[17] (Pasha and Ismail 2012)

Comparison of exports of Pakistan automotive sector as compared to the rest of the world is depicted in the figure below:

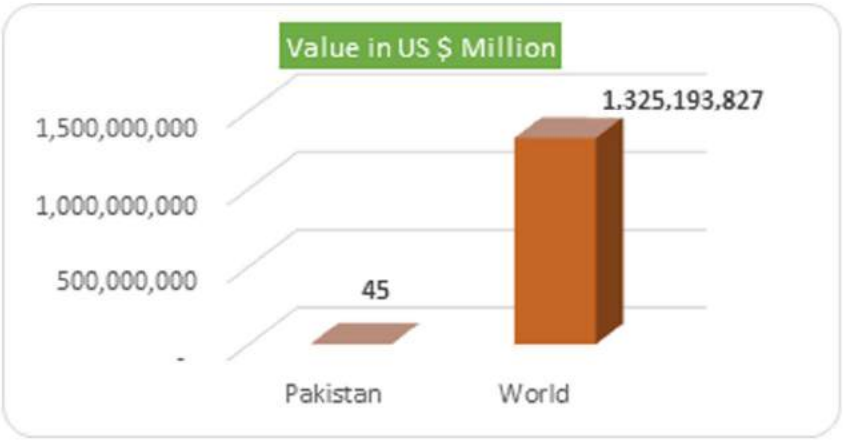


Fig-8 Pakistan's Automotive Sector Exports 2015 to World's Export
Source: Trade Map

The major components which are imported in tractors, commercial vehicles & passenger cars segments are listed in the table below:

Table-6: List of Components imported in Tractors, Commercial Vehicles and Passenger Car Segment

Code	Product label
870899	Parts and accessories, for tractors, commercial vehicles & passenger cars
870829	Parts and accessories of bodies for tractors, commercial vehicles & passenger cars
870880	Suspension systems and parts for tractors, commercial vehicles & passenger cars
870840	Gear boxes and parts for tractors, commercial vehicles & passenger cars
870870	Road wheels and parts and accessories for tractors, commercial vehicles & passenger cars
870830	Brakes and servo-brakes and their parts for tractors, commercial vehicles & passenger cars
870850	Drive-axles with differential, whether or not provided with other transmission components, for tractors, commercial vehicles & passenger cars
870810	Bumpers and parts for tractors, commercial vehicles & passenger cars
870894	Steering wheels, steering columns and steering boxes, and parts for tractors, commercial vehicles & passenger cars
870821	Safety seat belts for motor vehicles
870891	Radiators and parts for tractors, commercial vehicles & passenger cars
870893	Clutches and parts for tractors, commercial vehicles & passenger cars
870892	Silencers "mufflers" and exhaust pipes, and parts for tractors, commercial vehicles & passenger cars

[17] (Pasha and Ismail 2012)

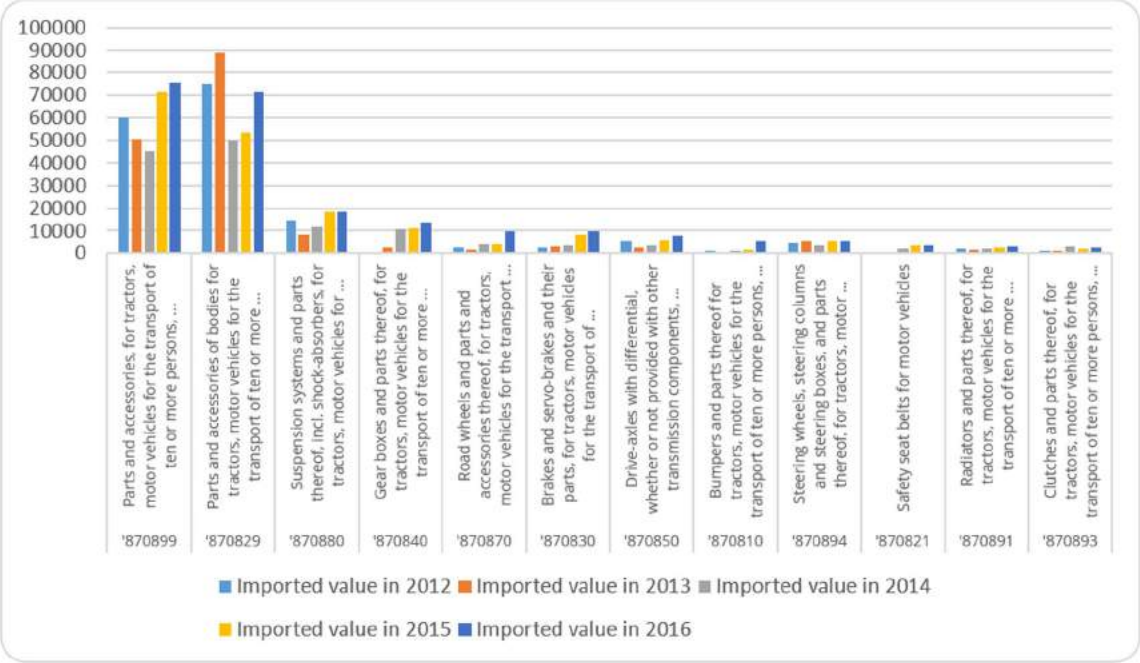


Fig-9 Pakistan's Import Trends for Tractors, Commercial Vehicles & Passenger Cars
Source: Trade Map

For the motorcycle segment, details of parts imported are depicted below:

Table-7: List of Components imported in Motorcycles Segment

HS Code	Product Category
871410	Parts and accessories of motorcycles
871411	Saddles for motorcycles

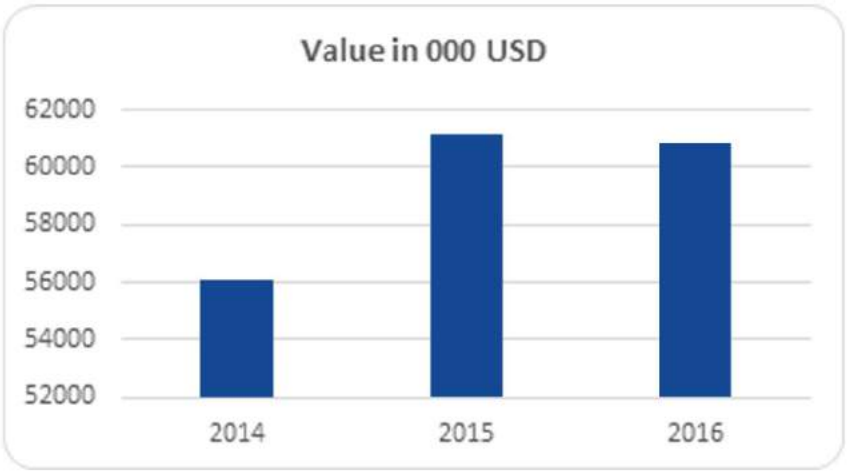


Fig-10 Pakistan's Import Trends for Motorcycle parts in 871410 category
Source: Trade Map

[17] (Pasha and Ismail 2012)

Export trends of Pakistan auto parts sector is appended below:

Table-8: List of Components exported in Tractors, Commercial Vehicles and Passenger Car Segment

HS Code	Product Category
870899	Parts and accessories, for tractors, commercial vehicles & passenger cars
870840	Gear boxes and parts tractors, commercial vehicles & passenger cars
870891	Radiators and parts for tractors, commercial vehicles & passenger cars
870829	Parts and accessories of bodies for tractors, commercial vehicles & passenger cars
870810	Bumpers and parts thereof for tractors, commercial vehicles & passenger cars
870880	Suspension systems and parts thereof, incl. shock-absorbers, for tractors, commercial vehicles & passenger cars
870870	Road wheels and parts and accessories for tractors, commercial vehicles & passenger cars
870894	Steering wheels, steering columns and steering boxes, and parts for tractors, commercial vehicles & passenger cars
870821	Safety seat belts for motor vehicles
870893	Clutches and parts tractors, commercial vehicles & passenger cars
870892	Silencers "mufflers" and exhaust pipes, and parts for tractors, commercial vehicles & passenger cars
870850	Drive-axles with differential, whether or not provided with other transmission components, and non-driving axles, and parts for tractors, commercial vehicles & passenger cars
870830	Brakes and servo-brakes and their parts, for tractors, commercial vehicles & passenger cars

Value in 000 USD

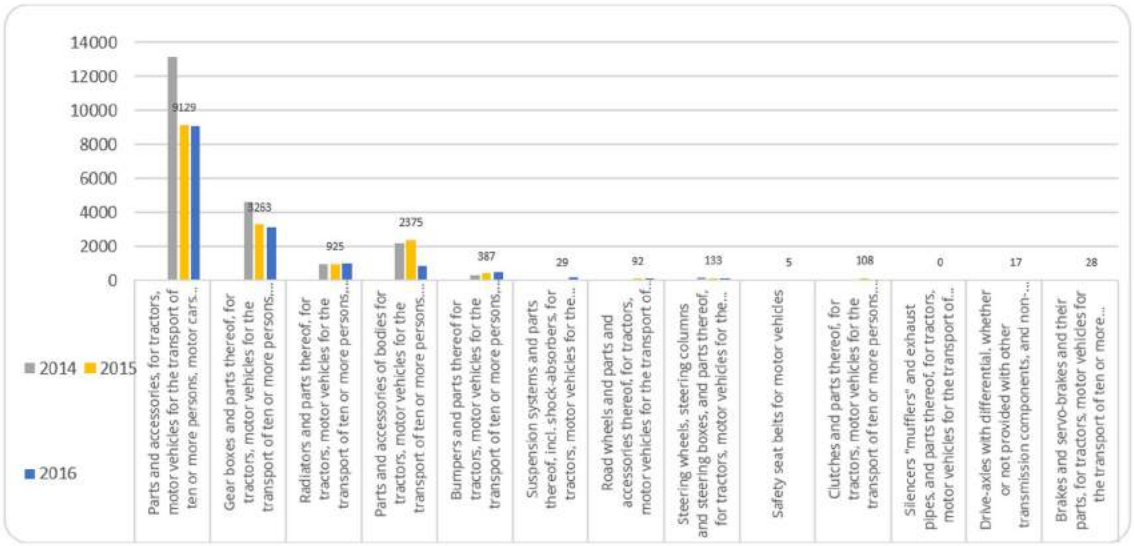


Fig-11 Pakistan's Auto parts Export Trends for Tractors, Commercial Vehicles & Passenger Cars
Source: Trade Map

[17] (Pasha and Ismail 2012)

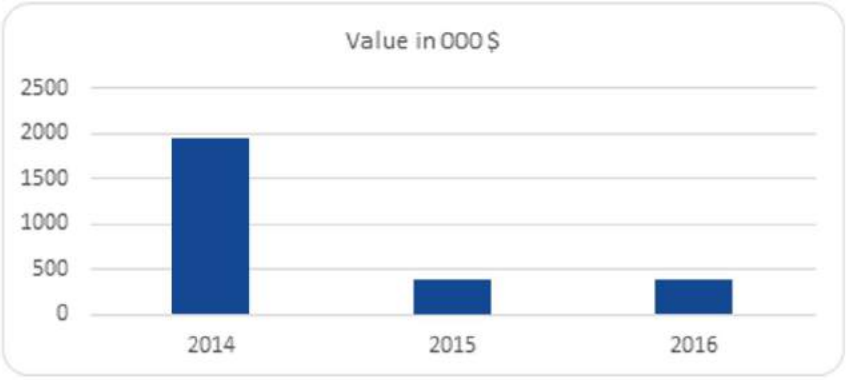


Fig-12 Pakistan's Exports Trends for Motorcycle parts in 871410 category
Source: Trade Map

It is clear from the table below that the distribution of manufacturers is actually skewed in favor of two and three wheelers (motorcycles and auto rickshaws).

Table-10: Manufacturers in various segments

Sector	OEM Assembling Units
Motorcycles	57
Auto-rickshaw	17
Trucks and Buses	7
Cars	6
Tractors	6
Pickup Truck/Van	1

Source: PAMA

Initially, lacking the indigenous capability and production facilities to manufacture automobiles, the government undertook several joint ventures with renowned firms in developed countries to acquire technology and latest production techniques.

In 1982, PACO initiated private sector participation, which was meant to support the growing auto parts manufacturing sector. This was done by allowing foreign manufacturers in Pakistan on the condition of achieving 75 per cent local content levels in five years. This is commonly referred to as the Deletion Program, which was based on Industry Specific Deletion Programs (ISDP) as well as Product Specific Deletion Program (PSDP)[18].

This policy evolved in to a number of successful projects. Pak Suzuki Motors was established by PACO and Suzuki. The company started to assemble passenger cars, pickups, vans and jeeps. Other collaborations included those with Honda, Toyota and Daihatsu. In the tractor segment, Fiat tractors were manufactured by Al-Ghazi Tractors Limited under the management of the Habib Group Republic Motors Co.

[18] (Bari, Afraz et al. 2016)

Detail of agreements in the matter are depicted as shown in Table-11.

Joint Venture Agreements by OEMs OEM Affiliation			
S. No.	**Domestic Company**	**Intl. Company**	**Country**
1	Pakistan Cycle Industrial Cooperative Society Ltd. (Sohrab)	Jincheng	China
2	Gandhara Industries Ltd.	Isuzu	Japan
3	Atlas Honda Ltd	Honda	Japan
4	Millat Tractors Ltd.	Massey-Ferguson	USA
5	DYL Motorcycles Ltd.	Yamaha	Japan
6	Gandhara Nissan Ltd.	Nissan	Japan
7	Master Motor Corporation Ltd	Mitsubishi	Japan
8	Pak Suzuki Motors Co. Ltd	Suzuki	Japan
9	Hinopak Motors Ltd	Hino	Japan
10	Indus Motor Co. Ltd	Toyota	Japan
11	Sazgar Engineering Works	n/a	n/a
12	Honda Atlas Cars (Pakistan) Ltd	Honda	Japan
13	Sigma Motors Ltd.	Land Rover	UK/India
14	Plum Qingqi Motors Ltd.	Qingqi	China
15	Fateh Motors Ltd.	Belarus MTZ	Belarus
16	Dewan Farooque Motors Ltd.	Hyundai	South Korea
17	Ravi Automobile Pvt. Ltd.	Piaggio	Italy
18	Daewoo Pakistan Motors Ltd.	Daewoo	South Korea
19	Raja Motors	Vespa/Fiat	Italy

Source: (Qadir 2016)

In order to achieve 75 per cent local content levels, automobile manufacturers started to look for local sourcing. They also started to provide auto parts manufacturers with technical assistance to ensure quality and uninterrupted supply, which led to the development of the auto vending industry.

Indigenization levels in the local automotive sector achieved till 2006 are depicted below:

Table-12 Indigenization levels in the local automotive sector

Category	Description	ISDP target achieved (%)
Car	Up to 800cc	70
Car	801cc - 1200cc	58
Car	Exceeding 1200cc	53
Tractor	40 - 55 HP (2X2)	85
Tractor	55 - 80 HP (2X2)	62.5
Motorcycles	Up to 100cc	85
Motorcycles	100cc - 175cc	83

Source: EDB

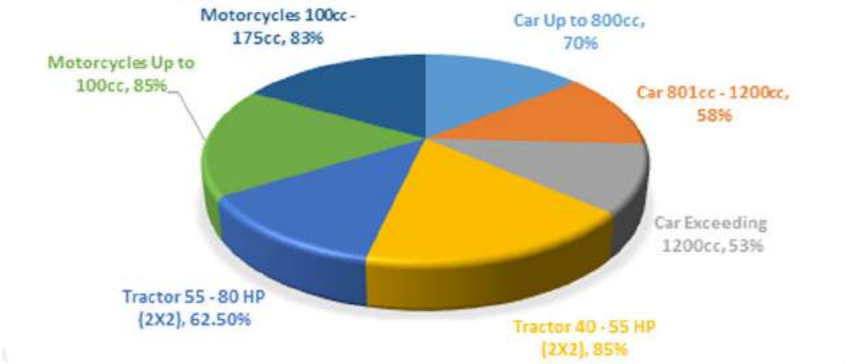


Fig-13 Indigenization level achieved in automotive sector
Source: (IRP-Asim Ayaz 2016)

Auto parts manufacturers in Pakistan specialize in a range of production techniques, such as forging, casting, plastic molding and sheet metal.

An important development that is likely to improve Pakistan's logistics and domestic and international connectivity is the planned China Pakistan Economic Corridor (CPEC), which promises transport infrastructure from Kashgar to Gwadar. Proximity to China, an established light engineering base and a good trading relationship with China, could make Pakistan an attractive partner for Chinese firms looking to outsource, particularly in the face of China's rising labor costs (Bari, Afraz et al. 2016).

1.6.5 Auto Parts Cluster in Lahore

Lahore is the capital city of Pakistani province of Punjab. It is the second-most populous city in Pakistan after Karachi. The city is located in the north-eastern end of Pakistan's Punjab province, near the border with the Indian state of Punjab. Lahore is ranked as a beta-world city, and is one of Pakistan's wealthiest cities with an estimated GDP of 127 billion US$ (PPP) as of 2017. The center of Lahore's economy is the Lahore Stock Exchange, which is linked to the Karachi Stock Exchange.

Lahore is the second largest financial hub of Pakistan after Karachi, and has various industrial areas including Kot Lakpat, Sunder Industrial Estate and the new Defense Road (Raiwind).
Lahore's main public transportation system is operated by the Lahore Transport Company (LTC) and Punjab Mass Transit Authority (PMTA).

Lahore Cantt. Station serves as the main rail hub for Lahore, and serves as a major hub for all Pakistan Railway services in northern Pakistan.

Pakistan's third busiest airport, Allama Iqbal International Airport (IATA: LHE), straddles the city's eastern boundary. Lahore Dry Port, Mughalpura handles imports and exports of various items.

Table- 13 Demographics of Lahore city

Estimated Population; 2016 (000 Persons)	
Total	9644
Male	5076
Female	4568
Urban	7932
Rural	1712
Intercensal Growth Rate (1998/1981)	3.5
Density (Persons per Sq. K.M.)	5128
Sex Ratio (Males per 100 Females)	111
Urban/Rural Ratio	82:18

Source: Directorate of Industries, Punjab

As regards availability of skilled labour, there are 29 technical/ commercial/ vocational institutions under TEVTA Punjab in Lahore imparting training in various trades (TEVTA Punjab). Moreover, 18 vocational training institutions under PVTC are operating in Lahore.

Lahore is also well known for its engineering industry. Since its inception, the major focus of auto parts industry was in Karachi, but slowly and gradually it has shifted to Lahore due to a shift in the technology paradigm.

The auto parts manufacturing sector is a male dominant industry. Females have least participation in this sector as the nature of work is labour intensive and the allied amenities required for female workforce are not present. However, industry is deprived of a huge, potential workforce.

Currently Lahore auto parts cluster is the second largest hub for auto parts manufacturing after Karachi and caters for more than 50% of auto parts demands of assemblers and after markets[19]. 143 units in the organized sector are members of Pakistan Association of Automotive Parts & Accessories Manufacturers. They are registered vendors of Original Equipment Manufacturers. The first auto parts manufacturing unit was established in 1942 in Lahore, which catered to the after sales market.

The initial focus of auto parts manufacturing units established from 1950s to 1970s was limited to tractors, buses & truck parts as well as to cater to the need of after sales market of different automobiles.

The Lahore industry witnessed a major paradigm shift in 1980's when for the first time Pak-Suzuki Motors commenced production in Pakistan. After that, other assemblers of cars and motorcycles also entered in the automotive sector, which consequently gave encouragement to the local industry to enter in auto parts manufacturing.

From 1990 to 2000, the auto parts industry in Lahore witnessed tremendous growth.

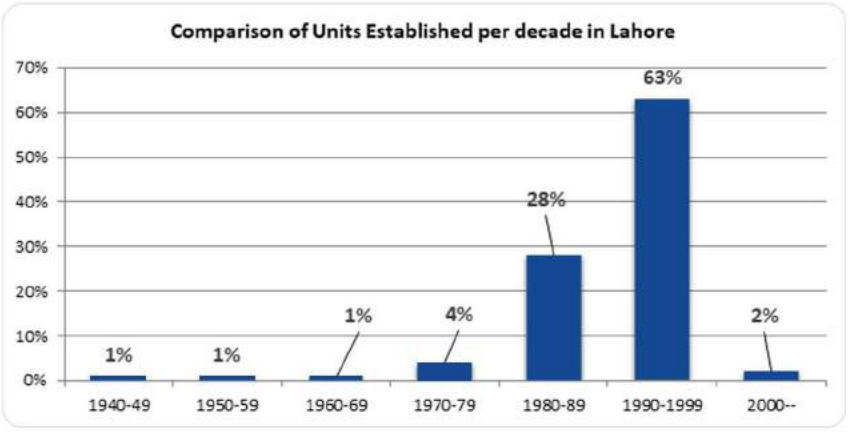


Fig-14 Comparison of Units Established per decade
Source: SMEDA Cluster Diagnostic Study Auto parts, Lahore 2006

Fig-14 depicts highest growth rate of auto parts cluster in Lahore during 1990 to 2000 during which 63% of total auto parts manufacturing units in Lahore were established.

[19](PAAPAM)

1.6.5.1 Auto Parts Industry Distribution in Lahore

The Lahore auto parts cluster is decentralized and varies in terms of size and location. Small and unorganized units are located in congested areas of Baghbanpura, Badami Bagh, McCleod Road and Bilal Ganj, while large and medium organized units are located in Kot Lakhpat Industrial Estate, Thokar Niaz Baig, Multan Road, Sundar Industrial Estate and Raiwind Road, Lahore.

It is pertinent to mention that Badami Bagh specializes in producing components of auto parts for the after sales market. Also, it is the largest trading hub for auto parts trading in Lahore. Similarly, McCleod Road is famous due to distribution networks of various brands of 2/3 wheelers. Bilal Ganj deals only with the aftermarket of used components of vehicles. The rest of the areas comprise mainly of auto parts manufacturers.

IDEAS FOR TRUCK ART

In Pakistan, there is a growing tendency of decorating Buses, Trucks and Auto-Rickshaw bodies with painting the familiar cultural themes and motifs in fluorescent paints. Their bodies shine bright from quite a distance and mirror good reflection. These buses and trucks are carriers of the image across lengths and breadths of the country, so they become the conversation starters on topics of famous national heroes and traditional cultures. This art is getting more and more popular and even attracted a bunch of fans in the Western world as well. Unfortunately, very few small industries on this art exist in the country and the Art has not yet been GI-tagged by Islamabad. This art costs US$ 9-16 thousand per truck which is multiple times the national per capita income.

1.6.5.2 Key Turning Points of the Cluster

The key turning points for the Lahore auto parts cluster are (SMEDA Cluster Diagnostic Study Auto parts, Lahore 2006):

1985 onwards: Entrance of new auto parts manufacturing concerns in early nineties due to indigenization of motor vehicles through Deletion Program started by Government of Pakistan in 1987.

SPEL Engineering Ayenbee

1996 – 2002: Franchise and technical cooperation agreements with Japanese, European and Korean manufacturers (Pak Suzuki Motors, Indus Motors (Pvt.) Ltd-Toyota, Honda Atlas (Pvt.) Ltd., Dewan Farooq Motors (Pvt.) Ltd.-Hyundai), etc. by the OEMs further diversified the industry for development and upgradation of new products.

SUZUKI INDUS MOTOR TOYOTA Atlas Honda DEWAN Dewan Farooque Motors Limited HYUNDAI

1990-1999: Automobile manufacturers (assemblers/OEMs) support in the form of technical assistance agreements for training manpower, financial support, thus creating an atmosphere where the vendors are treated as an extension of their own facilities.

1996-2001: Industry specific deletion program-ISDP to indigenize components further accelerated the growth of auto parts manufacturers

2002-2008: Easy financial assistance by Banks, Financial Institutions and Leasing Companies, due to stable government, economic growth with 8.5% GDP annually and Infrastructure Development.

1999-2011: In motorcycles segment entrance of local OEMs (112 new assemblers in 2/3 wheelers despite of Honda motorcycles), with more economical product range in comparison to foreign OEM resulted in exponential growth.

UNITED MOTORCYCLES ROAD PRINCE RAVI HERO ZXMCO SUPER POWER UNIQUE CRLF

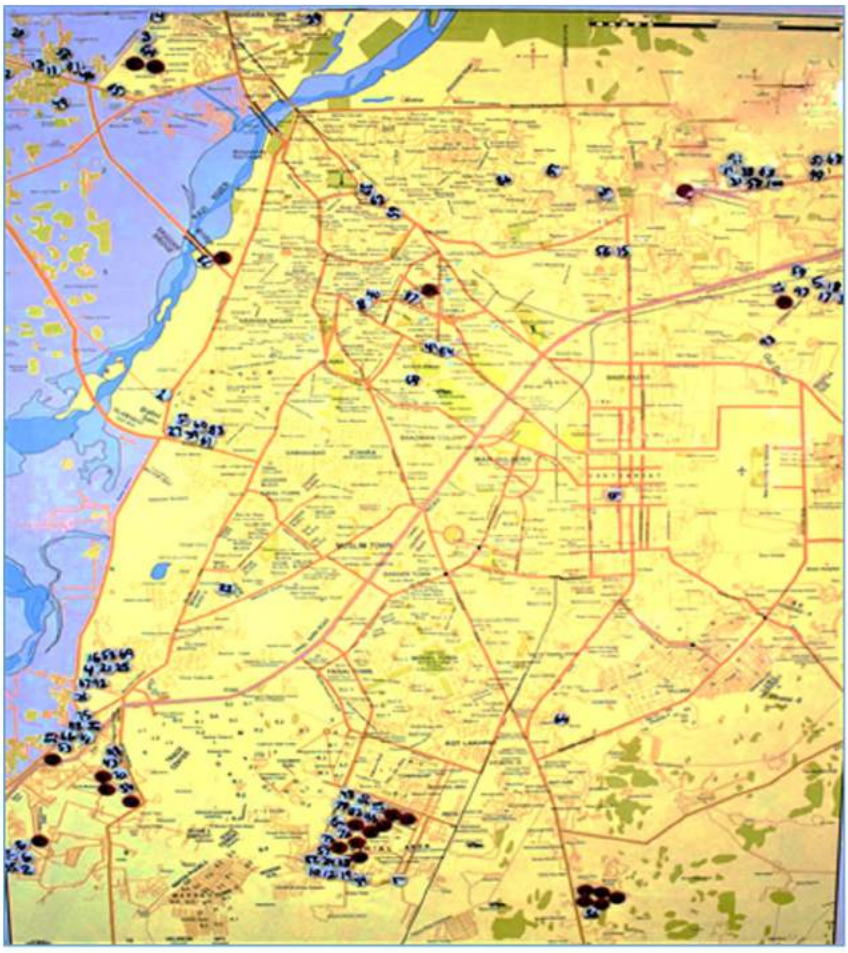


Fig-15 Geographical spread of Auto parts cluster in Lahore
Source: PAAPAM

1.6.6 Major Cluster Actors

There are three major cluster actors of auto parts manufacturers in Lahore:

- ✓ Principal Firms/Manufacturers.
- ✓ Backward Linkages - Input/Raw Material Suppliers.
- ✓ Forward Linkages – Original Equipment Manufacturers.

Table 14: Distribution of Principal Firms

Type of Firms	Export	Total Organized & Formal	Total Documented & Non-Member	Total Non-Documented & Non-Members
Large	5	12		
Medium	0	15	43	
Small	0	98	154	
Micro	0	18	43	
Total	5	143	240	380

1.6.6.1 Principal Firms/Manufacturers

As depicted in previous lines, there are 3000 auto parts manufacturers all over Pakistan, among which 700 are organized & Tier 1, 1000 units are Tier 2 and 1300 units fall in small and cottage category.

In Lahore only, the number of reported units are approx. 750 among which 143 are in organized and Tier 1 category[20].

[20] (PAAPAM)

The production of auto parts can be categorized in to the following categories:

- ✓ Cars and Light Commercial Vehicles (LCVs).
- ✓ Two Wheelers and Three Wheelers.
- ✓ Tractors
- ✓ Trucks and Buses
- ✓ After Sales Market

A vehicle consists of approx. 20,000 components. The product range of above segments can be classified into the following four broad categories.

- ✓ Engine Parts
- ✓ Body Parts
- ✓ Trims
- ✓ Suspension Parts
- ✓ Electrical Parts

"Body parts are the largest sub-segment; around 34% of units are involved in manufacturing of body parts for all segments. After that, suspension parts are the second largest as around 22% of units are involved in manufacturing suspension parts." [21]

The segment wise details of manufacturing units are not available as there is a mix of product range in auto parts manufacturing units.

1.6.6.2 Backward Linkages - Input/Raw Material Suppliers

The auto parts industry in Lahore has developed capabilities to produce components in five technologies, which include:

- ✓ Open & pressure die castings.
- ✓ Forging.
- ✓ Plastic injection moulding.
- ✓ Rubber moulding & extrusion.
- ✓ Sheet metal (press work, fabrication, etc).

However, the local industry still cannot produce high-tech operational components such as engine precision components (pistons, crankshafts, fuel pumps, alternator, starter motor, water pump, fuel pump, fuel filter, seat reclining, power steering, engines, transmissions for car and LCVs and regulator rectifiers, ignition coils, piston, fuel cock, clutch assembly, sprocket cam, drum gear shift, magneto and oil pump, etc.).

Auto parts manufacturers have managed to localize a large number of auto parts, including sheet metal parts, rubber and plastic parts, aluminum parts such as radiators, wire harnesses, chassis, tires, tubes, car seats, light gaskets, oil pump gears, dashboards, bumpers, fenders, interior trims, etc.

1.6.6.2.1 Pakistan Foundry Association-PFA

Pakistan Foundry Association-PFA members with 61 registered members, are supplying casting components to auto parts manufacturers. 39 among 61 units are situated in Lahore. It is pertinent to mention that 10 PFA members are also auto parts producers and members of PAAPAM as well.

1.6.6.2.2 Steel Mills

The main raw material for auto parts manufacturing "Steel" was normally purchased from Pakistan Steel Mills, but with the closure of Pakistan Steels, the industry is now buying from private steel mills which include People Steel Mills, Ayesha Steel Mills & International Steels Limited, which are located in Karachi.

[21] (SMEDA UNIDO Study 2006)

Large and medium firms directly buy steel from private steel mills, whereas small and cottage firms buy from local dealers and stockists.

High quality steels are imported from China, Taiwan, Russia, Korea & South Africa, directly or through importers.

1.6.6.2.3 Other Suppliers

For steel pipes, Shalimar Steels and Bashir Pipes in Lahore are major suppliers for auto parts cluster in Lahore and the vicinity respectively. A list of remaining suppliers is appended below: [22]

- ✓ 84 plastic resin suppliers in Lahore. Major players include Tariq Plastic, Agha Plastics, Engro Polymers, etc.
- ✓ 95 steel and iron suppliers/traders cater the demand of Lahore auto parts cluster.
- ✓ Industry gets rubber chemicals from 12 major suppliers in Lahore.
- ✓ 93 steel re-rolling mills provide services for the auto parts cluster in Lahore.
- ✓ There are 8 forging units from which manufacturers get services

1.6.6.2.4 Machinery Suppliers

It is estimated that 53 plastic machinery suppliers in Lahore fulfill the demand of auto parts cluster.

Around 29 Industrial Machinery Manufacturers & Suppliers are supplying metal processing & casting machinery to the auto parts manufacturers.

There are 10 machine tools and accessories suppliers in Lahore, supplying these goods to the industry.

1.6.6.3 Forward Linkages – Original Equipment Manufacturers

Among 22 assemblers all over Pakistan, 7 assemblers exist in the automobile sector in Lahore, which includes 1 passenger car manufacturer, 1 Tractors assembling plant and the rest of the 5 are 2/3 wheelers assembling plants[23].

The market share in cars is being enjoyed by three large players with Japanese principals. Pak Suzuki holds a dominant position with a market share of 54 per cent in 2015-16. Toyota has a roughly comparable market share with 32 per cent, and Honda followed with 14 per cent.

A comparison with 2014-15 also shows how market shares can change with the introduction of a new product: Pak Suzuki Motors introduced Suzuki Wagon-R which increased its market share from 50% to 54% in 2015-16.

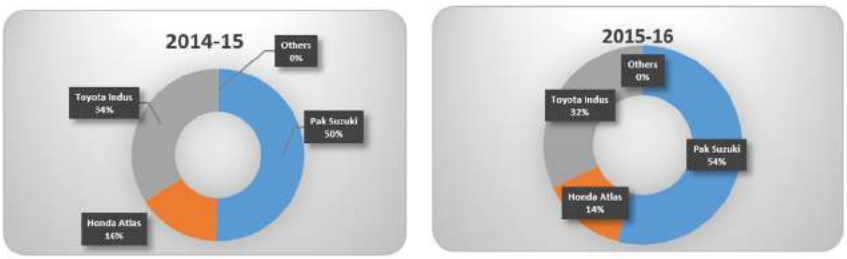


Fig-16 Market Share of OEMs in Passenger Cars
Source: PAMA

Market share is shared between three OEMs with Japanese principals: Toyota, Honda and Suzuki.

[22] Directory of Industrial Establishments,
Pakistan Plastics Manufacturers Association-PPMA
Pakistan Foundry Association-PFA
www.businessdirectory.pk

[23] (PAMA)

In the motorcycle segment, Atlas Honda still enjoys the biggest market share of 60% followed by United Auto Industries with 19% share & Omega Industries with 13% respectively in 2015-16.

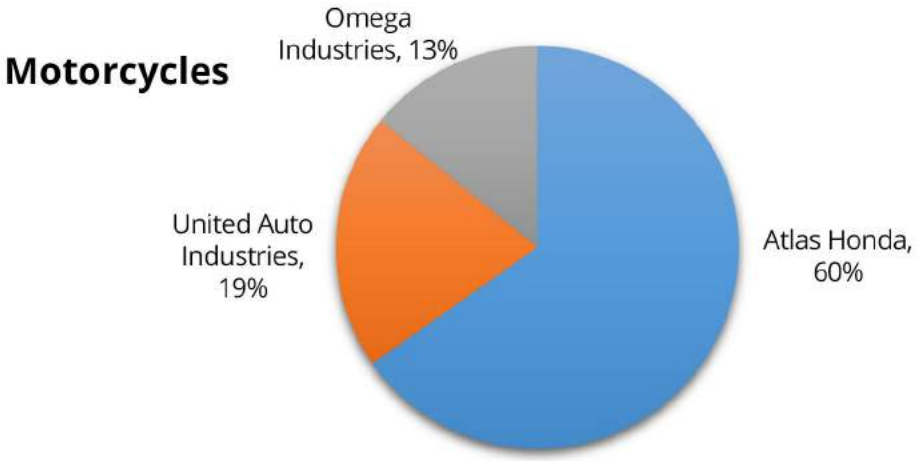


Fig-17 Market Share of OEMs in Motorcycles
Source: PAMA

In three wheelers, Qingqi enjoys largest market share of 57% followed by Sazgar Engineering having 35% market share; the rest of the three-wheeler assemblers have a meager market share ranging between 1% ~ 3%.

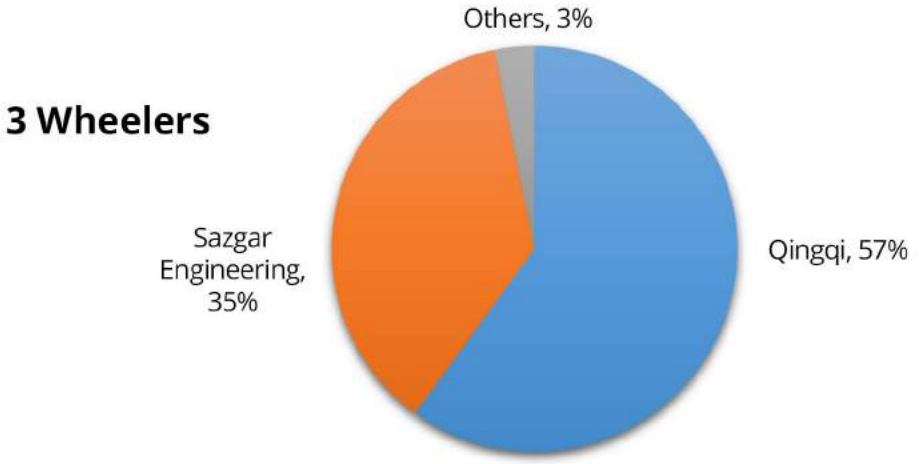


Fig-18 Market Share of OEMs in 3 Wheelers
Source: PAMA

Millat Tractors have the largest market share of 60% with 38% of Al-Ghazi Tractors, rest of 2% is enjoyed by Orient IMT Tractors.

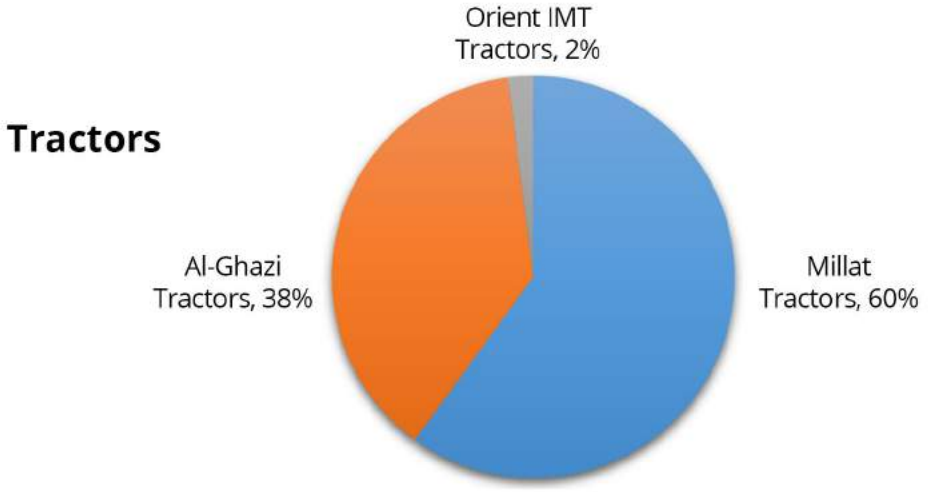


Fig-19 Market Share of OEMs in Tractors
Source: PAMA

2. Institutional Setup

Institutional setup to support auto parts manufacturing industry in Pakistan is divided into the following segments:

Government Departments

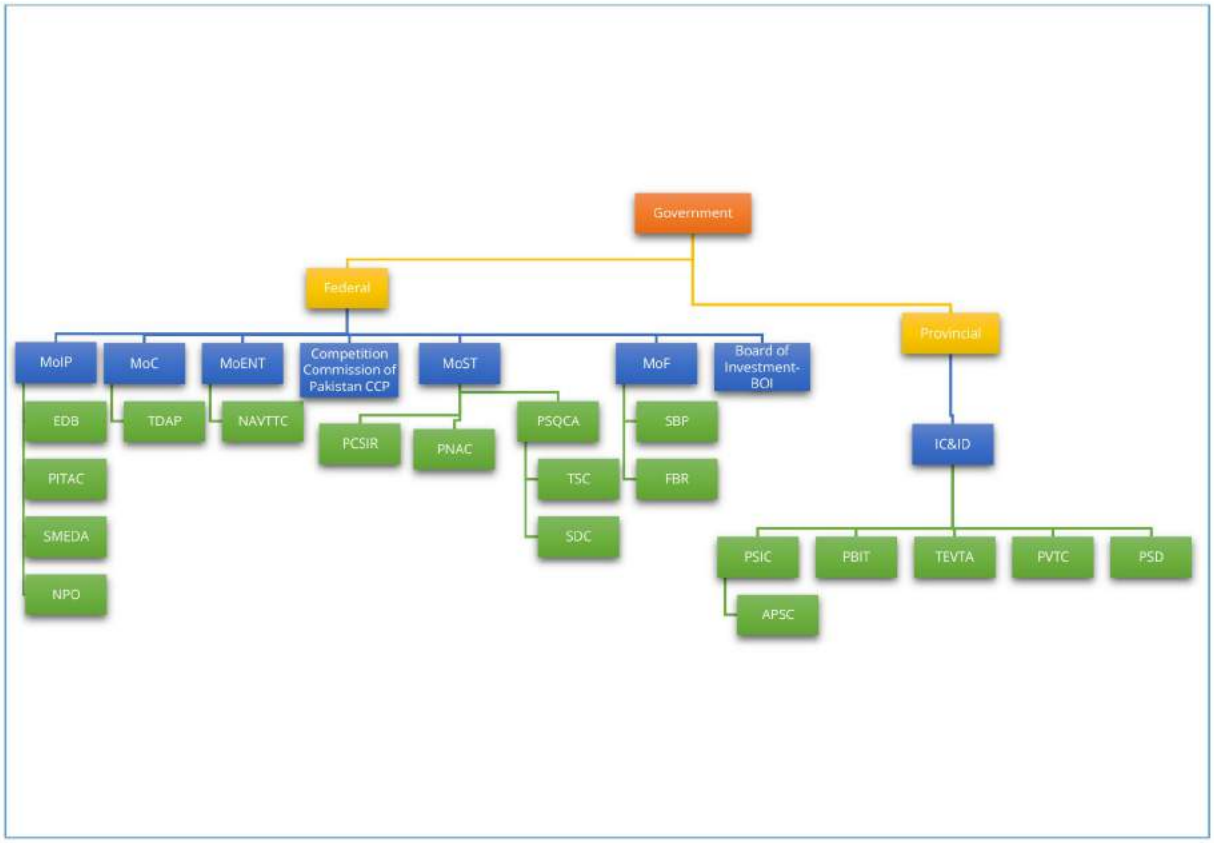


Fig-20 Government Institutions

2.1 Ministries:

2.1.1 Ministry of Industries & Production-Federal

Ministry of Industries & Production (MoI&P)'s role is that of a facilitator in creating an enabling environment for industrial growth in the country. Functions of Industries & Production Division include national industrial planning & coordination, policy making, industrial policy, employment of foreign personnel in commercial and industrial enterprises & development of industries (Federal Control) (Repeal)

2.1.2 Ministry of Commerce-Federal

The Ministry of cCommerce contributes towards the national economy through trade liberalization and facilitation, improving export competitiveness and reducing cost of doing business. Its main functions include imports and exports across custom frontiers, export promotion, commercial intelligence and statistics, tariff policy and its implementation, etc.

2.1.3 Ministry of Science & Technology-Federal

The Ministry of sScience and Technology is the national focal Ministry and enabling arm of the Government of Pakistan for planning, co-ordination and directing efforts to initiate and launch scientific and

programs and projects aimed at economic development of the country. The Ministry is working on the national agenda to have a sound and sustainable Science and Technological research base which would lead to the socio-economic development of the country.

2.1.4 Industries, Commerce & Investment Department-Punjab Province

The Industries, Commerce & Investment Department is one of the major Government Institutions striving to promote industrial development, trade and investment in the province. The main focus of activity is promotion of trade and investment in the province. The Government of the Punjab is keen to create a business-friendly investment climate in line with the Federal Government Policies and present the Pprovince of Punjab as an attractive investment destination for the entrepreneurs / investors. The functions of this department include pPromotion of Industry & Investment in the Province, Advocacy and Implementation of Trade & Investment Policies of the Federal/ Provincial Governments, Lliaison with Private Sector, Trade Bodies and Trade Associations, Ccreation of awareness about WTO related trade laws & standards, iImprove Product Competitiveness and Export Supply Chains, Cconduct research and provide Technical Expertise to the Private Sector, etc.

Private Sector

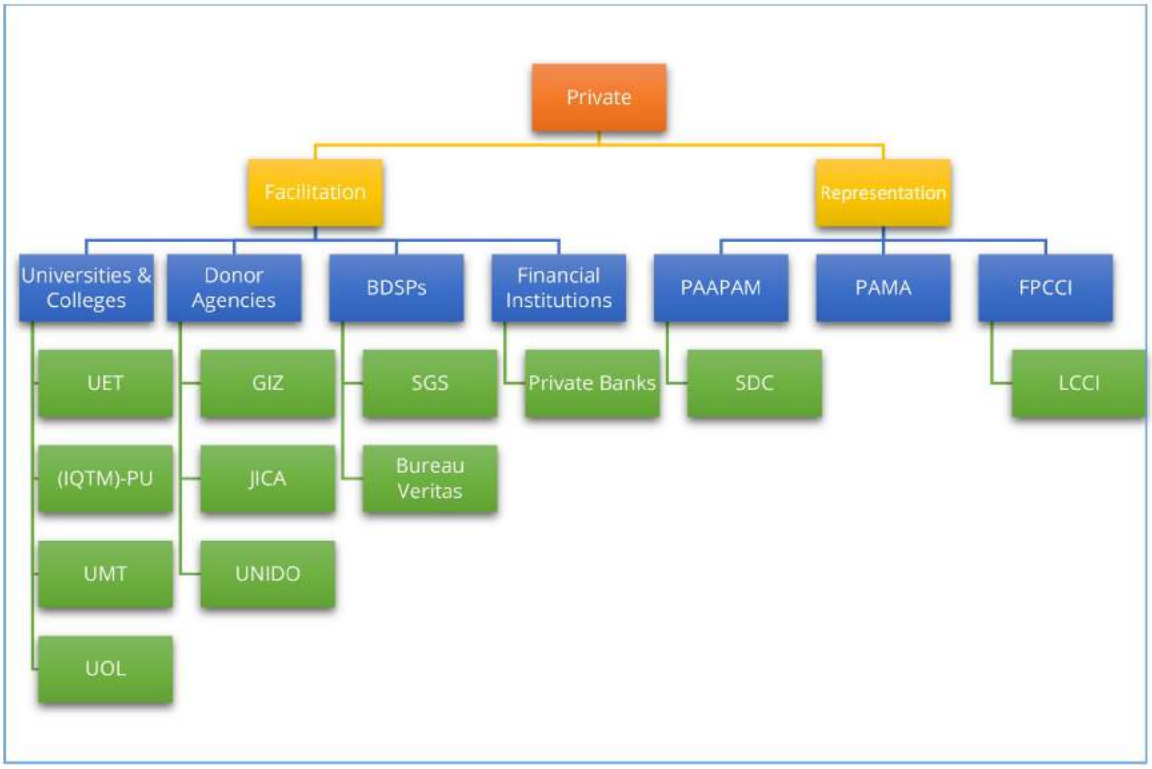


Fig-21 Private Institutions

2.2 Association of the Entrepreneurs

There are four associations existing for automotive sector, which are appended below:There are four associations existing for automotive sector, which are appended below:

- Pakistan Association of Automotive Parts and Accessories Manufacturers — PAAPAM.
- Pakistan Automotive Manufacturers Association — PAMA.
- Association of Pakistan Motorcycle Assemblers (APMA) -have offices in Karachi only.
- Industry Owners Association- Baghbanpura, Lahore- recently got registered with SECP.

Among them two associations namely PAAPAM and PAMA are actively working for the automotive sector in Pakistan including one specifically working for auto parts manufacturers only. They are:

PAAPAM

- Represents and provide technical and management cooperation to its members established in 1988.
- Has two offices one in Karachi and other in Lahore.
- It represents Tier 1 vendors.
- Currently it has over 300 members.
- It has established its own Skill Development Centre-PSDC, which conducts Training Needs Assessment study and provides training accordingly.
- Signed MoUs with Universities to create industry academia linkages.
- Organizes Pakistan Auto Show (PAPS) every year.

PAMA

- It is an association of Pakistan Automotive Manufacturers, which was established in 1982.
- Supports the OEMs in presenting their views before the Government and its different agencies.
- Currently it has 22 Members.
- Members are the assemblers of four wheelers, buses, commercial vehicles, two & three wheelers and tractors.
- It has10 executive committee members who are elected annually.
- Maintains overall production and sales statistics of all types of vehicles produced locally on monthly and annual basis.
-

APMA

- It is the body of motorcycle manufacturers and exporters in Pakistan established in 2006.
- To support and represent its members at various Government and private platforms.
- To develop effective coordination among its members.
- To provide guidance to members on various government policies.
- To help members in dealing their technical, administrative matters by providing specialist consultation services.
- To act as a catalyst to attract the foreign investments and technical collaboration.

Industry Owners Association-Baghbanpura

- It has recently got registered with Securities and Exchange Commission Pakistan.
- Currently it has 230 members.
- This association is not automotive specific only 75% of the members are related to automotive industry.
- Provides a platform for its members to discuss the issues through monthly and annual meetings.
- To provide guidance to members on various government policies.
- To represent its members for conflict resolution and negotiations.
- To liaise with LESCO and WASA to ensure hassle free supply of water and power/electricity.

2.2.1 Pakistan Association of Automotive Parts and Accessories Manufacturers — PAAPAM

PAAPAM was established in 1988 to represent and to provide technical and management cooperation to its members. The association achieved recognition from the Government of Pakistan in 1999. PAAPAM is a member of the Federation of Pakistan Chambers of Commerce and Industry (FPCCI). The management comprises of Chairman, Vice Chairman and Management Committee (10 members) who are elected every year. PAAPAM hasve two offices, one in Karachi and one in Lahore. The Association has over 300 members at present. PAAPAM represents Tier 1 vendors only.

The association also has also established a Skill Development Centre-PSDC, which provides training in various fields. PSDC of PAAPAM has also conducted a Training Needs Assessment study (TNA), in order to identify courses in which skilled workforce is needed by the industry. In order to develop industry academia linkages, PAAPAM has also signed MoUs with the University of Engineering & Technology, Lahore, University of Management & Technology-UMT Lahore, Punjab University Lahore, NED University of Engineering and Technology Karachi and, TEVTA Punjab. MoUs with Institute of Business Administration-IBA Karachi & Ghulam Ishaq Khan Institute-GIK, Islamabad are under progress.

These MoUs support students as to:

- ✓ Provide assistance to the students for final year projects.
- ✓ Provide internships and job placements.

- Represent PAAPAM in job fairs.
- Give free of cost stall to the universities in PAPS show.
- Teachers of these universities are invited to PAAPAM for delivery of lectures to further enhance their interaction with the industry.

Currently there has been a collaborative project with TEVTA, in which PAAPAM has shared a curriculum with TEVTA. PAAPAM has arranged 6 months trainings in such a way that 3 months training will be in class rooms and 3 months training in the factories of PAAPAM members (OJT).

PAAPAM also organizes Pakistan Auto Show (PAPS) every year to provide the automotive industry a platform to showcase its capability and potential to the world. It is a 2-3 days event with the entire Auto Engineering Sector assembled under one roof. Government high ups, Local and International Buyers and Manufacturers, Machinery Manufacturers, Raw Material Providers, and Service Providers attend this event.

PAAPAM is self-sustainable and generates funds from PAPS, membership fees and training workshops and, seminars organized. PAAPAM also hasve an active role in policy advocacy with the Federal Ministry of Industries & Production through the Engineering Development Board. PAAPAM has hired qualified staff including engineers to provide support services to its members.

2.2.2 Pakistan Automotive Manufacturers Association — PAMA

Pakistan Automotive Manufacturers' Association (PAMA) was established in 1982. It has a permanent secretariat with a full time Chairman and staff located in Karachi. PAMA supports the OEMs in presenting their views before the Government and its other agencies. Its membership includes assemblers of four wheelers, buses, commercial vehicles, two & three wheelers and tractors. There are 22 members of PAMA. PAMA has 10 executive committee members who are elected annually.

PAMA maintains overall production and sales statistics of all types of vehicles produced locally on a monthly and annual basis.

2.3 Lahore Chamber of Commerce and Industry (LCCI)

The Lahore Chamber of Commerce and Industry was established by the businessmen and industrialists of Northern India in 1923 under the name of "Northern India Chamber of Commerce and Industry".

LCCI represents its members and contributes to the nation's economic development through promotion of trade and industry. LCCI acts as a bridge between the government and the business community. It plays an important role in policy formulation by maintaining a constant interaction with the relevant authorities. LCCI has 7 standing committees representing the automotive sector among which 3 are directly related to the auto parts cluster. These committees raise their voice to the relevant government forums to resolve issues of the industry. Also, the chamber provides support to the industry through subsidizing participation in international trade fairs, etc.

2.4 Government/Semi Government Support Institutions

2.4.1 Pakistan Industrial Technical Assistance Centre (PITAC)

The Government of Pakistan established Pakistan Industrial Technical Assistance Centre (PITAC) in 1962. With the merger of Industrial Research and Development Centre (IRDC) and Industrial Productivity Centre (IPC) under the administrative control of Ministry of Industries, PITAC provides in-plant advisory and consultancy services, technical training, designing and manufacturing of dies and tools to the auto parts cluster of Lahore.

PITAC has also collaborated with Punjab Skill Development Fund to train 450 trainees from the target districts i.e. Lahore, Kasur, Gujranwala, Narowal, Faisalabad, Sargodha and Chiniot. This also includes training related to auto parts manufacturing sector.

2.4.2 Pakistan Council for Scientific and Industrial Research (PCSIR)

Pakistan Council of Scientific Industrial Research (PCSIR) was established in 1953 under the societies act to promote the cause of science and technology in the country. Since 1973, it is functioning under the act of parliament, which was amended in 1984. PCSIR through its departments provides testing facilities, technical support and consultancy services in the field of Metallurgy and Advanced Engineering Materials for auto parts sector as well. It also provides training on dies and mold manufacturing.

A Certification Incentive Program for SMEs under PQI Initiative 2025 was initiated by PCSIR in order to attract SMEs to resolve their technical issues.

Ministry of Planning, Development and Reforms, Government of Pakistan declared year 2016 as the year of Productivity, Quality and Invention (PQI). To support PQI Initiatives, Ministry of Science & Technology launched a program "Certification Incentive Program for SMEs under PQI Initiative 2025".

- This program was launched to attract SMEs who may use professional services to solve their problems, which would invariably lead to better quality products, improved industrial productivity, high level of competitiveness and wider penetration of Pakistani products into the international market.
- The objectives of this program are;
- To Guide & Support the SMEs to adopt new trends of international competitiveness, improved industrial productivity & Quality.
- To provide incentive grants to more than 2000 SMEs in developing a certification framework to improve business practices and enhancing export.
- To improve the competitiveness of Pakistani Entrepreneurs / SMEs in global supply chain.
- To organize training programs for stakeholders in establishing & maintaining certification systems.
- This program was formally inaugurated on 3rd December, 2016 at Lahore, the project life span is of 3 years.
- The project is still going on providing incentive to SMEs in the export based Manufacturing & Service Sector to acquire the Certification/ Accredited as relevant to their business areas.
- We have discussed this incentive with the respondent companies, now they are aware of this incentive and are interested to get certifications through this program.

2.4.3 Pakistan Standards and Quality Control Authority

The need for standardization and quality control was realized soon after the inception of Pakistan hence Pakistan Standards Institution (PSI), National Standards Body of Pakistan, was set up in 1951 along with establishment of Central Testing Laboratories (CTL) in 1951 for assessment of quality and grade of industrial raw materials and finished products. The objectives of PSQCA include setting up of standards on quality and dimensions, preparation & promotion of general adoption of Pakistan Standards, testing and assessment of industrial raw materials and finished products and work on standardization improvement of analytical methods, procedures and consultancy in the field of metallurgy, inspection and testing of products and services for their quality specifications.

The product wise shortcomings with regards to quality infrastructure are appended below:

Cars

- Standards framework is weak-no national standards exist
- Testing facilities are absent
- Imports are not regulated for quality
- Government is dependent on OEMs to define & conform to their own standards
- No product recall policy for important safety failures

2/3 wheelers

- Two main institutions implement standards for the motorcycle industry, Pakistan Standards Quality Control Authority-PSQCA and Environment Protection Authority-EPA
- Lack of clarity between EPA & PSQCA regarding responsible for monitoring and implementing the 2 and 3 wheeler standards, after devolution under the 18th constitutional amendment.
- PSQCA has so far set industry standards for 2 and 3 wheeler, yet implementation remains a serious issue.
- No labs available in Pakistan that can check compliance with Euro II standard

Tractors

- PSQCA is under capacitated to set or enforce quality and safety standards for any kind of vehicles.
- Currently a standard has been in draft stage for tractors

2.4.3.1 Technical Services Centre (TSC) -PSQCA

TSC was established at Lahore in 1975 to assist the metal and metallurgical industries of Pakistan under PSQCA. The services of this center include melting and casting of metal products, heat treatment, forging and rolling, sample preparation and maintenance, mechanical testing lab, metallography lab and non-destructive lab; these are all utilized by the auto parts cluster of Lahore.

2.4.3.2 Standards Development Centre-SDC, PSQCA

The Directorate of Standards, SDC (Standards Development Centre)-PSQCA is responsible for the development of Pakistan Standards to emphasize and contribute to enhance the national economy and international competitiveness. In addition, SDC-PSQCA also adopts international standards by the process of consultation and consensus involving stakeholders, which is a quicker process as compared to development of a new standard. PSQCA has adopted 22,070 standards and developed 8,860 standards. It is pertinent to mention that currently 5 standards have been developed by SDC i.e. 1 for tractors and agriculture implements, 1 for motorcycles and 3 standards for 3 wheelers.

2.4.4 Engineering Development Board-EDB

Engineering Development Board (EDB) is the apex government body under the Ministry of Industries & Production entrusted to strengthen the engineering base in Pakistan. EDB focuses primarily on the development of engineering goods and services sector on modern lines enabling it to become technologically sound and globally integrated. Its functions include developing a long-term vision for the engineering sector of Pakistan, formulate and coordinate Government policies relating to the engineering sector promotion of export, enhancement of technical training, formulate policies and guidelines for utilization of technical development and engineering funds, management of deletion policy, etc. The following programs under EDB also support the automotive sector:

- **Industrial Support Program** was initiated in the follow up of on-going regional economic integration originating from China- Pakistan Economic Corridor, with the collaboration of Academia and Research Organizations. ISP is focused on facilitating the Technological up-gradation of the local industrial set-ups, finding local solutions to technical issues of the local industries & match-making of local and foreign industries for possible joint ventures. 22 Engineering/Technical Universities of the country with 992 professors, researchers and different research organizations have been taken on board. Industries are being approached through their associations and Chambers of Commerce & Industries to share their technical issues as well as strategic programs for partnerships/ joint ventures with Chinese manufacturing companies.

  Engineering Development Board initiated Industrial Research Program (IRP)/ Industrial Support Program (ISP) with the collaboration of Academia to promote R&D activities in the industry by engaging Universities. The Program aims to addressthe industry's Technical issues pertaining to Product Design/Development, Production Process and its Materials to foster innovation.
  EDB has taken on board a research team comprising of Professors and Scientists.
  In response to the program, electronics, electrical, HVAC, castings/forgings, fabrications, chemicals, steel, renewable energy, etc industry shared their respective technical issues, which were discussed with universities; as a result 23 industrial technical problems received from the industrial units were resolved. The aim of the program was to create much needed sustainable interaction between the engineering technical institutions and the industry.

- **Online Quota Debiting System for Clearance of Automotive Parts and Inputs thereof (Shifting of One Customs System of PRAL To WeBOC):** The WeBOC System is operational since 1st July, 2013 and EDB is working closely with FBR for effective implementation thereof and has also been providing inputs for its refinement.

  EDB allocates a quota of imported inputs to OEMs and vendors, which is debited on-line through WEBOC. The EDB can access this system for year-round monitoring of Tariff Based System (TBS).

2.4.5 The Board of Investment (BOI)

The Board of Investment (BOI) was established with broad responsibilities of promotion of investment in all sectors of economy; facilitation of local and foreign investors for speedy materialization of their projects and to enhance Pakistan's international competitiveness and contribute to economic and social development. The BOI assists companies and investors who intend to invest in Pakistan as well as facilitates the implementation and operation of their projects. The wide range of services provided by the BOI include providing information on the opportunities for investment and facilitating companies that are looking for joint ventures.

2.4.6 Trade Development Authority of Pakistan (TDAP)

The Trade Development Authority of Pakistan (TDAP), was established on November 8, 2006, under a Presidential Ordinance, under Federal Ministry of Commerce. TDAP is the successor organization to the Export Promotion Bureau (EPB) and is mandated to have a holistic view of global trade development rather than only the 'export promotion' perspective of its predecessor. TDAP facilitates the industry to participate in trade fairs and exhibitions abroad for the automotive sector on subsidized rates. It is pertinent to mention that there is a condition from TDAP that an industrialist can avail the opportunity to participate in international trade fairs not more than three times throughout the lifetime, which is demanded to be waived off.

2.4.7 The Punjab Board of Investment & Trade (PBIT)

The Punjab Board of Investment & Trade (PBIT) is the premier trade and investment promotion agency of the Government of Punjab. PBIT does not provide any funding to the business entities; it only facilitates them by making their B2B linkages for the promotion of investments through missions. If they want to participate in trade fairs, PBIT can provide visa facilitation while writing to TDAP for their accommodation after doing due diligence of the company/individual. If an international company wants to start their own business or start a joint venture in Pakistan, PBIT provides support to interact with relevant Government departments.

2.4.8 Small and Medium Enterprise Development Authority (SMEDA)

SMEDA is the premier institution of the Government of Pakistan under the Ministry of Industries & Production. SMEDA was established in October 1998 to take on the challenge of developing Small & Medium Enterprises (SMEs) in Pakistan. It provides an enabling environment and business development services to small and medium enterprises. SMEDA has the following support programs for the auto parts manufacturing industry.

- **SMEDA-JICA Technical Support (TSP) to Auto Parts Manufacturing Industry:** The objective of this program is to broaden the scope of productivity improvement activities across the value chain of the automotive sector and subsequently improve the share of localization of auto parts. JICA has approved a 4 years project for Technical Support on "Japanese Way of improving Productivity and Quality", of Auto Parts Manufacturing Industry of Pakistan which is being implemented by SMEDA under the guidelines of JICA technical experts. Technical Support will be extended to 50 Auto Parts manufacturing units of Pakistan from Punjab (Lahore) & Sindh (Karachi) using five (05) JICA Technical Experts. Out of 50 SMEs, around 10 SMEs would be developed as model factories in the field of productivity and quality.

  The SMEDA JICA TSP program was launched in August 2015. Duration is for four years i.e. from 2015 till 2019. 50 companies among the auto parts manufacturers from Karachi and Lahore will be selected. A mechanism has been devised to short list and select the companies, which includes nomination of companies from PAAPAM and OEMs . Based on the nominations provided on the prescribed format, the information is validated through company visits, which is then evaluated and scored to select a company.

  Once a company is selected they are provided support in terms of:

  1. Technical issues related to their production lines.
  2. General management practices to streamline their management operations.

  Currently, 20 companies have been supported in the first phase in the above mentioned areas. The companies who are more responsive towards interventions are selected as 'Model Companies' and are set as an example for the rest of the industry.

  30 more companies are going to be selected in the next phase.

- **Green Productivity: BFZ-Germany:** SMEDA and BFZ, initiated the "ESPIRE Green" Project in 2012 with an objective to improve environmental performance of SMEs of Pakistan by reducing wastages at source, through Green Productivity (GP) techniques. In FY 2015-16, 11 audits were conducted in green productivity industrial units at Karachi and Lahore. As an outcome of SMEDA's initiative, 11 industries implemented GP/CP model after getting training on Fire Safety.

- **Energy Efficiency jointly with JICA, GIZ, BFZ:** SMEDA, jointly with JICA, GIZ, BFZ has launched many projects/ programs to tackle prevailing inefficiencies in energy usage at demand side. In FY 2015-16, EA/EnMS program implemented in 35 industries of selected sectors (13 energy audits, 20 follow-up visits and 2 evaluation visits) was accomplished, 16 training workshops/seminars were conducted to impart awareness on energy efficiency self-assessment tools, 6 energy calculators were launched. SMEDA launched an Energy Efficiency Advisor Certification Program jointly with UET & GIZ, which will facilitate the Certification of ESCOs under GIZ TVET Program.

- **UNIDO-Subcontracting and Partnership Exchange (SPX):** Subcontracting and Partnership Exchange Centers (SPXs) have been established globally by UNIDO in order to achieve inclusive and sustainable industrial development (ISID). SPX specifically helps local enterprises to successfully meet the challenges of globalization and to take advantage of emerging industrial subcontracting, outsourcing and supply chain opportunities. This program is being implemented in collaboration with SMEDA.

  More than 230 enterprise profiles have been uploaded on the SPX Management Information System serving as an important matchmaking database for enhanced buyer-supplier linkage development. 32 companies have received SPX Benchmarking services including an assessment of business practices and operational performance in comparison to local, regional and international firms.

25 buyers have been supported by SPX to realize their local content strategies, meeting subcontracting requirements and their corporate social responsibility (CSR) goals. More than 10 matchmakings in the automotive sector have been facilitated by the SPX Centre in Pakistan with more linkages being facilitated on an ongoing basis.

2.4.9 National Productivity Organization (NPO)

The National Productivity Organization (NPO) is the sole Government body undertaking productivity with quality initiatives in Pakistan. NPO Pakistan has established research and resource institutions working with the support of the Asian Productivity Organization (APO), Tokyo-Japan. NPO is also working as a Liaison Office of Asian Productivity Organization (APO), which represents 20 Asian Countries with the mandate to promote productivity and quality consciousness among the public and private sector organizations. NPO Pakistan promotes enhancement of productivity culture in Public and Private Sector Organizations by providing training, seminars, workshops, consultancy, release of index surveys, qualification certification, promotion of a comprehensive understanding of energy and the environment and research on productivity. NPO provides class room training to the industry to enhance their productivity.

2.4.10 The Competition Commission of Pakistan (CCP)

The CCP is an independent quasi-regulatory, quasi-judicial body that helps to ensure healthy competition between companies for the benefit of the economy. A Competition Impact Assessment Report of the automotive sector of Pakistan was conducted by CCP in 2013, which assessed the level of competition in the automotive sector of Pakistan.

2.4.11 Federal Board of Revenue-FBR

The Central Board of Revenue (CBR) now FBR, was created on April 01, 1924 through enactment of the Central Board of Revenue Act, 1924. In 1944, a full-fledged Revenue Division was created under the Ministry of Finance. FBR is responsible for enforcing fiscal laws and collecting revenue for the Government of Pakistan. FBR has the responsibility for (i) formulation and administration of fiscal policies, (ii) levy and collection of federal duties, taxes and other levies, and (iii) quasi-judicial function of deciding taxation cases and appeals.

2.4.11.1 Pakistan Customs

Pakistan Customs serves as the guardian of the borders of Pakistan against movement of contra band goods and is a facilitator of bona fide trade. It also helps to protect the domestic industry, discourage consumption of luxury goods and stimulate development in the under -developed areas.

2.4.12 Punjab Small Industries Corporation-PSIC

The statutory body of PSIC was established in 1972 with the mission to promote sustained industrial development through provision of market driven credit, infrastructure and technological support contributing to employment generation, poverty alleviation and socio-economic uplift of the province. PSIC was established as a result of dissolution of West Pakistan Small Industries Corporation in 1972. Since its inception, PSIC has been involved actively in devising plans and initiating programs for the development of small industries in the province of Punjab. The corporation offers a wide range of services including loan facilities, promotion of industrial sector including handicraft shops, cluster development centers, advisory services and industrial estates development.

Some initiatives of PSIC include Green CNG auto rickshaw loan scheme and credit assistance for conversion of diesel buses into CNG. Other initiatives include cluster based lending for artisans in the creative and cultural industry, establishment of model HDC[24] at Multan and Murree, formation of Board of Management in industrial estates to manage operation of estates. Apart from these PSIC intends to establish nine new industrial estates and increase the lending portfolio to 3.5 billion rupees in the next five years.

A new project with the name of Cluster Development Initiative-CDI has been initiated by PSIC. The project has been envisioned to create linkages of high growth clusters of Punjab with global value chain. This will be done by bridging the gaps in terms of productivity, good manufacturing practices (lean manufacturing, green manufacturing, etc.), skill development and integration with international compliance regime for which CDI intends to benchmark local clusters with best performing clusters across the globe. The objective is to create impact in terms of value addition, export integration, job creation and inclusive growth in line with SDG9 with the active cooperation of relevant associations of the clusters. In order to realize the above objectives, United Nations Industrial Development Organization (UNIDO) with globally recognized diversified experience of cluster development has been engaged by PSIC as an implementation partner. Currently, four cluster development teams are working in Ready Made Garments, Leather Footwear & Products, Surgical Instruments & Auto Parts sectors. The teams are in the phase of conducting Diagnostic Studies of their relevant sectors & meeting cluster actors, which includes business development service providers, support institutes, principal firms, raw material suppliers, etc.

2.4.12.1 Auto Parts Support Centre-APSC

PSIC established Auto Parts support service center-APSC in Lahore in 2006. The main objective of the center is to provide support services for the development of auto parts, designing, testing/inspection, production of dies and heat treatment facilities at Lahore. To the advantage of APSC is its location at the heart of Kotlakhpat Industrial Estate, where a significant number of auto part manufacturers are located. The main objective of the Centre was to provide engineering support service to the auto part manufacturers in the fields of:

- Reverse Engineering (using Faro Arm 7-axis portable CMM);
- Die and Mold production using CAD/CAM;
- Metrology and testing;
- Technology dissemination, and
- Training

2.5 Technical Training & Educational Institutions

2.5.1 Engineering Colleges and Universities Public Sector Institute

2.5.2 Public Sector Institutes

2.5.2.1 University of Engineering & Technology (UET), Lahore

The institution started its career in 1921 as the 'Mughalpura Technical College'. UET, Lahore is the premier institution offering engineering courses in various fields of engineering. It also provides research and development, testing and inspection services for the local industry. UET provides 14 engineering courses in Bachelors of Engineering, 12 course for Masters and 12 Ph.D programs. The Mechanical, Metallurgy & Polymer Engineering Departments provide inspection and testing facilities for the auto parts cluster of Lahore.

[24]Handicrafts Development Centre is working under the umbrella of PSIC for the empowerment of artisans through Skills Development, Design development and Provision of design material.

2.5.2.2 Institute of Quality & Technology Management (IQTM) - PU

Offers a B.Sc, M.Sc and Ph.D courses in Total Quality and Total Quality Management. The institute also offers a wide range of Post Graduate diplomas and short courses in TQM.

2.5.3 Private Institutes

2.5.3.1 University of Management Technology (UMT)

The UMT is a project of Institute of Leadership and Management (ILM) Trust established in 1990. UMT offers courses in Engineering and Technology as well as other fields. PAAPAM has signed an MoU with UMT. Center for Executive Education of UMT is providing support to PAAPAM members to gear up the industry for CPEC

2.5.3.2 The University of Lahore-UoL

The University of Lahore claims to be the largest private sector university in Pakistan with more than 35,000 students and 7 campuses. The University was established in 1999 and has since then been offering courses in the fields of Engineering and Technology along with other fields.

2.5.4 Technical and Vocational Training Institutes

In order to fulfill the requirements of technical and skilled workforce, the bodies and institutions catering to the needs of the industry in the matter are appended below:

2.5.4.1 National Vocational & Technical Training Commission (NAVTTC), Pakistan

NAVTTC is an apex body at the national level to regulate, facilitate and provide policy direction in Vocational & Technical Training. The Commission is establishing and promoting linkages among various stakeholders existing at national as well as international level. The functions of NAVTTC include development of National Policies, Strategies and Regulations, National Qualification Framework (NQF), Accreditation, Certification, Skill Standards & Curricula, Labor Market Information System, etc.

2.5.4.2 Technical Education and Vocational Training Authority (TEVTA)

TEVTA was established with a mission to enhance global competitiveness in Punjab, through a quality and productive workforce by developing demand driven, standardized, dynamic and integrated technical education and vocational training service. Skilled Labour Market Information/ Placement System (SLMIS) initiated by TEVTA with three basic components: An online Information System, Skill Mapping of 36 districts of the Punjab and Online/ Offline Placement system to facilitate TVET graduates of TEVTA and other institutes. This project is considered as a comprehensive baseline document/ platform for planning of the TVET sector.

2.5.4.3 Punjab Vocational Training Council (PVTC)

Punjab Vocational Training Council (PVTC) was established in 1998 on the basis of Public Private Partnership by the Government of Punjab. PVTC is providing demand driven skill training to deserving youth, involving private sector to enhance employability and assist the graduates in their placement for permanent rehabilitation. In Lahore there are 5 vocational institutes, which offer courses related to the auto parts cluster.

The location of the 5 institutions are as follows:

- Green Town on the gateway of Quaid-e-Azam Industrial Estate, near APSC.
- Kahna Nau.
- Manga.
- Shalimar.
- Walton.

These all are situated in industrial agglomerations, except for Walton road, around which industrial concentrations are thin.

2.5.4.4 Punjab Skills Development Fund (PSDF)

Punjab Skills Development Fund (PSDF) is a not-for-profit company set up under the Companies Ordinance 1984 by the Government of Punjab in collaboration with Department for International Development, UK. Currently Punjab Skills Development Fund (PSDF) is running various schemes under three main programs with the objective of financing 380,000 individuals, which are:

- Punjab Skills Development Program (PSDP) which is a 32 Million US Dollar World Bank funding to Government of Punjab
- Skill Development Program (SDP) which is GBP 127 Million collaboration of the Government of the Punjab and Department for International Development UK
- IRMNCH, which is completely owned by the Punjab Government and includes funding of Rs. 35 Million.

2.6 Donor Agencies

2.6.1 Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) Gmbh-GIZ

Germany and Pakistan have been partners in international cooperation for more than 54 years. GIZ has been working in Pakistan on behalf of the German Government, mainly the German Federal Ministry for Economic Cooperation and Development (BMZ) and the Federal Foreign Office (AA). Currently, the following program is being conducted under GIZ

- **TVET Sector Support Program:** To improve access, quality, equity and relevance of TVET, Government of Pakistan has embarked upon a comprehensive reform in 2011 with the support of the European Union and the Governments of Germany, Netherlands and Norway. The first phase of the reform, which was based on the National Skills Strategy (NSS) ended in December 2016, the deliverables of which included national TVET policy, National Vocational Qualifications Framework (NVQF) and Competency Based Training & Assessment (CBT&A) etc. Curricula details based on NVQF of 8 training courses are enclosed at **annex-1.**

2.6.2 Japan International Cooperation Agency-JICA

JICA is a governmental agency that coordinates official development assistance (ODA) for the Government of Japan. It is chartered with assisting economic and social growth in developing countries and the promotion of international cooperation. JICA is supporting the auto parts industry through a Technical Support Program.

2.6.3 United Nations Industrial Development Organization (UNIDO)

Established in 1968 UNIDO has extensive and successful experience in industrial development cooperation. This experience has been gained through a continuous interaction with the public and private sectors and by implementing over 50 projects covering many industrial sectors. The projects aim at building indigenous (human and/or institutional) capacity to enhance the industrialization process of Pakistan in a sustainable way. UNIDO worked with TDAP and SMEDA for cluster development in 2001 & 2006 respectively. Currently UNIDO is implementing a "Cluster Development Initiative" in collaboration with PSIC and "SPX-Subcontracting Exchange Program" in collaboration with SMEDA.

2.7 Private Business Development Service Providers-BDSPs

There is very poor presence of private BDS providers in the cluster. Very few consultancy firms are working in the cluster. They provide service with respect to ISO 9000 and other certifications. BDS providers in the areas of technology, material mixing, product standardization and latest production techniques are the main requirements of the cluster.

2.7.1 Bureau Veritas

Bureau Veritas is an international certification agency. In addition to certifications, they provide HSE expertise (Health, Safety and Environment). Bureau Veritas' services benefit all players in the automotive value chain, from manufacturers and dealers, to suppliers, Governments and, ultimately, consumers. Bureau Veritas offers inspection, testing, certification, fleet inspection services, etc.

2.7.2 SGS

SGS is the world's leading inspection, verification, testing and certification company. With more than 90,000 employees, SGS operates a network of more than 2,000 offices and laboratories around the world.

For the auto parts cluster, SGS services are provided in Inspection, Testing, Certification & Verification.

2.7.3 The International Growth Centre (IGC)

The International Growth Centre (IGC) aims to promote sustainable growth in developing countries by providing demand-led policy advice based on frontier research. IGC Pakistan provides independent and demand-led research to support growth policy in Pakistan. Current priority areas include macroeconomic management, state capabilities, firm capabilities, urbanization and energy. IGC has done research studies related to trends in the industry and policy framework on automotive sector of Pakistan in 2012.

2.7.4 Dimotec Engineering Services Company

Dimotec is a business development services provider, which provides engineering services to the industry. Their services include product designing, CNC machining & profiling, injection molding production, conventional machining, turret tooling, mold making and wire cutting. They provide services from concept prototyping to quality production.

2.8 Financial Institutions

Lahore is adequately covered by nationalized and private sector banks and financial institutions.

2.8.1 State Bank of Pakistan

State Bank of Pakistan is the central bank which regulates monetary policies in the country. According to the prudential regulations for SMEs there is a per party exposure limit for Small and Medium Enterprises which is given as under;

2.8.1.1 Regulation SE-2: Per Party Exposure Limit

Small enterprises can avail exposure up to Rs. 15 million from a single Bank/DFI or from all Banks/DFIs.

2.8.1.2 Regulation ME-3: Per Party Exposure Limit

The maximum exposure of a bank/DFI on a single medium enterprise shall not exceed Rs. 100 million. The total exposure (including leased assets) availed by a single medium enterprise from the banks/DFIs shall not exceed Rs 200 million.

Service / Function	Provider	Recipient	Who pays?	Mechanism
R&D services	PITAC	Cluster company	Cluster company + Govt.	Pay for service
Testing and laboratory services	• PCSIR • PSQCA	Cluster company	Cluster company + Govt.	Pay for service
Upgrading services*	• NPO • SMEDA	Cluster company	Government	Free of charge
Skills development service	• TEVTA • PVTC • PSDF • PAAPAM	Cluster company	• Government • Cluster Company + PAAPAM	• Free of charge • Pay for service
Financial services	Banks	Cluster company	Cluster company	Pay for service + interest /service charges
Management consulting services	• SMEDA • UMT • SGS • BV	Cluster company	• Govt. • Cluster company	• Free of charge • Pay for service
Product and Market development **	• PITAC • PCSIR	Cluster company	Govt.	Pay for service
Export services	TDAP	Cluster company	Govt.	Free of charge
Non-financial investment support services	• SMEDA • PBIT	Cluster company	Govt.	Free of charge
Standard and certification (national, international, ISO series)	• SGS • BV	Cluster company	Cluster company	Pay for service
Insurance services	• Insurance companies	Cluster company	Cluster company	Pay for service
Logistics	• NLC • TAG Cargo • Fast	Cluster company	Cluster company	Pay for service
Management support for implementing upgrading measures	• SMEDA • PCSIR • PITAC	Cluster company	Cluster company	Free of charge
Other?				

Table 16- BDSPs and support institutions

*Such as technology, production techniques, production processes

**Only product development, there is no specific market development company existing in the cluster

2.9 Policy Framework for Automotive Sector

The automotive policy in Pakistan is developed and implemented by the EDB. In order to overcome the shortcomings of the previous Automotive Industry Development Policy (AIDP), which was approved in November 2007 the tenure of which was till 2012, the new Automotive Development Policy 2016-21 was tabled in the Economic Coordination Committee (ECC) after over a year of consultations with the industry and the government, and got approved in March 2016[25], which sets the following targets for the industry by 2021:

- ✓ Cars/vans/jeeps 350,000
- ✓ LCVs 79,000
- ✓ Trucks 12,000
- ✓ Buses 2,200
- ✓ Tractors 88,000
- ✓ Motorcycles 2.5 Million

Further targets include, increasing contribution to GDP from 2.3% to 3.8%, and manufacturing from 22% to 30%. Also, to increase indirect employment from 2.4 Million to 4 Million.

A comprehensive comparison of policy framework for automotive sector (previous and current) along with incentives for the industry is enclosed at annex-2.

[25]Engineering Development Board

3 Cluster Assessment

The Cluster Assessment presents a review of the current situation of the auto parts cluster/industry in Lahore. The information presented is based on the survey questionnaires administered to auto parts and components manufacturers and interviews with them.

3.1 Trends

A total of 36 companies (Principal Firms) were visited during field visits, including large, medium and small enterprises. The distinction between large and small & medium enterprises was based on the total number of employees working in an organization.

Three years data was collected to analyze the trends of business scenario of Lahore auto parts cluster. It was found that respondents were not willing to share financial figures, hence only 29% of the sample size provided information regarding increase in tax paid, while 71% have not responded in this regard.

The detailed trend analysis with respect to various indicators is appended below:

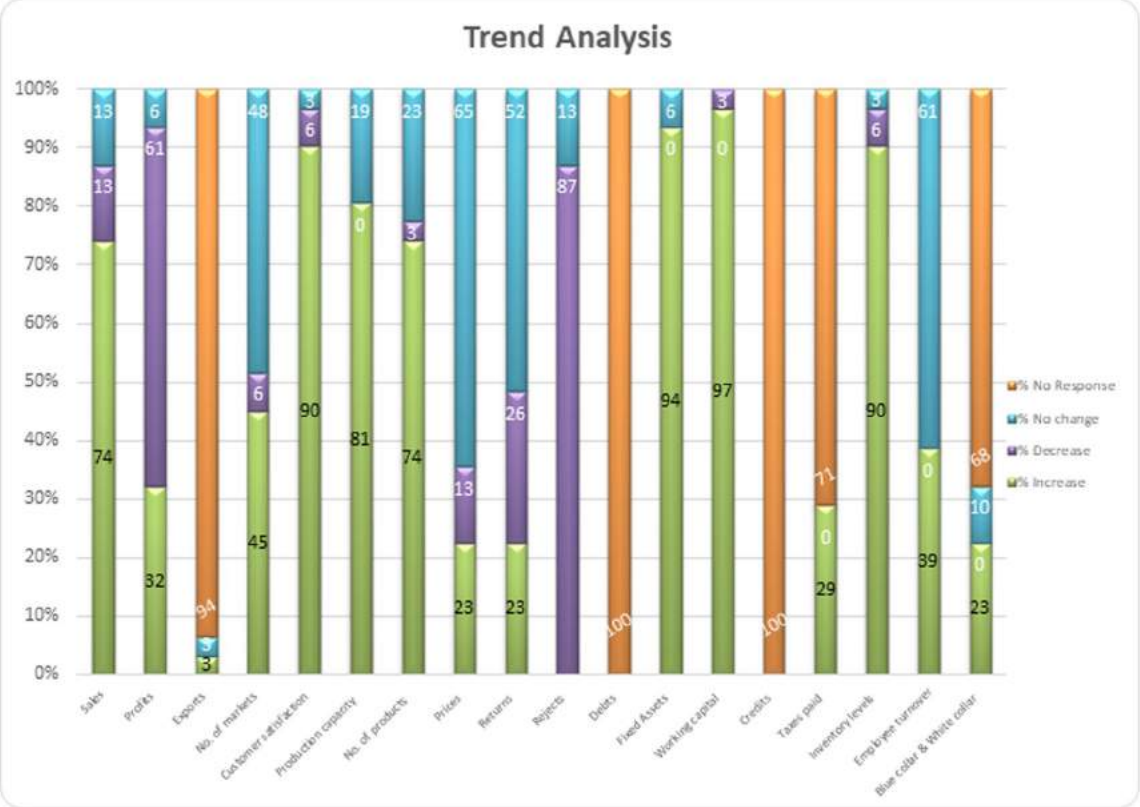


Fig-22 Trend Analysis

Analysis of the data collected from the companies as depicted in Figure-23 suggests that 74% of the companies had increase in sales, 13% reported stagnant sales and the remaining 13% informed a declining trend in sales. The increasing sales trend is due to increased demand of OEMs. This depicts the overall growth of the sector in terms of sales volume and revenues.

Fig-23 Sales Trends Analysis

The data in the figure depicts that despite increase in sales, 61% respondents have reported that their profits have decreased, which is the repercussion of increasing cost of inputs. Inputs mainly include raw materials and utilities as non-availability of electricity and gas are major barriers to achieving greater competitiveness, as the use of diesel generators increases costs of production. However, 32% reported an increase in profit margins, which is due to increase in production capacity, while 7% respondents mentioned no change in profits.

Fig-24 Profits Trend Analysis

Since auto parts manufacturing industry is mainly focused on import substitution, hence a majority of auto parts manufacturers have local sales, which is clear from the figure above. This depicts that only 2 out of 31 respondents are in exports. A major reason of low exports is that locally produced parts are not competitive in international markets in terms of quality, cost and even for the replacement market, which is flooded with low price/quality imported parts.

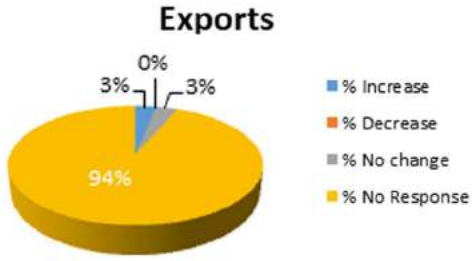


Fig-25 Exports Trend Analysis

The data shows that 48% companies reported no change in markets/customers, while 45% companies mentioned increased number of customers and 6% respondents reported decrease in customer base. As depicted above, a majority of auto parts manufacturers cater to local OEMs and very few companies are in exports, hence the number of markets are stagnant, whereas new entrants (OEMs) in 2/3 wheelers depict an increasing trend in the number of customers. Since there is cut throat competition, hence a slight change in price can affect the existing customer base negatively. Customer satisfaction is dependent on quality products with competitive prices. The cluster companies are following these parameters due to which 90% of the respondents have reported an increase in customer satisfaction. This factor can be found in relation to price as well, where 65% of the companies informed no change in price and 13% mentioned price decreasing trend. This price stagnation also has an adverse effect on the profit margins of the manufacturers as returns are related to prices and cost of inputs, therefore trend of returns is very much similar to the price trends.

Since profit margins have reduced, manufacturers are focusing on increasing sales volumes, thus increasing production volumes. Introduction of new variants/models by OEMs has generated higher demand of auto parts, thereby encouraging investment in enhancing production capacities to cater to new products or higher utilization of existing capacities. Data in the Figure-26 shows that 81% companies have enhanced their production capacities while 18% respondents have reported no change.

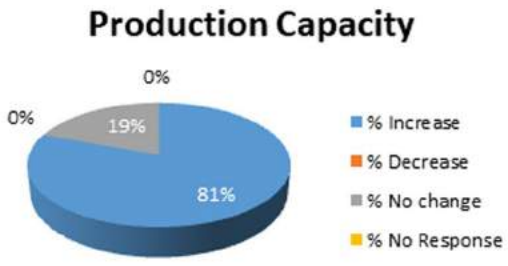


Fig-26 Production Capacity Trend Analysis

Regarding production of new products 74% companies reported production of new parts as well, whereas 23% companies have not diversified their product range. This enhancement of production capacities and addition of new products has resulted in increased fixed assets of 94% of respondent firms. However, only 6% companies informed no change in their fixed assets. None of them have reported any decline.

It is pertinent to mention that the industry is becoming more quality conscious as firms have also reduced their rejection rates by integrating improved and advanced production techniques. This can be validated through the survey data reflected in Figure-27, which depicts a decrease in rejection rates reported by 87% respondents, whereas 13% reported no change and none reported increased rejections.

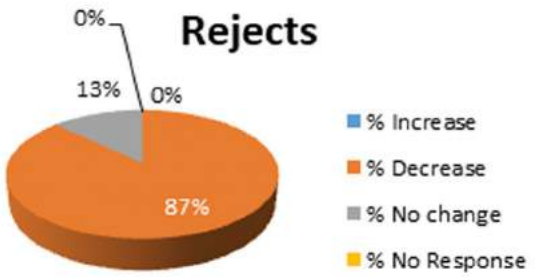


Fig-27 Rejection rates Trend Analysis

The decreased trend in rejection rate is because of tough competition, cost saving and requirement by OEMs to maintain minimum rejections.

It was also revealed that auto parts manufacturers invest their own resources in business, as the industry is operating on low profits and interest rates on loans further adds to the cost of inputs, hence none of the respondents have taken any financing facilities from banks/financial institutions.

As Japanese OEMs have implemented 'Just in Time' approach, the fall back of which has increased pressure on the manufacturers to maintain high inventory levels for raw materials and for finished goods as well, in order to ensure timely deliveries. To achieve this, increase in working capital and inventory levels was the strategy and the figure above depicts that 91% respondents reported increased inventories and 97% of the manufacturers reported an increase in working capital.

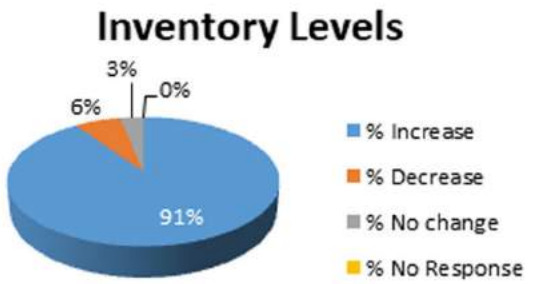


Fig-28 Inventory Levels Trend Analysis

Employee turnover is imperative for any industry. Availability of skilled work force is also imperative for a business to be successful. As suggested by the figure above, increase in employee turnover was reported by 39% respondents while 61% reported no change. A reduced employee turnover rate was not reported by any company. Major reasons for employee turnover include low wage rates, availability of substitute income opportunities, structural mismatches and search for better opportunities in the same trade.

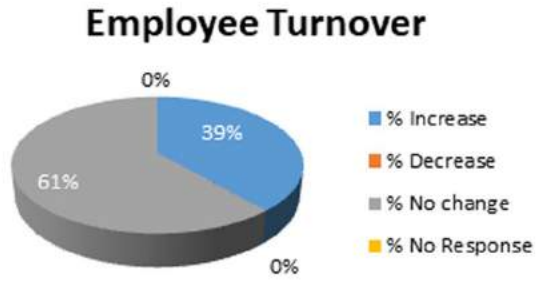


Fig-29 Employee turnover Trend Analysis

3.2 Raw Materials

The automotive components industry is more aptly described as an "agglomeration of industries" rather than as a single industry. The main raw materials used in manufacturing of auto parts are Steel, Aluminum, Silver, Copper and alloys for casting products, Rubber and Plastic.

- **Steel** Amongst the above, the major raw material for auto parts manufacturing is steel. The industry used to purchase steel from Pakistan Steel Mills, but after its closure, manufacturers are left with no choice but to purchase steel from private steel mills which include People Steel Mills, Ayesha Steel Mills and International Steels Limited. These steel mills are located in Karachi. Large and medium firms buy directly, whereas small and cottage firms buy from local dealers and stockists. The Government of Pakistan has recently imposed an additional 15% regulatory duty on imported steels, consequences of which leads to increased cost of production.

- **Other metals and alloys** Just like Steel, Silver, Aluminum, Copper and alloys are also imperative for manufacturing of geometrically complex auto parts. Some of the auto parts that are manufactured through die casting techniques includes pistons, cylinder heads, engine blocks, gears, bushings, pumps and brake pedals. During the survey it was revealed that the industry is buying 'pure' raw material for castings from two major suppliers i.e. Sun Metal Industries (Pvt.) Ltd. in Karachi and Bismillah Steel Industries in Gujranwala. In addition to 'pure' materials, scrap/waste from different resources is also used for low quality casted products like handle locks and ignition switches for 2/3 wheelers, etc. Scrap is being procured from scrap dealers located at 'Misri Shah', Lahore, which is then melted with the addition of new alloys/materials for desired mechanical properties, which afterwards is verified through spectrometer testing.

- **Rubber** For manufacturing of rubber auto parts, the industry is using both local as well as imported raw materials. It was found during the survey that a majority of manufacturers are using imported rubber. Natural rubber is imported from India, Sri Lanka, Thailand, Malaysia, Vietnam and Burma whereas synthetic rubber is imported from Korea, Japan, Russia, Iran and India. Since synthetic rubber is the by-product of petroleum (sweet oil), hence its price fluctuates with petroleum prices in international markets. In order to cope with price volatility, the industry procures large quantities, which eventually adds to the cost of production.

  Plastic being a substitute for many metal products also has significance in auto parts manufacturing, especially for the production of interior and exterior parts of automobiles with complex profiles. PVC, ABS, PP, PC are major types of plastics used by the industry. The industry is using 100% imported materials from Saudi Arabia, Taiwan, Singapore and Thailand.

  It is pertinent to mention that although Foreign OEMs (Japanese) have comprehensive mechanisms devised to support their vendor chains, which includes information of raw materials with its source for procurement, however, it was found during the survey that the industry relies on "Self-research" for quality and economic raw material procurement. In addition to self-research, exhibitions and international clients are also the source of information for the industry for raw material procurement.
  Overall industry perspective depicts that 33% manufacturers use local while 67% use imported raw materials. Steel, Rubber and Plastics are imported mainly from China, however they are also imported from Taiwan, Korea, Japan, Thailand, Russia and Poland.

3.3 Production Details

3.3.1 Production Processes Flow Chart

Major assemblies in a vehicle are appended below:

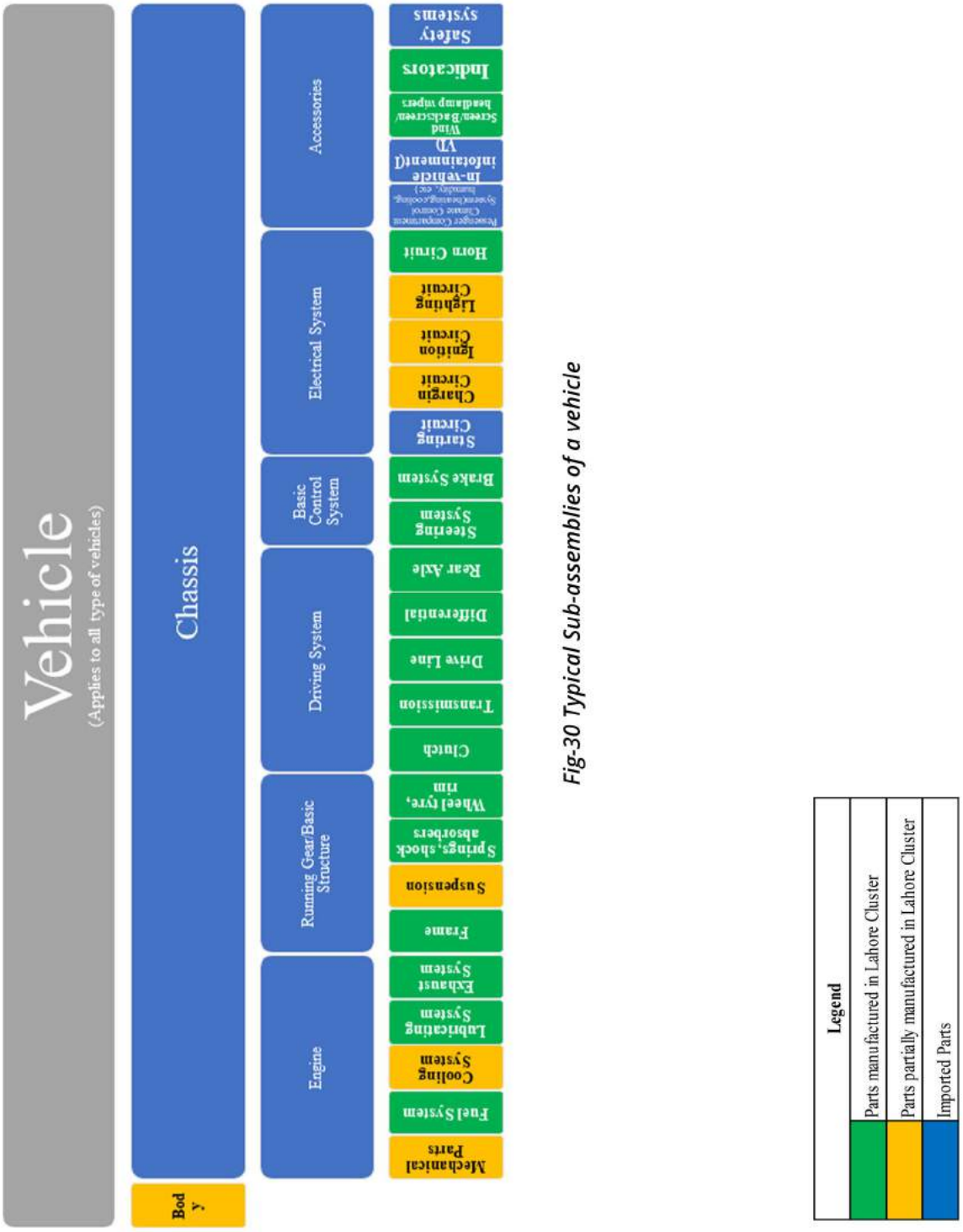


Fig-30 Typical Sub-assemblies of a vehicle

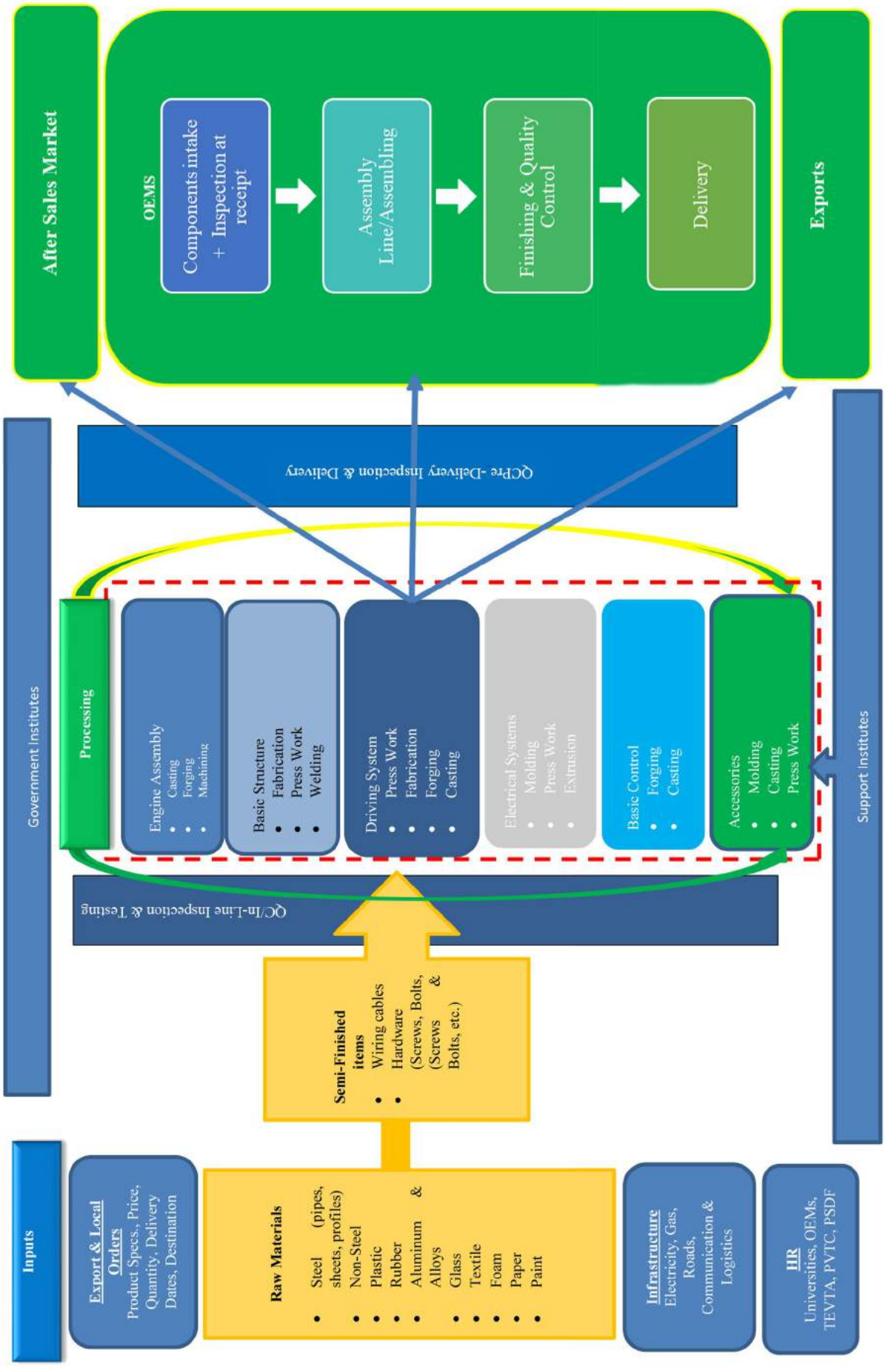


Fig-31 Machining & Assembling of a Vehicle

It was revealed during the survey that 71% of the units have formal production plans whereas 29% have informal production plans.

As depicted in the 'Trends' section, the auto parts industry is operating in low profits due to cut throat competition, whereas demand is increasing; hence to maintain the equilibrium between demand and supply and ensure sustenance, the industry is focusing on increasing production volumes. A comprehensive production plan is hence required to keep a schedule of orders issued by the customers/OEMs.

Fig-32 Production Plan Analysis

The manufacturers who do not have formal production plans have somehow implemented informal production plans based on orders / trends of regular products. 100% respondents mentioned specialization in producing whole parts, thus creating a comparative edge over their competitors. Depending on the type of product demand is affected by seasonality; as the data suggests, production of 65% respondents is affected by season while 35% reported stable demand trends. Since Pakistan is an agricultural country, it was reported by the manufacturers that production of auto parts is closely related to harvesting of crops i.e. near harvesting, a demand hike is reported for tractors. OEMs produce more tractors thus demand for tractor parts also rises. Similarly, during winters, usage of motorcycles is reduced due to cold weather, hence OEMs produce less, consequently decreasing the demand of motorcycle parts. During low seasons, contractual employees which constitute around 8%~10% of the workforce are laid off by the industry, and are then re-hired in peak seasons on ad-hoc basis.

Production Capacity is the volume of products or services that can be produced by an enterprise using current resources. Regarding capacity utilization, data is classified into Very low (0%-20%), Low (21%-40%), Medium (41%-60%), High (61%-80%) and Very High (81%-100%). As depicted in the figure below, 10% companies are in Low category (low capacity utilization),19% are in Medium, 52% High and 19% have Very High levels of capacity utilization.

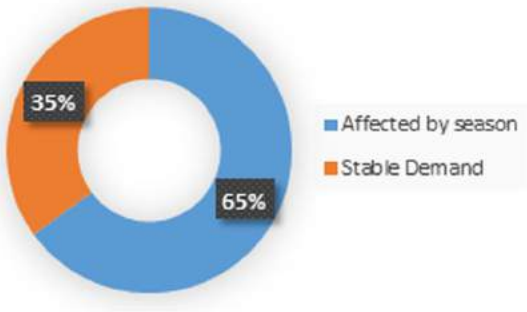


Fig-33 Effects of seasonality

The data reflects that a majority of the companies are utilizing their production capacities optimally, which is justified by the increased demand of customers. Moreover, high and very high capacity utilization also depicts trends of the manufacturers who developed a 'comparative edge' over competitors; in order to lower their cost of production and enhance product quality, they adopted new technology, contemporary production techniques for resource optimization and better marketing skills. Low levels of capacity utilization depict inability of the management to transform through adaptation.

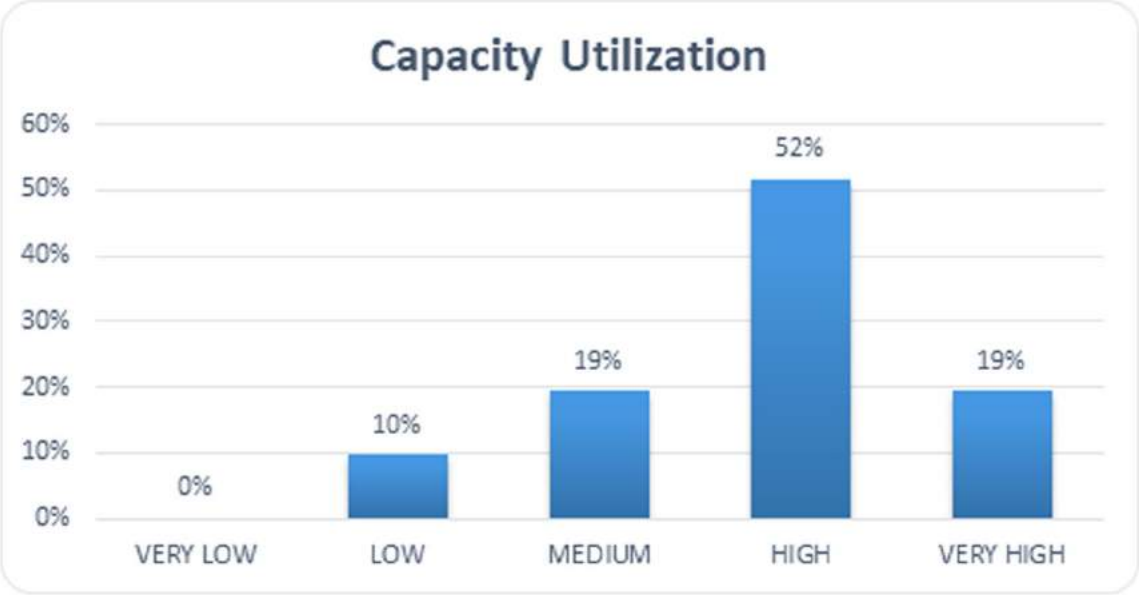


Fig-34 Trends of Capacity Utilization

Flowcharts provide a gist of the process flow in a single glance. The survey data depicts that the process flow chart is available in 55% respondent firms, 16% have informal process flow charts whereas it was missing in 29% respondent companies. This implies a lack of awareness of the management to use such tools with which problems can be analyzed in a more effective way, therefore reducing cost and wastage of time.

Training of new hires is imperative for the industry. Efficient & skilled human capital produces quality products effectively. The survey data shows that newly inducted workers are trained by senior and experienced workers; hence skills are transferred to the new inductees through informal guidance (On Job Trainings) and that is why the importance of developing process flow charts is overlooked.

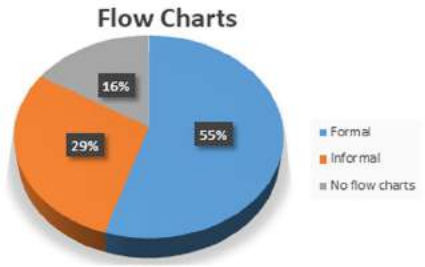


Fig-35 Trends to Maintain Flow Charts

Same is the case with Production Lead Time calculations regarding which 58% respondents reported that they calculate and record lead time of their products, 19% respondents do it informally while 23% of the respondents were unaware of such calculation. With only few exceptions, the work force is being trained and managed informally and firms totally lack production planning and control, hence calculation of production lead time is ignored, which results in low productivity and unbalanced loading of resources.

As OEMs have shifted towards 'Just In Time' techniques to curtail inventory holding costs, that backlash has hit auto parts manufacturers to maintain bigger inventories of finished goods; hence lead time calculation becomes more imperative for the manufacturers, in order to cope up with demand surge from the customer, which is more typical in high demand seasons.

Fig-36 Trends for Lead Time Calculation

3.4 Technology

Some of the most important aspects behind the analysis of technological capabilities in developing economies are the processes involved in the adoption, adaptation and mastering of imported technologies and the learning processes and mechanisms needed to renew an existing knowledge base or to build a new base of technological knowledge[26].

It was revealed from the survey data that operations of 97% of the respondents are Labour Intensive while 3% have semi-automatic operations. None of them have fully automatic production lines, which requires huge upfront and maintenance costs. This implies that the performance of the sector depends on the skills and output of the workforce; having labour intensive operations is cheaper than having semi or fully automatic operations as costs of inputs increase due to unavailability of utilities like gas and electricity, hence the industry is left with no choice but to shift to power generators to cope with power shutdowns. Since auto parts manufacturers are facing price wars with cut throat competition, hence they are more inclined towards cost saving which is another reason to have labour intensive operations.

In the case of the auto parts industry in Lahore, there have been important technological efforts to strengthen the sector's production capacity in recent years. The main efforts in this regard are characterized by technology acquisition and upgradation of capital equipment. Data further depicts that 77% companies are using new and refurbished machinery, 19% are using only refurbished machinery whereas only 3 % respondents have only new machinery. Here it can be seen that most of the companies are working with a combination of new or refurbished machines as the industry is a proponent of the idea of cost saving. In order to maintain a comparative edge over competitors, manufacturers opt to enhance production capacities by enhancing super structures, hiring more workforce and investing on manual and semi-automatic machines, which is evident from the data trends regarding type of machinery installed at production floor This depicts that a major portion of the industry is using manual and semi-automatic machinery, whereas there is a very low percentage of fully automatic machines, which cost more than conventional machines.

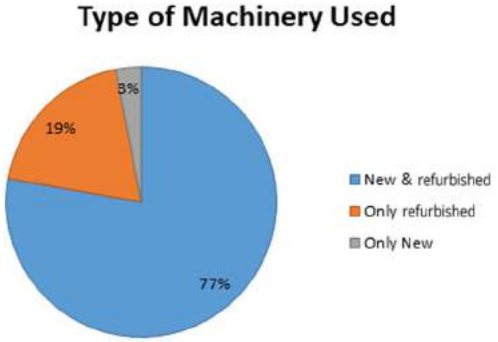


Fig-37 Type of Machinery Used by the Cluster

[26] {Katz, 1987 #9}

3.5 Innovation and R&D

In industry and technology sectors R&D is a crucial component of innovation and a key factor in developing new competitive advantages[27]. It is essentially an investment in technology and future capabilities, which is transformed into new products, processes and services.

Since developing a product is a critical factor for the auto parts sector, hence data regarding research and development activities of the firms was collected. The data depicts that 55% respondents have research and development departments, whereas it was missing in 45% firms.

It is pertinent to mention that R&D activities are carried out by owners themselves and experienced workers in firms which do not have R&D departments. Moreover, it was also mentioned that R&D activities are being performed by production/quality control departments, partially in such firms. It was further mentioned that assistance regarding product design & development have been acquired from institutions like PITAC, PCSIR, etc. however, lead time for delivery of services was not satisfactory for the industry, hence the industry had no option but to switch to in-house capabilities.

Currently, it is difficult to say that innovation exists in the auto parts sector of Lahore. OEMs provide components or CAD data to the manufacturers; thus R&D departments are assigned with the tasks of product development (reverse engineering) along with process development. If CAD data of a product is provided by the customer, then only the process is developed by R&D. On the other hand, components/assemblies/sub-assemblies are provided by the assembler for which both product and process development are carried out by R&D. In such cases, product development includes inspection and measurement, preparation of design/drawings, prototype development which further includes development of production tools i.e. Dies & Molds, Machining, and Quality Assurance Mechanism. Afterwards, Quality Control Plans, Production Flow Charts, Process SOPs and production tools (dies and molds, jigs and fixtures) are developed and handed over to the Production department for trial runs and subsequently for regular production.

In Process development, KAIZEN (Plan, Do, Check, Take Corrective Action) approach is adopted by companies formally or informally and problems like quality issues, quantity problems and bottlenecks are identified in existing processes. A contingency plan is then developed and executed for results. Errors are monitored in the long run and changes are made accordingly in SOPs, Fixtures, Quality Control plan, Equipment and Skills Development.

The collected data also depicts that the industry academia linkages are weak. Figures show that 77% firms do not have R&D collaboration with any academic institute, while 23% firms informed that they have collaborated with various institutes, which include NUST, UET Lahore, PITAC and MIRDC for some services. The reason behind this weak linkage is that the industry and academia, both are not clear about each other's role. Currently, there is no platform available for industry and academia to create such linkages.

[27]http://www.incrementalinnovation.com/innovation-management-development/rd-to-innovation

However, PAAPAM is now trying to bridge this gap by signing MoUs with University of Engineering & Technology, Lahore, University of Management & Technology-UMT Lahore, Punjab University Lahore, NED University of Engineering and Technology Karachi, TEVTA Punjab, etc.

The survey data also suggests that 74% manufacturers maintain a record of upgradation/ product diversification, whereas, 19% firms informally maintain this record and there is a small portion of 7% firms, which do not maintain a record of such activities; reason being is lack of awareness of the management, which consequently impedes growth of the company.
As discussed in previous lines, product design is provided by OEMs along with CAD data, fall back of which results in weak R&D infrastructure in the cluster.

3.6 Marketing & Market Analysis.

Keeping in view sales patterns and industry dynamics, the market for Lahore auto parts cluster can be categorized in to two following segments:

3.6.1 OEMs Market

Automobile sales of a country indicate economic prosperity. Similarly, motorization index depicts growth of automotive sector along with per capita income. Market share by product in Pakistan is dominated by motorcycles at 86%, with cars at 12% and tractors 2% only.

Keeping in view the above sales trends and the Automotive Development Policy, 2016[29] it is estimated that Motorcycle and Car Parts are and will remain the major dominant segment of the market for auto parts manufacturers in the coming years. This market segment is dominated by the Organized Sector (Tier-1 vendors), which constitutes 300+ large and medium auto parts manufacturing units, which are the registered suppliers of foreign and local OEMs.

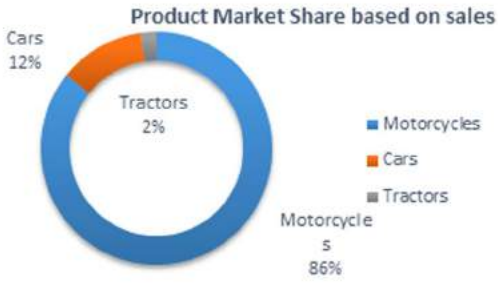


Fig-38 Product Market Share in Automotive Sector of Pakistan[28]

In addition to working with OEMs 19% companies also cater to exigencies of local after sales market. It was found that only one respondent company is selling its products to the foreign after sales market. There is a lack of resource commitment in the companies to enhance access to the new markets. Furthermore, none of the companies are availing marketing related services from any other organization. Firms are already working at 80%-90 % production capacity to fulfill the orders of existing OEMs. It was mentioned that if manufacturers tend to tap further markets, they will require enhancement in production capabilities and capacities (innovation, technology, human capital) thus investing more capital resources. As discussed in the 'Trends' section, auto parts manufacturers operate in low profits and have huge costs of inputs with large inventories of finished goods, which all confines the industry for further marketing ventures. Therefore, only 42% manufacturers mentioned that they have formal marketing plans, while 42% reported having informal marketing plans, whereas 16% of the respondents mentioned absence of any marketing plan.

[28]PAMA

[29]Engineering Development Board

Regarding sources of obtaining market information all respondents informed that they obtain market information through self-research or through their marketing departments. Data also reveals that 29% respondents get information of markets through customers and participation in national/international exhibitions.

Firms are having their prime focus on the production for the auto parts sector. However, it has been reported by 3 respondents that they are also selling plastic and rubber products to other sectors as well, which includes Food and Beverages, Kitchenware and home appliances (fans and washing machines manufacturers).

It was revealed through the collected data that 97% of the respondents mentioned Quality and Competitive Price remains the main product features, which are used to attract customers. In addition to these features, some companies also informed that continuous upgrading, timely delivery and provision of after sales services are also being used to attract the customers.

Distribution Channel

The Distribution channel for OEMs is very simple. The auto parts manufacturers get orders from OEMs against which goods are supplied directly.

Fig-39 OEM Distribution Channel

3.6.2 After Sales Market

The aftermarket of auto parts in Pakistan is dominated by the unorganized sector. There is cut throat competition in the after sales market with lower quality products, as the competition is with the parts imported through informal channels / false-declared imported low-quality components. However, due to increase in costs of production, it has become almost impossible for local manufacturers to compete with imported parts.

Distribution Channel for After Sales Market

As reported by the respondent firms, after sales market is a mix of Organized and Unorganized sector. Also, product diversification is high in the after sales market. The channels of distribution in this segment vary according to the dynamics of manufacturing units.

There are three different distribution channels prevailing in the market, as depicted in the figure below:

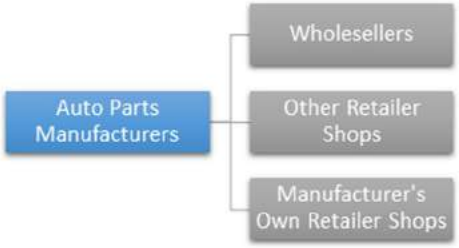


Fig-40 Distribution Channels for After Sales Market

3.7 Business Resources

A business plan provides insight on steps to be taken, resources required for achieving business goals and a timeline of anticipated results to articulate a strategy for starting/expanding business, hence data regarding availability of business plan was acquired from auto parts cluster of Lahore.

The survey data depicts that 52% respondent companies maintain formal business plans, whereas 45% companies informed about having an informal business plan. Only 1 respondent mentioned absence of any business plan. It was found that a majority of the firms have family owned businesses, which initially started at small level and grew with the passage of time, hence the need for such strategic plans was never felt. It was further found that formal business plans were prepared in progressing companies, who have strategized and adopted changes with time for further growth.

The data also reveals that respondents have not taken any financial assistance or external credits from financial institutions and they are doing business with their own resources. This fact is further validated by the data, which depicts that 100% respondents were initially funded by their own resources. Higher interest rates and cumbersome banking procedures make stakeholders hesitant to take loans. Data regarding investment of firm's profits depicts that only 26% respondents reported investing their profits for enhancement of production and infrastructure, while 74% firms gave no response in this regard. It is conferred that companie reporting investment of profits in production and infrastructure have handsome growth rates and customer base.

It has also been reflected by the collected data that 35% respondents are using various modules of Enterprise Resource Planning for Inventory Management, Payroll and Accounting, whereas 65% companies are using other IT based management solutions like 'Power Soft, Quick Books, Pearl Solution and Pinnacle, etc.' which mainly focuses on payroll management and accounting purposes. This is due to the fact that large entrepreneurs need ERP modules for management and control of their business, whereas small companies lack funding and technical expertise to implement such solutions.

3.8 Human Resources

Respondents are classified into Micro (1-10), Small (11-50), Medium (51-250) and Large (more than 250) enterprises depending upon their number of employees[30]. Data reveals that one respondent is a Micro Enterprise, 19% respondents are Small Enterprises, whereas 65% companies are Medium Enterprises, while the rest 16% are Large Companies. Majority of the employees working in the respondent companies are male, however some companies have recruited female workers as well but their ratio is very low. It is mainly because of the fact that female workers are not encouraged to work owing to the social norms of the society.

It was informed by 58% respondents that they did not acquire training & development services from any organization in recent years, reason being that a majority of the workers are trained through on the job training in supervision of their seniors on the shop floor. Moreover, a major proportion of the employers mentioned that they cannot spare their workforce for long durations for training purpose.

[30]State Bank of Pakistan

Another aspect mentioned for not availing training services is job switching by the employees, through interaction with trainees from other companies during training sessions; thus, companies prefer in-house on the job training. This is also depicted by the data where 26% companies reported availability of training and development plans while 74% reported absence of any plans related to workforce skills upgradation.

On the other hand, data also depicts that 42% respondents have availed training & development services from organizations like PITAC, PIMS, OEMs, SMEDA, JICA, PVTC and TEVTA. It was further mentioned by the manufacturers that they received support in upgrading worker skills from OEMS as as through 'Vendor Development Program'. It is pertinent to mention that International Development Agencies like JICA and GIZ are also supporting the industry for skill development. PAAPAM and GTDMC also impart training on soft skills to the industry.

The respondent firms have reported that they need capacity building in areas like 'Engine Assembly, Lean Manufacturing, Quality Control, Line Balancing, Real-Time production Monitoring, Production Tooling Design, Performance Management System, Nickel Chrome Plant Operations, Press Work, CO2 Welding, CNC Machine Operations, Injection Moldingand Mold Assembly & Finishing Techniques.

3.9 Infrastructure & Superstructure

Regarding ownership status of the land, 97% respondents informed that the land of their company is owned by them while 3% reported that they are doing business on rented premises. The data depicts similar trends regarding the status of premises of respondent firms where the business premises of 97% respondents were formal and only 1 company is working in informal business premises, which is done to evade checking by various government departments.

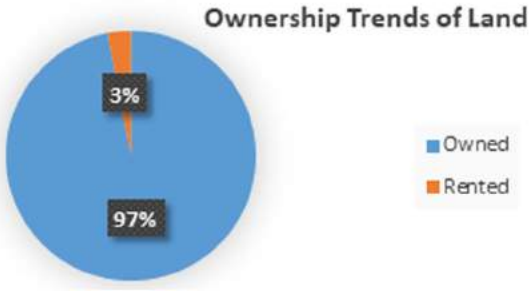


Fig-41 Ownership Trends for Land

The collected data suggests that formal departments exists in 68% respondent companies whereas 29% companies reported informal departments, while 3% respondents mentioned existence of no departments. Establishing formal departments is directly proportional to the size of the company. Large and medium entrepreneurs have formal or informal departments. It was found that respondents with no departments have low growth rate and are situated in congested areas, hence they face expansion issues.

Data trends regarding sources of procurement of machinery and equipment by the auto parts manufacturers depict that 68% respondents are using a combination of local and imported refurbished machinery and equipment, whereas 13% respondents informed that they are using only local machinery, while 19% reported that they are using only imported machines, which implies that in order to curtail upfront costs, industry invests in a combination of technology mix for machinery and equipment. However, quality of production and lead times get affected by using local machinery, due to high break down frequencies and production down times.

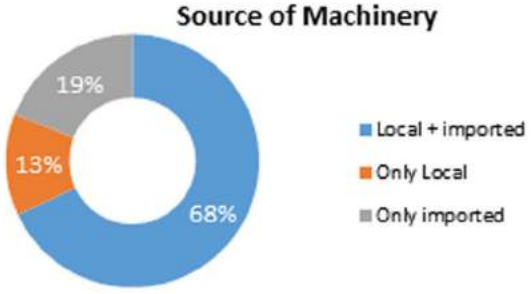


Fig-42 Source of Machinery & Equipment

It was found that progressive companies have shifted towards procuring only imported machinery to minimize production down times, which is followed by the rest of the players as well, realizing costs and time incurred to rectify problems in case of machine breakdown and production loss time, consequently increasing cost of production.

It was also reported that principal sources of parts, servicing and repairs for machines are available locally to 74% respondents whereas 16% respondents have in house facilities to repair production tooling (dies and molds). In addition to these sources, some of the respondents have also reported that they get such facilities through machinery and equipment suppliers as well.

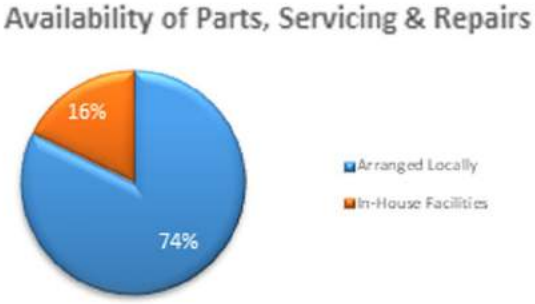


Fig-43 Trends for availability of parts, servicing and repairs

It has been reported by 26% firms that they have to face break downs frequently, 61% manufacturers reported that break down frequency is moderate and 13% respondents informed few breakdowns. In addition to the above-, it was found that many manufacturers struggle with increased pressure on costs, strict enforcement of standards by customers/OEMs and growing competition, which leads to cost cutting and switching from reliance of workers in long term employment to labourers on temporary contract, thus resulting in high machine break downs with lower quality of products.

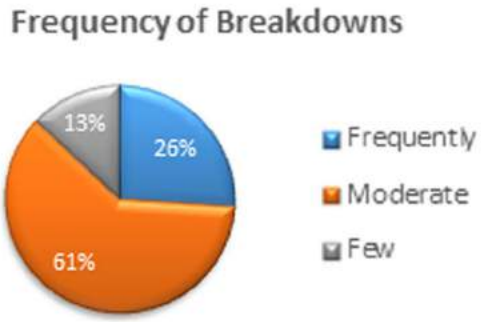


Fig-44 Frequency of break downs

It was also reported that 84% respondents have formal maintenance departments with dedicated staff while 16% respondents mentioned that the repair and maintenance activities are done by assembly workforce in order to curtail additional workforce cost. It was further informed that maintenance services are also rendered by machine suppliers and some private individuals on a need basis.

Fig-45 Trend of Maintenance Department in Auto parts Manufacturers

Government bodies are the main source for the main infrastructure facilities and services (electricity, water, gas etc.). Except for the shortage/shutdowns related to utilities, the respondent firms do not have to face any substantial infrastructure problems.

3.10 Quality Control & Corporate Social Responsibility

The survey revealed that 48% respondent companies already have various certifications, which include ISO 9001:2008, ISO 9001:2015, etc. while 52% reported that they do not have any certifications. It was mentioned by the respondents that their customers (especially local motorcycle OEMs) do not require certifications, hence compliance with international standards is not the priority of auto parts manufacturers in Lahore. However, various initiatives have been taken by the Government in order to create awareness regarding quality management in the manufacturing industry like 'Certification Incentive Program' for SMEs under PQI Initiative 2025. This program was initiated by PCSIR in order to attract SMEs, who may use professional services to solve their problems, which would lead to better quality products, improved industrial productivity, high level of competitiveness and wider penetration of Pakistani products in the international market. This project provides incentive to SMEs to acquire the Certification/ Accreditation for the auto parts cluster as well.[31] It is also a norm at international level that auto parts manufacturers acquire ISO/TS 16949 prepared by International Automotive Task Force (IATF), which supports development of a quality management system that provides continual improvement, emphasizing defect prevention and reduction of variation and waste in the Automotive Industry.

It was reported by 61% companies that they are interested in acquiring ISO-9001 certification, 19% companies showed interest in ISO-14000 and other companies intend to acquire other certifications which include; TS/ISO 16949, etc. With new OEMs entering the local market in coming years, as reported by respondent firms, the compliance regime will be more stringent; thus, increased competition will compel the auto parts manufacturers of small and medium size to acquire certifications, the need for which is now felt by the industry, which is further validated by the data which depicts that 87% firms requested training/capacity building to acquire certifications.

Fig-46 Trends of Certifications in Auto Parts Industry in Lahore

3.11 Competitors & Competition

Internationally, as Pakistani auto parts exporters are up against exporters from developed countries, which have more advanced technological resources and established market network, even regional economies like India and China, the local industry is only able to compete in basic and low-end parts. In order to penetrate high-end markets, technological upgradation and quality is required, which is transformation from factor based production to knowledge based production. It was reported that only 8-10 units in the organized sector (Tier-1) of the cluster are engaged in exports, however a strong potential exists for export of auto parts to neighboring countries i.e. Afghanistan, Iran, Bangladesh, Africa and Central Asian Region (CARS -provided a sustainable supply chain is established through Afghanistan).

With respect to the other competitor countries/clusters, 100% respondents mentioned China as the main competitor.

[31]Federal Ministry of Science & Technology

However, other competing countries include Thailand, Korea, Turkey, Taiwan and India. Local manufacturers have developed competencies in manufacturing low tech static components. A very small chunk is producing low tech dynamic components like crankshafts of tractors, etc. However, the industry endeavors to develop and manufacture high-end dynamic parts. Currently, locally manufactured dynamic parts are not at par in terms of quality and price, as compared to international competitors. That is why OEMs prefer using imported high-end components. It was also mentioned by the respondents that OEMs do not provide support to develop high end dynamic components (critical engine parts like piston, crankshafts, valves, fuel injections, fuel pumps, etc.). The major reason of this mismatch is that the local cluster lacks in specialized vendors – backward linkages e.g. dies and mold manufacturers, specialized engineering material providers and workforce skills, etc.

Feedback was taken from the firms about how the cluster can enhance its competitiveness both locally and internationally; 68% respondents suggested that the said objectives can be achieved by reducing cost of inputs, while 32% informed about improving the quality. In addition to reduction in input costs and quality improvements, respondents have also mentioned factors like innovation, product diversification and technology upgradation.

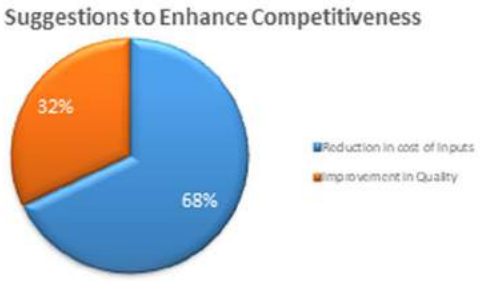


Fig-47 Recommendations for enhanced competitiveness

3.12 Cluster Connection, Relationship & Supply Chain

Regarding the cluster connections and relationships, it has been reported that 74% firms are members of PAAPAM, 6% are members of Pakistan Foundry Association also, while 20% respondents mentioned that they are not members of any association.

In addition, it has also been reported that firms are members of other associations like Industry Owners Association, Baghbanpura-Lahore, which is in nascent stage as they just got registered with SECP. Companies are also members of LCCI and FPCCI. As reflected by data, PAAPAM has the strongest representation, because of the fact that it provides technical as well as management support to its members and acts as a platform to represent the industry to discuss its problems and issues with Government bodies for their effective resolution.

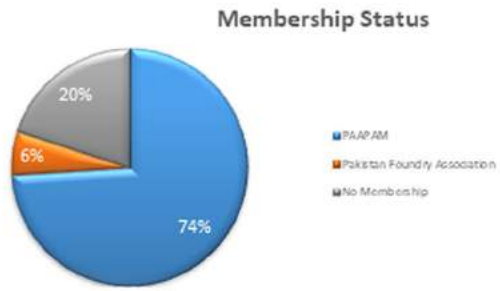


Fig-48 Membership Trends

Feedback was taken from the industry regarding vendor/supplier selection criteria, it has been cited that 77% respondents have formal input vendor selection criteria while 7% respondents follow informal vendor selection; the remaining 16% firms do not have any criteria. This implies that the industry is conscious regarding quality of its input materials.

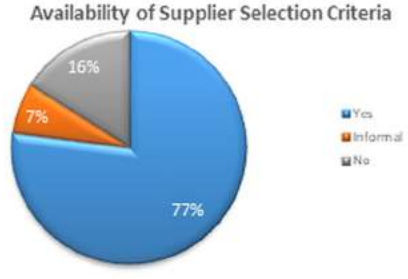


Fig-49 Supplier Selection

One reason for this is the growing competition among the rivals, also immense pressure by OEMs to improve quality conformities of supplied products. During the survey, respondent firms have reported certain issues related to supply chain management, which include unreliable supply of local raw materials, unstable prices of raw materials and logistics, especially which are directly proportional to fluctuation in fuel prices. To overcome these issues firms are holding bigger inventory levels, which leads to high inventory holding costs and adds to the cost of production; this reduces the profit margin of the auto parts manufacturers.

3.13 Operations Management

During interviews/discussions with the firms it was informed that a majority of the respondents are aware of modern production techniques, such as lean manufacturing, total quality management, etc. Data reveals that the range of rejection rates is between 0%-10% and the industry strives to further reduce rejections. 48% respondents reported rejections rates less than 2%, while 39% reported rejection rates less than 5%, while the rest of the 13% reported high rejection rates of up to 10%. It was found that firms with strong quality infrastructure had less rejection rates, while higher rejection rates were found in the firms where concepts of quality integration within production processes were not the priority.

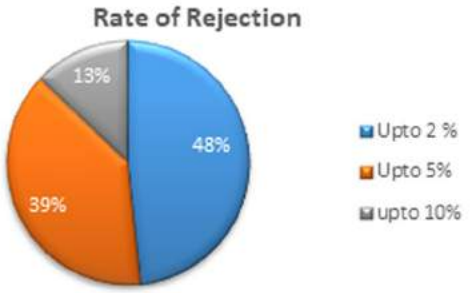


Fig-50 Rejection Trends

39% manufacturers have established key performance indicators (KPIs), 42% have informal KPIs and 19% of the respondents do not have KPIs. Moreover, it has been reported by 39% of the respondents that they record production data formally to measure the KPIs, 45% reported that they informally record production data whereas 16% respondents stated that they do not record the data at all. Further, it has been informed by the firms that production data is recorded on formats which include Job cards, Daily, Monthly & Annual Production sheets/reports, etc.

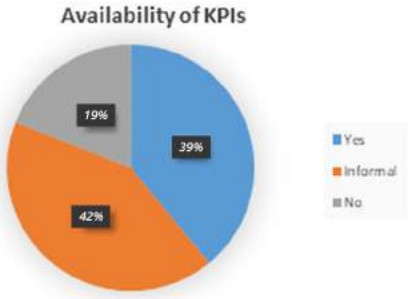
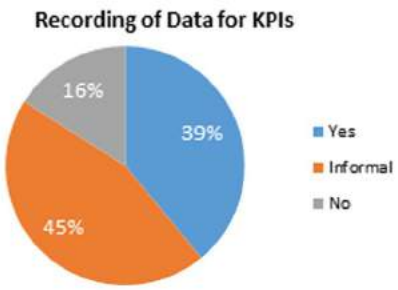


Fig-51 Availability of Performance Indicators

58% firms reported that they measure & keep a record of production loss time with defect causes, 19% firms informed that they informally perform such activities while 23% of the firms do not keep any record regarding production loss time. The reason of not measuring recording production down time is the lack of awareness of management. They are unaware of the overhead cost being borne by their business which consequently affects productivity, which further reduces their profit margins, thus impeding growth.

Data suggests that 87% respondents have sufficient resources to meet QC requirements while 13% reported that they lack such resources. During discussions, the industry highlighted certain areas of operations management which are weak and they need capacity building for them, which includes product upgradation, process upgradation, production planning, supply chain management, quality management, productivity, energy efficiency, performance management system, inventory management, R&D, financial management and organizational upgrading.



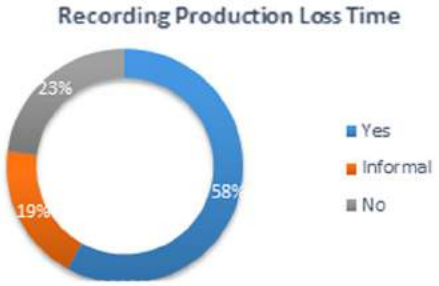


Fig-52 Data Recording Trends of the Industry *Fig-53 Trends to record Production Loss Time*

3.14 Potentials for Collaborative Action

With a very few respondents who refused to be a part of the cluster development initiative, almost all respondents including two OEMs mentioned their willingness to participate in collaborative actions of the CDI project. It has been cited by 26 companies among 36 principal firms and 2 assemblers among 6 OEMs visited, that they are open to cooperate and collaborate in Productivity Improvement including Layout Planning, Line Balancing, Energy Audits, Capacity Building and Fire Safety Management. In addition to the above, there have been special requests for hand holding regarding implementation of Real Time Production Monitoring Systems. Furthermore, it has been informed by the OEMs that they are very much interested in the above mentioned joint collaborative actions along with the Vendor Development Program and implementation of Performance Management Systems.

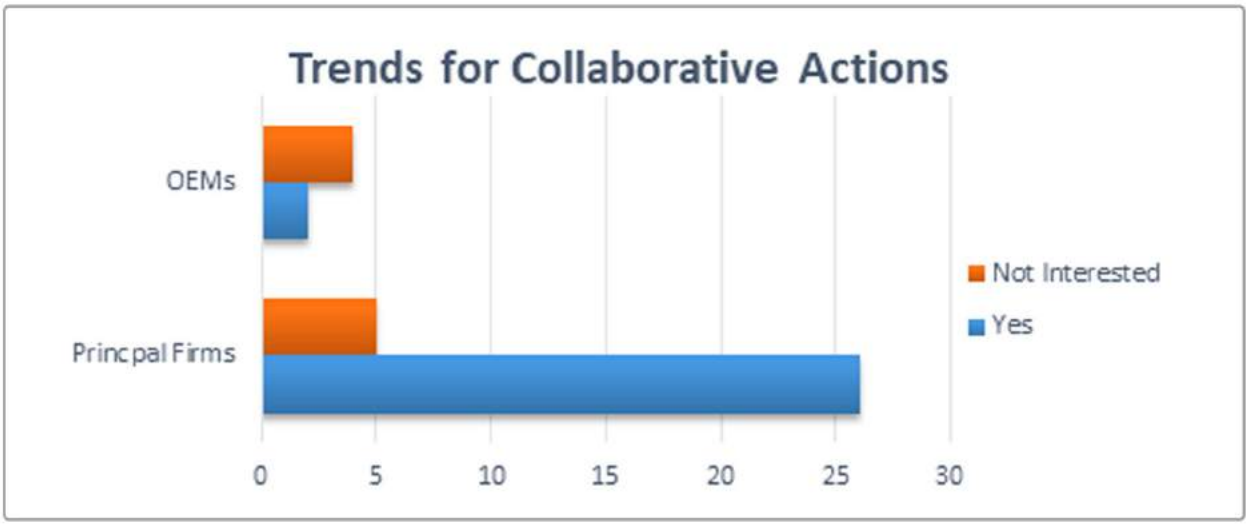


Fig-54 Trends For Collaborative Actions

4 Analytical Tools Applied

4.1 PESTLE Analysis

In order to comprehend the macro environment factors like Political, Economic, Social, Technological, Legal, and Environmental. PESTLE analysis is a helpful tool. The analysis carried out using PESTLE tool can be used to understand the existing external marketing/business environment to formulate business strategies. In addition, PESTLE analysis provides key inputs to perform a SWOT analysis.

The following table shows some critical macroeconomic indicators for Pakistan:

Indicator	Figure	Ranking
GDP	USD283,659.9807 million (2016)	26th
PPP	USD1,014,180.70 million (2016)	25th
Population	193,203,476(2016)	6th
GDP per capita	USD1468.19 (2016)	176th
Industrial growth rate	5% (2017)	
GDP contribution by Industry	20% (2017)	
Labour participation rate	53% (2014)	
Human development index	0.55 (2015)	147th
Expected years of schooling	8.1 years (2015)	
Primary school dropout rate	20.4% (2015)	
Employment rate	51% (2015)	179th
Gender inequality index	0.54 (2015)	130th
Environmental performance index	34.58 (2014)	148th
Ease of Doing Business	147 out of 190 (2017)	147th
Global Competitiveness Index	115 out of 137 (2017)	115th

Table 17- Macro Economic Indicators of Pakistan

Political	**Government stability**	**Government stability is mandatory for policy formulation, implementation and most importantly prevailence. Repercussions of unstable political environment leads to lack of trust of industrialists and foreign investors; henceforth lead to flight of capital, which poses a direct threat the cluster.**
	Bureaucracy	Currently, bureaucratic setup impedes the growth of the cluster due to cumbersome and ineffective procedures, which poses a threat to the cluster.
	Ease of Doing Business	Cumbersome and lengthy procedures hinders in ease of doing business which is due to weak implementation of policies henceforth rebates offered through policy incentives are not delivered to the industry which poses a serious threat to business environment by shattering trust of manufacturers and discourage investors for green/brown field investments, undocumented grey economy, informal channels, other mal practices, fall back of which results in increased cost of doing business. Transparency International has ranked Pakistan 116th out of 176 countries whereas regional competitor like China stood at 40th position, thus having comparative advantage over Pakistan in terms of supportive business environment. This is further reinforced through 'Ease of Doing Business' report 2017, where Pakistan is ranked at 144th position whereas the regional competitors; China and India are at 78th and 130th positions respectively, hence both have competitive advantage over Pakistan for new investors as well as for current industrial setup, hence pakistan is lagging behind in terms of ease of doing business.
	Tax policies	**Key Tax Incentives Provided in FY17**[32] Several tax incentives were provided to support exporting industries and the agriculture sector. The government also incentivized investment and employment generation by allowing firms tax credits. The important incentives are summarized below: **Exporting industries** • Off peak electricity tariff rates were reduced to Rs 5.35 per unit from Rs 8.85 per unit; **Invest ıent and employment generation** • Facility of 1.0 percent tax credit for every industrial undertaking employing 50 persons was increased to 2.0 percent, and the setting up period was extended till June 30, 2019; • Tax credit facility for investment in Balancing Modernization and Replacement was revised upward to 20.0 percent from the existing 10.0 percent and period to avail this facility was extended till June 30, 2019; • The condition of 100.0 percent of fresh equity raised through shares to avail 100.0 percent tax credit was relaxed up to 70 percent fresh equity raised with proportionate tax credit facility and, the time period for this measure was extended till June 30, 2019; • The exemption period for investment in green-field industrial undertakings was extended up to June 30, 2019.
	Trade control	The Government has sought to reduce monetary and external imbalances, reduce trade barriers, modernize the financial sector, privatize state-owned industries, and offer specific incentives to attract foreign investment. The Government of Pakistan is a keen pursuer of bilateral trade and investment agreements., which is an oppurtinity for the cluster.

[32]FBR

	Import restrictions	**The Government has introduced several import restrictions and tariffs; applied on import of raw material which is a serious threat for the cluster, as quality raw material is unavailable locally, hence finished products will not be produced at par with the international standards as input costs are high. Whereas, import restriction on semi/finished products provides an opportunity for the local industry depicted in Automotive Development Policy 2016, however implementation of policy incentives is still questionable. Implementation of the policies will act as engine for cluster growth on the other hand weak implementation of the said policy poses a serious threat for the cluster.**
	Govt involvement in trade unions and agreements	Less involvement of the Government in trade unions viz a viz involvement of few industrialists in agreements which are made at the Government level is a serious threat for the cluster, which depicts weak public-private linkages fall back, which leads to poor policy framework formulation and implementation. If government ivolvement in trade agreements is strengthened, it will be an oppurtunity for the cluster in future.
Economic Factors:	**Growth rate**	**Since its founding in 1947, Pakistan has been one of the few countries in the developing world that have experienced an average annual growth rate of less than 5%[33] over the past 60 years.** **The current growth rate of GDP of Pakistan is 5.28%; which provides an enabling environment to induce industrial growth, and an opurtunity for the cluster as well.** **However, despite of 5.28% GDP, industrial growth still remains on lower side, when compared with regional competitors like China and India GDP growth that is currently 6.7% and 7.1% respectively, enabling their auto parts clusters to be more competitive as compared to Pakistan.**
	Inflation rate	Inflation remains on higher side, resultantly input costs are rising; selling price remain stagnant, hence diminishing profit margins of the cluster, thus quality of the products is lowered, making products less competitive, both locally and internationally.
	Interest rate	Recently, the interest rate has witnessed a decrease as compared to 6.5% (2015) it has been kept stable at 5.75% for 2016 and 2017. The bank borrowings in private sector reached up to PKR 3.355 trillion in 2015-16 and PKR 3.980 trillion in 2016-17.[34] Car loans amounted upto PKR 150 billion in 2016-17. This implies increased credit opportunities for the manufacturers. Moreover, falling interest rates also mean people will no longer put their money in the banks for saving purposes and would rather start investing their money which is an oppurtunity for the cluster.
	Exchange rate	Currently, the exchange rate is increasing which is depcited from the official figures of the government in 2016 it was 1$=102.95PKR and in 2017 it is 1$=105.59PKR,[35] as exports are decreasing which is eventually have a negative effect on inflation and exchange rates.
	Unemployment trends	There is a rise in the unemployment rate. Accroding to official Government figures, it was at 6% in 2016 and is at 6.1% in 2017[36] that has resulted in increased availability of labour.

[33]Pakistan Economic Survey 2016-17

[34]https://propakistani.pk/2017/07/19/__trashed-174/

[35]State Bank of Pakistan

[36]http://www.theglobaleconomy.com/Pakistan/Unemployment_rate/

	Labor cost	**Keeping in view the increase in inflation rate, official government figures depicts that labour cost has increased from PKR 14,000/- in 2016-17 to PKR 15,000/- in 2017-18[37] which has resulted in increased cost of production.**
	Credit availability	Cumbersome process of acquiring credit along with collateral demands of financial institutions make it difficult for the manufacturers to availt this facility.
	Trade flows & patterns	India and China, two big economies in the region play a dominant role in exports which goes for the automotive cluster as well, which leaves a very small room for the exports for Pakistan automotive sector.
	Consumers disposable income	Per Capita Income of Pakistan in 2010 was 1,040.14$ which increased to1,181.6 $, in 2016.[38] It was estimated that 29.5% population was living below poverty line in year 2013.[39] The figures depicts low level of Consumers' disposable income with decreased purchasing power and growing middle class.
	Price fluctuations	High price fluctuations due to changing government regulations lead to unstable pricing of the products which is a negative impact for the consumer preferences as well.
Socio - Cultural	**Education level**	**The poor quality of education in public schools has created parallel education systems, disconnected and producing two different types of individuals: the highly trained, skilled and Westernised elites and the conservative masses. Currently around 33.9% of the population of age 20-24[40] has no formal education, this implies that the existing workforce is uneducated and unskilled which results in high cost of doing business due to low productivity and inability to apply modern production techniques. Pakistan is ranked 147th out of 188 countries surveyed for human development,[41] which put Pakistan in the 'medium human development' bracket, which also includes India, Bangladesh, Bhutan, Kenya, Myanmar and Nepal. However, government has taken initiatives like TVET Reform Support Program in collaboration with NAVTTC and GIZ to produce skilled workforce for the industry which includes auto parts cluster as well.**
	Attitude towards imported goods and services	From consumers' point of view there is a lack of trust in local goods, hence they prefer foreign brands.

[37]Labour Department

[38]http://www.heritage.org/index/country/pakistan

[39]Ibid

[40]https://tradingeconomics.com/pakistan/labor-force-total-wb-data.html

[41]https://www.pakistantoday.com.pk/2017/03/23/pakistan-ranked-147th-on-human-development-index-un-report/

Attitude towards products quality and customer service	**Due to no competition with imported motorcycles and availability in the same engine capacity, ranging from 70cc to 125cc, masses are left with no choice but to purchase locally manufactured motorcycles which has 86% share of sales in auto motive sector of Pakistan.** **It is also pertinent to mention that the same trend is for passenger cars as well that people buy locally manufactured foreign brands like Honda, Toyota and Suzuki with one of the major reasons that after sales services and spares are being provided by these OEMs.** **Similarly, tractors with renowned established brand have high sales volumes with the major reason of availability of after sales service.** **The growing middle class increases the demand for three wheelers to commute, thus increasing demand.**
Buying habits	People prefer to buy vehicles which are suitable to their low incomes which increases demand for the motorcycles in Pakistan, hence motorcycles with engine capacities ranging from 70cc upto 125cc are most popular due to their price. The buying trends for three wheelers has increased, as consumers use to commute and earn their livelihood as well. However, demand for 2/3 wheelers decrease during winters due to cold weather and increases in summers. Cars have stable demand pattern. Tractors are in high demand in the beginning of harvesting season and are low in demand after harvesting season.
Attitude towards green and ecological products	Currently Pakistan is ranked 113th of 127 countries surveyed in terms of Global Innovation Index which was previously at 119th position.[42] In spite of improvement in ranking, Pakistan is still one of the least innovative countries in the world. On the contrary, India maintained its superiority in the region: moved up six spots from last year's 66th ranking to 60th this year. This shows that though there are some improvements in this context but yet the industry is not very much inclined towards "green" or ecological products because it will increase cost of doing business in comparison with foreign OEMs. CNG rickshaws which are eco-friendly were introduced in line with the strategy for going green.
Population growth rate	Pakistan is ranked number 6th in terms of population and population growth rate of Pakistan in 2017 is 2.4%.[43] This growth in population is an opportunity for the cluster because it means more customers and population of youth is 60% of total population that creates more hands to work providing an oppurtunity for the auto parts cluster of Lahore as well.
Sex distribution	Total population of Pakistan stands at 207,774,520, men 51%, and women 48.76% of the total population of Pakistan.[44] The gap between the male and female ratio among the population is also increasing. The sex ratio for the whole country stands at 105.07, which means that there are 105 men for 100 women in Pakistan. This unutilized women workforce is an important impedement for the development of workforce for the cluster. Gender disparities between regional, urban and rural areas are pronounced. The overall labor force participation rate for women is only 25%, much lower than that for men (82%). This under-utilized female workforce is also an opportunity for the cluster.

[42]https://tribune.com.pk/story/1450757/pakistan-among-least-innovative-countries-world-survey/

[43]https://www.pakistantoday.com.pk/2017/08/25/pakistans-population-soars-to-207m-with-2-4-growth/

[44]https://www.pakistantoday.com.pk/2017/08/25/pakistans-population-soars-to-207m-with-2-4-growth/

Technological Factors	**Basic infrastructure level**	**Pakistan is ranked 111th out of 127 countries in terms of availability of general infra structure.[45] Which means there is lack of basic infrastructure and unavailability of utilities especially electricity and natural gas results in increased cost of production. This lack of structural transformation in Pakistan is indicative of the manufacturing sector's unsatisfactory growth performance.**
	Rate of technological change	Globally the rate of technological change is rapid for the auto parts sector, thus providing a vision to the local manufacturers to innovate, however, technological sophistication in manufacturing in Pakistan continues to be low resulting in the country's exports being dominated by low technology manufactures.
	Spending on R&D	There is a lack of R&D activities in the automotive sector; at present Pakistan is ranked 84/110 regarding Gross Expenditure on R&D (GERD) it is because of weak industry academia linkages and lack of resources which results in low end products leading to inability of the products to compete with regional competitors. Pakistan is ranked 65th with respect to universities and industry research collaborations, which is far below than its regional competitors India and China where India is ranked 23rd and China holds 29th position.
	Technology incentives	To support the industry various technological incentives are being provided by the Government such as PQI initiative 2025 under Ministry of Science & Technology.
	Technology level in auto motive industry	The industrial sector in Pakistan has failed to transform to more sophisticated products such as capital goods continues to be dominated by resource based and low technology activities. Lack of production of capital goods and absence of upstream ancillary industries such as chemicals and engineering limits the growth potential of the industry. The current moderate technology level poses a threat to the cluster as it results in low productivity and quality.
	Communication infrastructure	In the given scenario, Pakistan has good Information and Communication technology infrastructure as Pakistan is ranked 109th/127,[46] which enables the cluster to communicate swiftly and promote its business both at national and international levels.
	Access to latest technology	Access to latest technology in cluster is low as compared to regional competitors.

[45]United Nations Development Program

[46]http://www.theglobaleconomy.com/Pakistan/GII_Index/

Enviromental Conditions	**Pakistan has one of the six great ecosystems in the world, which includes permanent snow bound mountains, glaciers, and forests in the north, tropical and subtropical swamps and dry steppe land elsewhere. The Arabian Sea has been receiving biological waste brought down by the Indus river system for millennia. The whole ecosystem and its diversity is under threat from human activities. Another sign of deteriorating habitat is air pollution, which is endemic because of massive surge in automobiles and insufficient emission standards. This is further exacerbated in winter by heavy smog rolling in from India's coal-fired power plants.** **Pakistan is among the World's Top 10 in terms of vulnerability to the impacts of climate change. The cost for Pakistan to adapt to climate change has been estimated at $10.7 billion per year for the next 40-50 years.[47] This investment is needed in natural resource management and planning, implementation of incentive-based regulatory policy regimes and support for voluntary environmental protection initiatives by industries.**
Climate change	Weather affects production levels - in summer's low production rates, in winters there are high production rates in general. It effects on products and machinery as well (rusting, precision errors), etc. poses a threat for the cluster. Due to change in climate Production/availability/quality of raw materials may get affected as well due to climate change. There is a weak enforcement of laws regulating environment pollution which currently provides an opportunity for the industry as it results in low cost of doing business. Currently Pakistan holds 83rd ranking regarding availability of ISO-14001 Environmental Certificates which again is very low than its reginal competitors whereas China is ranked 18th and India 69th out of 126 countries.[48] It is pertinent to mention that due to climate changes, consumer behaviours also change as 2/3 wheelers are less in demand during cold season/winters and are in high demand during summers. Similarly, tractors are high in demand before harvesting seasons and low in demand after crop harvesting. However, demand for the cars remain unchanged during the whole year.

[47] http://www.un.org/sustainabledevelopment/blog/2016/05/unep-report-cost-of-adapting-to-climate-change-could-hit-500b-per-year-by-2050/

[48] https://www.globalinnovationindex.org/analysis-indicator

Legal Factors	**Legal System Of Pakistan**	**The legal system in Pakistan is based on the English common law system. The main government agencies involved in the regulation of companies in Pakistan are: Securities and Exchange Commission of Pakistan (SECP) which incorporates and registers companies.** **Board Of Investment (BOI) promotes investment opportunities in all sectors of the economy, and provides investment facilitation services to local and foreign investors.** **Pakistan Standards and Quality Control Authority (PSQCA) is responsible for adaptation, development and implementation of quality standards in Pakistan.** **Investments in Pakistan are governed by the Investment Policy of 2013.** **Foreign Private Investment Act of 1976, and the Economic Reforms Act of 1992. Under the Investment Policy of 2013, Pakistan has liberal investment policy regimes and public-private partnership frameworks.** **The law also provides incentives including tax exemptions, reduced customs tariffs, and investor facilitation services.**
	Laws regulating environment pollution	Weak enforcement of laws regulating environment pollution currently provides an opportunity for the industry as it results in low cost of doing business but an unhealthy business practice. Sustaining Pakistan's ecological and environment and biodiversity is now an important agenda of Pakistani society. Inability to do so will result in extremely high costs in future. Cleaning up water sources, retrieving land, and planting forests are three critical elements of the strategy.
	Copyright, patents and intellectual law	Weak enforcement of IP law, currently provides room for the manufacturers to copy and replicate other products.
	Health and safety law	Health and safety laws currently increase the cost of doing business for the manufacturers, hence in the long run it will be for the benefit for the society, for the workforce and for the manufacturers as well.

Ethical	**Ethical recruiting practices and employment standards (not using children to produce goods)**	**Currently ethical behaviour to recruit workforce by the industry is mostly towards hiring informal (un-registered) workers, which includes child labour as well with the reason to curtail cost of production. However, repercussion of hiring unskilled workforce leads to poor product quality and increased maintenance cost.**

4.2 SWOT Analysis

Strength	Weakness	Opportunity	Threat
Markets			
Growing population depicts growing market	Lacking competitive products for the international markets	Huge potential of local and some aftersales markets (Italy, Mexico, Brazil)	Regional competitors like China and India are offering competitive prices and technology to same target markets
Growing demand for vehicles in domestic market	High price of locally manufactured products compared to Chinese products	Export potential in niche markets especially in neighboring countries like Afghanistan, Iran, Africa, and Latin America.	Components imported through informal channels especially in aftersales market makes local manufacturers in-competitive
Improving trust and relationship with aftersales market players	Lacking production of high-tech (dynamic) parts	New OEMs entering in the market provides diversification opportunities for the auto parts manufacturers	Weak policy implementation poses a threat to the industry
		Adoption of e-commerce tools provides better opportunity for the promotion of auto parts business	High quality standards needed to sell to target market
		CPEC provides an opportunity for the industry	
Technology			
Availability of imported latest machinery and equipment	Majority of the industry is still using conventional refurbished machinery and equipment for production	Auto parts manufacturers working with foreign OEMs are becoming increasingly aware about latest technology	Introduction of e-vehicles in the global market
Availability of imported special purpose customized machinery - SPMs	Lacking indigenous production of capital goods (machinery and equipment)	Need for diversified services for the automotive sector	Rapidly changing technology use in automotive sector makes the sector very dynamic
Availability of Common Facility Centers having latest machinery and equipment	Due to usage of obsolete technology, high in line rejection rates and defects	Advancement in ICT provides better networking and access to information related technology	Regional competitors technology development
Availability of in-house CAD/CAM facility among the medium sized auto parts manufacturers	Lacking awareness and access to new technologies among the SMEs		
Good investment capability of large manufacturers, who invest more in the technology to integrate latest manufacturing technology in their production lines	No R&D & technology development sector		

Strength	Weakness	Opportunity	Threat
Existing infrastructure available for reverse engineering of machinery like Pakistan Machine Tool Factory, Karachi, etc.	Slow adaptation towards latest technology		
Exhibitions (local and international) provides awareness regarding latest technology	Low level of indigenous technological development		
Innovation & R&D			
Capability of medium size auto parts manufacturers to produce in-house production tools	Non-existence of industry oriented R&D by academia	Universities and R&D institutions exists, which is an opportunity for the industry	Limited level of innovation
Technical assistance from foreign OEMs to vendor industry in design and R&D	Lacking collaboration between industry and R&D institutions	International collaboration with international R&D institutes play a key role in knowledge transfer	No provision of incentives and weak intellectual property rights in Pakistan
Technology transfer from foreign OEMs to vendor industry	Poor quality infrastructure (testing and accreditation)	Industry oriented research along with impact evaluation	Huge investment in R&D budget by regional competitors
	Weak industry academia linkages		
Inputs Availability			
Easy access and availability of local and imported raw materials	High duties and taxes on imported raw materials	Support for input suppliers to provide all the steel variants and required gauges and grades	Comparative advantage in terms of cheaper and high quality raw material of regional competitors like India and China
Auxiliary items/machine tools are adequately available in the cluster	Inadequate supply and high energy costs for the industry (PKR 16/KW)		Availability and low cost of energy of regional competitors (Rs. 7/KW in India)
			Industry is not able to produce some quality raw materials which is an impediment for the industry
Skills			
60% of population consist of young people (more hands to work)	Low rate of induction of semi-skilled workforce trained through vocational institutions due to un competitive wages	Cooperation between the support institution and the industry	Regional competitors have comparative advantage due to skilled labour force
Semi-skilled workers are trained by government institutions	Structural mismatch due to skills mismatch between potential employees and the employer	Better HR practices can improve the labour turnover	Conducive working environment by the regional competitors helps them retain high skilled work force

Strength	Weakness	Opportunity	Threat
Availability of workforce at lower/competitive wages with respect to regional competitors	Weak in-house training and development of the existing workforce	Coupling government youth internships schemes for enhancing the workforce	Adoption of best manufacturing practices by regional competitors gives them a comparative advantage
Availability of vocational training infrastructure to develop semi-skilled workforce	Management perceives training and management as expense rather than investment	Adopting latest operations management tools and techniques for labour productivity	Knowledge workers (industry 4.0) are replacing conventional workforce due to increased automation
International Donors like GIZ, JICA and public organizations like TEVTA, PVTC, PSDF have collaborated for enhancement and promotion of Technical Education & Vocational Training	Availability of alternate job opportunities for the potential workforce		
	Non-conducive working environment to attract the workforce		
	Lower productivity level due to organizational system weaknesses		
Business Environment			
Strong vendor industry for OEMs	Weak implementation of automotive sector support policies and programs impedes growth of the industry	CPEC provides a strong opportunity for the auto parts manufacturers to link to the regional markets and Global Value Chains eventually	The global drive for e-vehicles has not been realized on part of local manufacturers
Knowledge transfer from the OEMs and spinoff effects are encouraging companies to adopt better management practices	Trust deficit between industry and relevant government institute hinders cluster growth	Different vehicle giants are planning to avail the green field opportunities in Pakistan (Hyundai, KIA, Great Wall, etc.)	Preferences of emerging middle-class buyers are skewed towards imported vehicles
	In competitive utilities cost as compared to regional competitors	Local 2/3 wheelers OEMs are joint venturing to assemble 4 wheelers thereby indigenizing 4-wheeler assembling technology	Competitive costs of utilities of regional competitors provides them comparative advantage
	High rivalry levels among cluster players competing for the low-cost auto parts deteriorates healthy competition	Industry academia collaboration enhances R&D, innovation and management capacities of the industry	Preference of customers of imported vehicles is exerting pressure on local OEMs and auto parts manufacturers consequently to improve quality and safety features of their products
	Protection regime has rendered	Provision of common facility services and	

Strength	Weakness	Opportunity	Threat
	automotive industry to compete in the international market	capital goods manufacturers (machinery and equipment) can improve access to services at competitive prices and development and dissemination of indigenous technology	
		Auto parts industry is at the tipping point to embark on product diversification due to saturation of already existing market	
		Tax holiday and other incentives in new ADP is providing better business opportunities for the industry	

4.3 Porter's 5 Forces Analysis

Michael Porter's Five Forces analysis model identifies the most relevant external forces that influence the business environment of an industrial sector.

The model has been applied on auto parts cluster of Lahore for Input Suppliers, Auto Parts Manufacturers and Original Equipment Manufacturers (OEMS) by evaluating the factors associated with these forces and assigning them scores from 1 as very weak, 2 as weak, 3 as moderate, 4 as strong and 5 as very strong. The average points have been calculated by taking average of scores of the factors for respective force **(Table – 18)**. These points are then plotted on a web chart (Figure – 59) that represents each force as low or high.

5 Forces	Input Suppliers	Manufacturers	OEMs
Threat of New Entry	2.6	3.2	3.7
Bargaining Power of Buyers	3.4	4	2.4
Industry Rivalry	3.1	4	3
Bargaining Power of Suppliers	3.3	2.8	2.8
Threat of Substitutes	3.7	3.2	3.7
Average	**3.2**	**3.0**	**3.1**

Table- 18 Porter's Five Forces Model on Auto Parts Cluster, Lahore

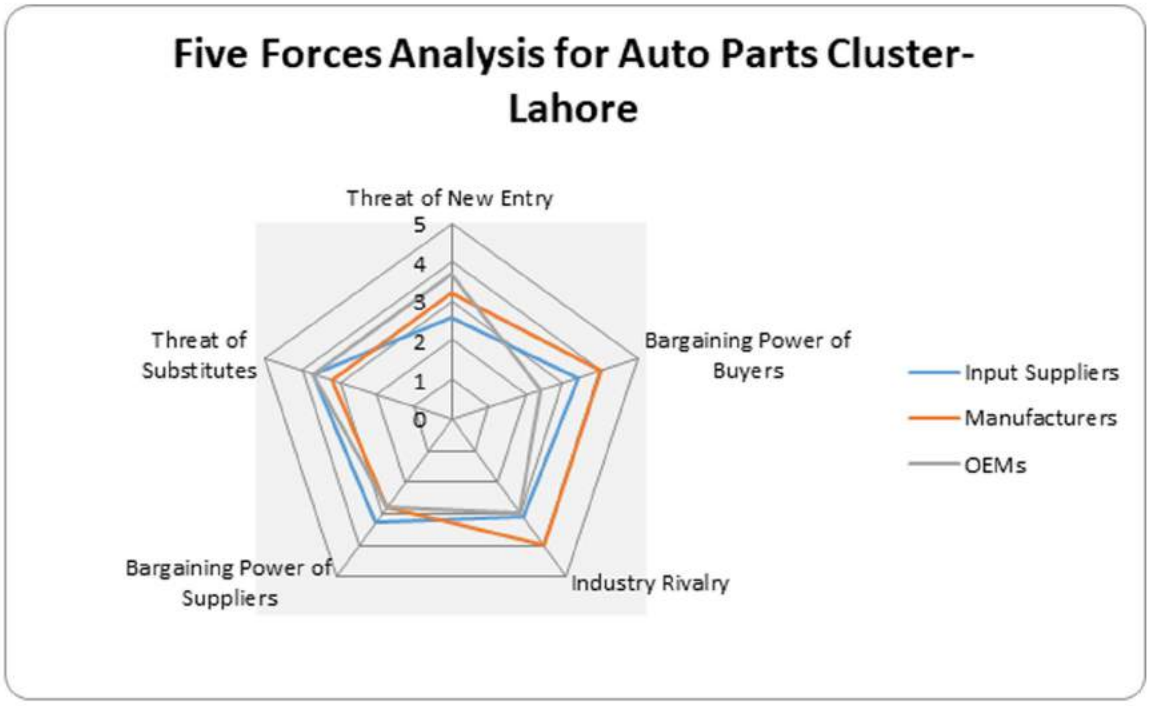


Fig-55 Web chart for 5 Forces for Auto Parts Cluster, Lahore

Five Forces Analysis for Input Suppliers:

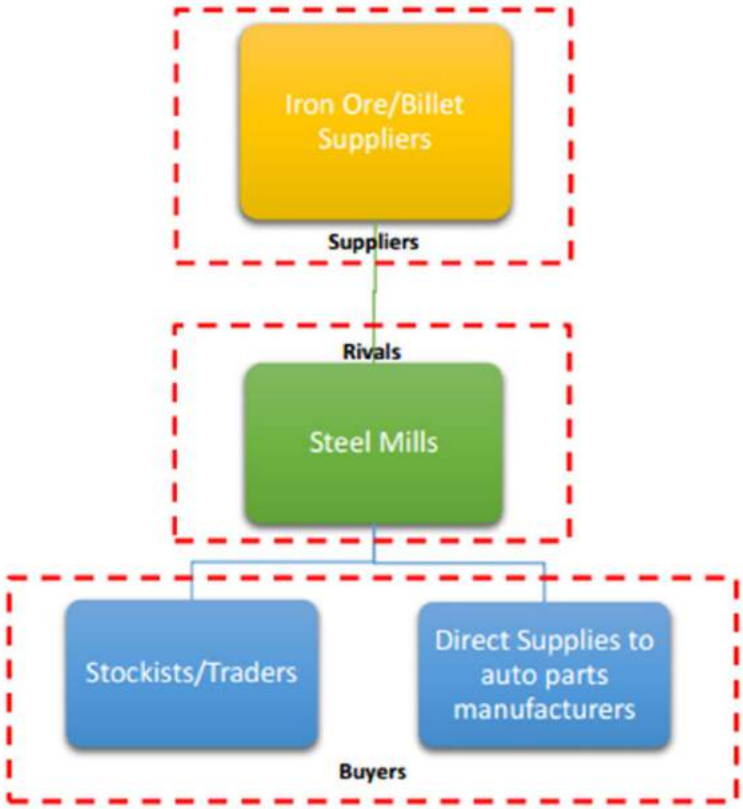


Fig-56 Suppliers, Rivals and Buyers relationship for raw material supplies of auto parts manufacturers

Fig-57 Five Forces Analysis for Input Suppliers

With reference to figures 55 and 56, **Threat of New Entrants in the suppliers market is weak to moderate.** Since major raw material for the auto parts manufacturing is steel, hence the capital requirement to establish a steel mill/furnace is high along with other complications to establish a brand and penetrate into the market. Furthermore, to achieve economies of scale with optimum utilization of installed capacity further raises the bar high to enter the business. This is equally applicable for other input suppliers such as plastic, rubbers, casting material suppliers, machinery and equipment suppliers.
Contrary to the above mentioned situation, however, a frail legal framework and implementation, low product differentiation, easy access to suppliers/distributors, encouragement to new entrants, etc. poses a threat of new entrants.

Bargaining Power of Buyers for the auto parts inputs suppliers is moderate to strong. As there are limited number of steel producers, currently only three private steel mills, hence cost of substituting supplier for stockists and principal firms ordering directly from these steel mills is moderate to strong.
Since most of the auto parts manufacturers are small and medium enterprises, hence low quantity orders to the suppliers/indentors/stockists turns price negotiations in favor of the suppliers.

However, auto parts cluster is competing in terms of cost leadership and is highly sensitive to the raw material prices therefore the buyer has the oppurtunity to frequently change supplier based on price offers. This situation is valid for steels of precise guages and quality, as there exist a number of indentors for these materials.

Industry Rivalry for the input suppliers is moderate to strong. High industry growth rate and industry size are the main factors for the suppliers to stay in this business. In addition as the existing number of indentors/traders/stockists is high as compared to the industry size of auto parts, along with low product differentiation creates a higher rivalry level among the suppliers. Moreover, to retain the current customer customer base in a volatile price environment is becoming increasingly difficult. The above factors contribute towards moderate to strong rivalry among the input suppliers.

Bargaining Power of Suppliers for the auto parts inputs suppliers is moderate. As there are a limited

number of steel producers in the market with huge business sizes, this has resulted in moderate competition, which enhances the bargaining power of the suppliers.

However, it is important to note from the demand perspective that the auto parts manufacturers are using numerous steel variants including local and imported steels to produce low tech parts. Coupled with the high growth rate of auto parts leading to a reduced likelihood of switching to alternate materials by the input suppliers, in this case the steel mills, and this in turn strengthens the position of steel mills to monopolize and enhance profits on the sale of bulk quantities of steel to the manufacturers/suppliers/stockists who are left with no choice but to purchase steels at a high price due to closure of Pakistan Steel Mills and high regulatory duty on imported steels. This scenario helps the suppliers of the steel mills to retain adequate levels of supplies thereby keeping their business vibrant.

Threat of substitutes for the auto parts inputs suppliers can be analysed considering current development trends in local industry and global trends as well. From a local industry perspective, the threat of substitutes is **moderate to strong** as the final product, a vehicle in this case, is competing in the local market. However, this threat is **strong** in the international market where new materials such as plastic composites are replacing conventional steel components especially vehicle skin and body frame components. Furthermore, from the local industry perspective this threat is also strong as the cost of changing to the alternative material will require change in technology, skills and access to the alternative input materials along with the supply chain.

Similarly, threat of substitutes for the international market is very strong as new materials, technology and skills are being implemented (e-vehicles) thereby replacing the convetional technology currently used in auto parts. If this global trend is not realized by the local indusry, it will have severe repercussions on the supply chain of local auto parts of Lahore.

Five Forces Analysis for the Principal Firms:

The **Threat of New Entrants** for the auto parts manufacturing business is **low to moderate** for the 4 wheeler and tractor suppliers and moderate to high for 2/3 wheelers.

Since the suppliers for 2/3 wheelers are operating in a market place where legal barriers to establish a firm are low, products are largely the same, access to suppliers and distributors is very easy, economies of scale are quite low and business friendly.

However, for the suppliers of 4 wheelers and tractors, capital requirement to set up business is **moderate to high**, health of existing suppliers along with high sunk cost create substantial barriers for the new entrants, hence the threat of new entrants in 4 wheelers and tractors auto parts suppliers is weak.

Fig-58 Five Forces Analysis for Principal Firms

Bargaining Power of Buyers for the auto parts manufacturers is **moderate to strong**. As the buyers are mainly renowned international OEMs having huge organizational sizes and global operations, therefore the vendor industry is mainly depenedent on the OEMs product demand. Moreover, buyers (OEMs) invest on their vendor chain by building their capacity through 'Vendor Development Programs' which facilitates auto parts manufacturers from product development till setting up process/production lines, thereby creating specialized vendors. Since these vendors have specialized products thereby making bargaining power of buyers moderate and to retain bargaining power, OEMs strategize barganing power in their favour by developing 3 to 4 vendors for one component. developing 3 to 4 vendors for one component.

Since the components produced by the auto parts manufacturers are of low value and require high skilled labour, backward integration for the OEMs becomes less attractive.

Industry Rivalry in the auto parts is **very strong** for 2/3 wheelers and **moderate** for 4 wheelers and tractors. There are many auto parts manufacturers doing business at small to medium scale, who are competing for the same or similar components for 2/3 wheelers, therefore creating cut throat competition amongst themselves. Customer loyalty for suppliers of 2/3 wheelers is **very weak** for local 2/3 wheelers assemblers and **moderate** for the foreign 2/3 wheeler OEMs. This in turn makes switching from foreign OEMs to local OEMs for the 2/3 auto parts manufacturers less attractive.

The auto parts manufacturers for the 4 wheelers and tractor OEMs are normally operating from medium to large scale with specialized products; they enjoy long term relationships with the buyers, thus have lesser rivalry levels.

Since auto parts manufacturers supply to specific OEMs only that is why the level of advertising expense is low. Due to long time industry protection regime, the industry has not been able to substantiate market diversification and penetration, therefore not being able to produce internationally competitive high tech (dyamic) components.

In view of the above, the auto parts manufacturers could not achieve high efficiencies and are now facing the challenge of high cost of production, therefore limiting the possibilities of competing in the international markets in the foreseeable future. On the other hand, due to high sunk cost, the cost of leaving the industry is also high.

Bargaining Power of Suppliers is **weak to moderate** for the auto parts manufacturing companies since there exist a number of suppliers of all sizes, both for imported and local materials. The availability of material is abundant and easily accessible. In addition, the material quality in terms of grades and sizes is the same, therefore, the main factor to retain a supplier is based on the price of the material or the credit line extended to the buyers (principal firms). Therefore the switching cost of the supplier is very weak. On the other hand, threats from supplier side to produce auto parts is very weak as the capital requirement to establish auto parts business is strong, along with the requirement of completely different skillset.

other hand, threats from supplier side to produce auto parts is very weak as the capital requirement to establish auto parts business is strong, along with the requirement of completely different skillset.

Threat of substitutes in short run for the auto parts manufacturers in local market is **weak to moderate,** however, this threat is **substantial** in the long term. Auto parts with new materials and technologies are being developed especially for vehicle skins and body frame components, which can be produced using advance technologies for eco-friendly vehicles (Electric Vehicles), which are replacing conventional engine vehicles, which in turn will replace current manufacturing techniques and materials as well.

Five Forces Analysis for the Original Equipment Manufacturers

The **Threat of New Entrants** in the automotive industry is **moderate to strong** despite the high capital requirement of setting up this business and high sunk cost. This is because of the Tax holiday and other incentives in the new Automotive Development Policy 2016, which is providing better business opportunities for new assemblers. Low motorization index of Pakistan which is 16 cars per 1000 persons[49] provides a huge

[49]Source: Engineering Development Board

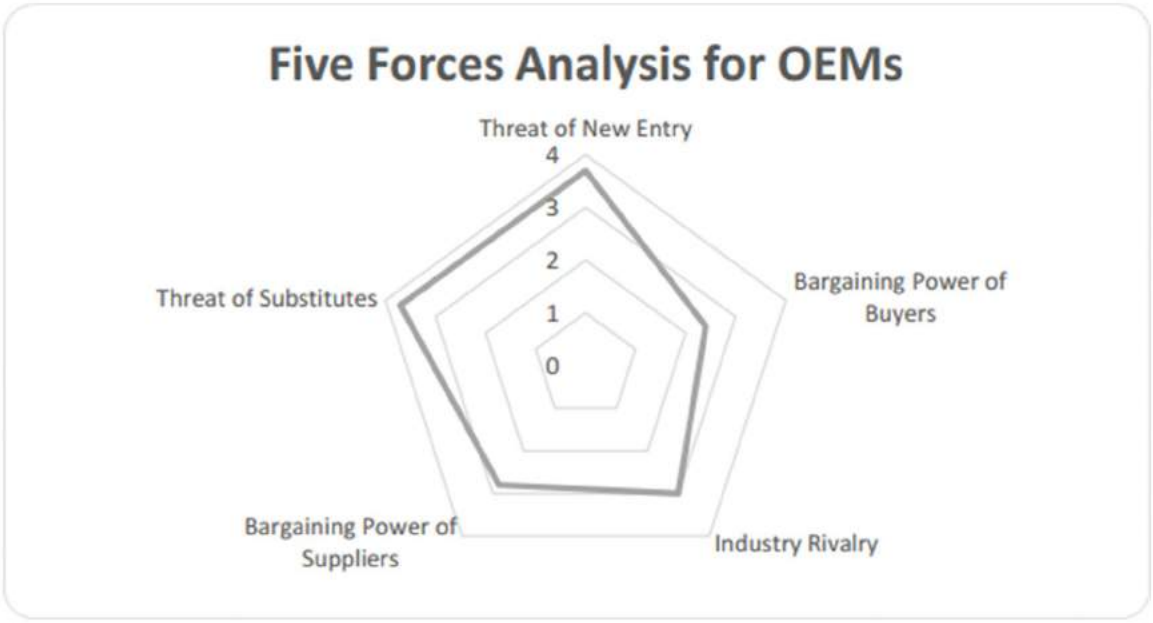


Fig-59 Five Forces Analysis for OEMs

opportunity for new entrants. Recently the Ministry of Industry and Production has given permission to United Motors Private Limited (local 2/3-wheeler OEM), Kia-Lucky Motors Pakistan Limited and Nishat Group to set up units for assembly and manufacturing of vehicles under the Greenfield investment category, thereby making the threat of new entrants high.

Industry and Production has given permission to United Motors Private Limited and Nishat Group to set up units for assembly and manufacturing of vehicles under the Greenfield investment category, thereby making the threat of new entrants high.

Moreover, the auto parts industry is at the tipping point to embark on product diversification due to saturation of the existing market. Local 2/3 wheelers OEMs are entering in to joint ventures to assemble 4 wheelers, thereby indigenizing 4-wheeler assembling technology. The presence of a strong vendor base encourages new players to enter the market.

This growth potential is typical for the 2/3 wheelers segment, which has seen a massive increase in volume, increasing thirty-fold[50] in the last fifteen years. The most important consequences of this have been the achievement of mass production, high levels of localization and low prices, which have further fueled expansions in market size. There are low barriers to entry for 2/3 wheelers as the products are non-exclusive along with availability of supplies on credit. Moreover, brand consciousness has increased over time causing higher exit rate for the new 2/3-wheelers. Another interesting characteristic of the motorcycle market is the ubiquitous presence of the 70-cc motorcycle, which is largely absent elsewhere in the world.

The threat of new entrants for 4 wheelers and tractors is weak to moderate due to high upfront costs and specialized vendor chain.

The Bargaining Power of Buyers for auto parts cluster is **weak to moderate** as buyers are the general Moreover, protection of the industry by imposing high duties and taxes on imported motorcycles and similar products leaves the masses with no choice but to purchase locally manufactured motorcycles. This is further validated with the share of sales of 2/3 wheelers, which is 86% in the automotive industry of Pakistan.

public, which is large in number. There are many substitutes available for 2/3 wheelers, as lack of R&D and weak legal framework encourages cloning of existing products for cost saving on developing a new product.
Moreover, protection of the industry by imposing high duties and taxes on imported motorcycles and similar products leaves the masses with no choice but to purchase locally manufactured motorcycles. This is further validated with the share of sales of 2/3 wheelers, which is 86% in the automotive industry of Pakistan.

[50]Source: PAMA

On the other hand, there are only a moderate number of substitutes available for 4 wheelers and tractors. One of the major reasons people prefer to buy locally manufactured foreign brands like Honda, Toyota and Suzuki is availability of after sales services and spares, which is provided by these OEMs. This also means that if the buyers switch to other substitutes like imported vehicles, they have to bear comparatively higher vehicle maintenance costs. Buyers are very price sensitive owing to lower levels of disposable income, which reduces their purchasing power. The threat of backward integration by the buyers is very weak due to a huge variety of components and process requirements, which is further topped up with the requirement of huge capital for setting up an automotive assembly plant.

Industry Rivalry in the automobile assemblers is **moderate** for 4 wheelers and tractors as currently there are only 3 OEMs for cars in which Pak Suzuki Motors enjoys a monoply in the low engine capacity vehicles (800cc - 1000cc), which are not being manufacturered by its two competitors - Honda Atlas Cars (Honda) and Indus Motor Limited (Toyota) as they compete only in the 1300cc and 1800cc variants. However, strong industry rivalry is imminent to increase in the future among OEMs with the arrival of new assemblers.
Also, low demand in tractor segment makes it less attractive for new entrants, hence the two OEMs enjoy and share the market.

The rivalry level among local 2/3 wheelers OEMs is very strong due to low product differentiation and competing for the same market size, which in this case is the local market only.

However, a foreign OEM (Honda Motorcycles) has been able to create product differentiation in terms of product quality.

The Bargaining Power of Suppliers is **weak to moderate** for the OEMs, as there are limited number of OEMs especially in the car and tractor segments. Also, as OEMs develop their vendor chains by themselves, which is especially common for foreign OEMs, hence vendors are left with limited room to switch to other OEMs.

This is monopolistic in case of 2/3 wheelers where only Atlas Honda Motorcycles enjoys 60%[51] market share in terms of sales, which is the largest among 2/3 wheelers, despite a large number of assemblers in this segment. One of the major reasons is the payment schedule of Honda to its suppliers over its competitors, which is a great attraction for auto parts vending industry.

As huge capital resources are required to become an assembler along with the time required to establish a brand, hence there is a **weak threat** of suppliers integrating forward to become an assembler/OEM.

Threat of substitutes for OEMs is also **moderate to strong** due to the enactment of decades old protection regime for the automotive industry. Since the local OEMs are providing very few variants, therefore the buyers are now inclinied towards the purchase of imported vehicles. Therefore, in the absence of adequate options for the customers, the imported vehicles are becoming increasingly substitutes to the local manufactured vehicles. The performance of these substitutes in terms of quality and price is much better compared to the local manufactured vehicles. Major reasons, however, hindering the market penetration of the imported vehicles are reliability of suppliers, availability of maintenance services & spare parts and regulation for importing at least three year old cars.

However, due to unavailability of after sales services for imported tractors, local tractors are high in demand; this trend remains unchanged over the years and is perceived to persist in the future as well due to low demand of tractors and unattractive market for new entrants.

Moreover, with the entry of new assemblers the threat becomes more imminent for already existing OEMs. Global trends of technological shifts from conventional engine vehicles to green (electric) vehicles has revolutionized the buying trends as well, which if not realized soon by the local assemblers will have severe repercussions; hence there lies a strong threat of substitutes for the industry.

4.4 Diamond Model

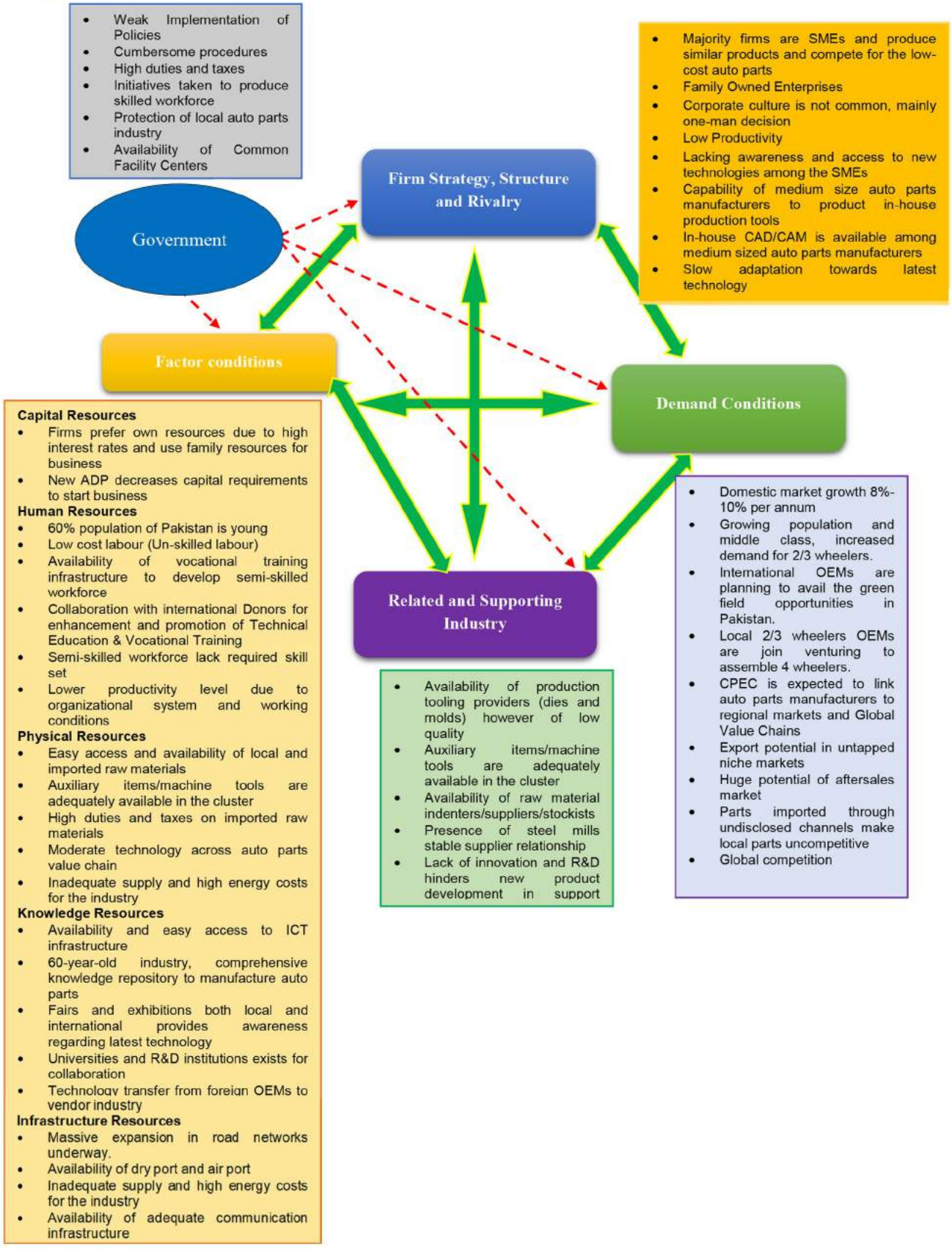


Fig-60 Diamond Model for Auto Parts Cluster

Michael Porter, renowned Harvard Professor known for his pioneering work on competitiveness and cluster theory, introduced a model for analyzing the areas of strength and weakness that can give an industry within a country or a cluster, competitive advantage or disadvantage. Porter also suggested that the four key elements all affect each other, and they also affect opportunity and government policies. The factors mentioned in the above shown diamond model were identified from secondary data sources, field research and in-depth discussions with stakeholders.

Having gone through the conditions prevailing in the automotive vendor industry it can be said that despite being a member of the most expanding sector of Pakistan's economy, with 8% to 10% annual growth rate, automotive vendors seem to be in a threatening situation. There is immense pressure from four sides of industrial structure and vendors have not been provided enough assistance to withstand the pressure.

Increased population contributes towards increased demand of vehicles in the country. If we have a look at the market of automotive products it depicts an ever-increasing trend, which is due to the healthy state of market drivers that automotive market seems to be expanding in future. Major market drivers for automotive products are given in the table

A majority of local auto parts manufacturers are family owned enterprises with one-man decision. The local industry lacks in corporate culture; as a result, a majority of the units do not have conducive working environments or good manufacturing practices, which leads to low productivity and inferior quality products.

Driver	State of Driver
Demand of vehicles	High
Import barriers on import of automobiles	Low
Availability of support industry	High
Production capacity of auto parts manufacturers	High
Production capacity of assemblers	High
Delivery time	Low
Incentives for the industry in ADP 2016-21	High

Table 19- Major market drivers for automotive products

Local vehicles are replicas of globally launched models; this stems from the fact that the OEMs do not invest considerably in research & development, making local products uncompetitive internationally. The greatest selling point of the imported vehicles is their quality due to which, there is a good demand for imported vehicles; however, local vehicles are mainly purchased due to the easy availability of after sales support service, which is absent in case of imported vehicles.

However, this scenario is perceived to change in the future with the advent of the new Automotive Development Policy 2016-21, which provides incentives to new entrants as already 4 new OEMs (2 foreign and 2 local 2/3wheeler diversifying towards 4 wheelers) are establishing their units.

Another aspect for local auto parts uncompetitiveness is a lack of inter and intra cluster cooperation, which is due to lack of importance given to the parts manufacturers on the part of the Government and the manufacturers themselves.

The local industry also faces very high cost of utilities such as electricity and gas as well as inadequate supply of these basic utilities. Also burdening the local industry are the high duties and taxes as federal and provincial governments charge different tax rates which places some producers at an advantage over the other producers in the country.

A majority of the components of the vehicle made locally have competition from foreign products. Most of the components imported into the country are made in Thailand and Thai Baht has depreciated significantly against Pakistani Rupee in recent years, which has made these components even cheaper. This situation becomes grave when products are imported from undisclosed/informal channels.

We can term CPEC a chance for the automotive industry of Pakistan as it has the potential to boost the automotive sector and take it to newer heights, thus increasing export potential to niche markets and enable local auto parts manufacturers to link with global value chains.

4.5 Cooperation Matrix

X	IC & ID	PITAC	PCSIR	PSQCA	EDB	BOI	TDAP	PBIT	SMEDA	NPO	CCP	PSIC	LCCI	NAVTTC	TEVTA	PVTC	PSDF	PAMA	PAAPAM	GOVT. UNIVERSITIES	PVT. UNIVERSITIES	Private BDSPs	Banks & Financial Institutions	Raw Material Suppliers	Certification Agencies	Donors Agencies	SUM
IC & ID	X	0	0	0	0	0	0	4	2	0	0	5	3	0	5	4	5	0	3	1	3	3	3	1	0	3	45
PITAC	0	X	1	3	4	1	1	0	3	4	2	0	2	2	3	1	4	0	2	1	1	2	1	3	1	3	45
PCSIR	0	1	X	5	3	1	1	0	2	2	0	1	1	1	0	0	0	0	2	1	0	0	1	3	4	3	32
PSQCA	0	3	5	X	4	0	0	0	1	2	0	1	0	0	0	0	0	0	1	1	1	1	0	3	1	2	26
EDB	0	4	3	4	X	1	2	0	2	2	1	0	0	0	0	0	0	0	4	2	2	1	0	0	1	2	31
BOI	0	1	1	0	1	X	3	1	2	1	1	0	1	0	0	0	0	2	2	0	0	0	1	0	0	4	21
TDAP	0	1	1	0	2	3	X	1	2	1	1	1	3	1	1	0	1	2	3	2	2	2	1	0	1	3	35
PBIT	4	0	0	0	0	1	1	X	1	1	0	2	3	1	1	0	0	0	1	1	2	2	3	0	1	3	28
SMEDA	2	3	2	1	2	2	2	1	X	3	1	2	4	2	1	1	1	2	4	3	3	2	3	1	1	4	53
NPO	0	4	2	2	2	1	1	1	3	X	0	1	2	1	1	0	0	2	2	2	2	3	1	1	2	4	40
CCP	0	2	0	0	1	1	1	0	1	0	X	0	1	0	0	0	0	2	3	1	0	1	2	1	0	1	18
PSIC	5	0	1	1	0	0	1	2	2	1	0	X	2	0	2	0	0	0	3	2	2	2	3	0	0	3	32
LCCI	3	2	1	0	0	1	3	3	4	2	1	2	X	0	1	1	1	0	3	1	1	2	2	3	2	3	42
NAVTTC	0	2	1	0	0	0	1	1	2	1	0	0	0	X	4	3	2	0	2	1	0	1	1	1	1	4	28
TEVTA	5	3	0	0	0	0	1	1	1	1	0	2	1	4	X	2	1	1	3	2	0	0	0	0	0	3	31
PVTC	4	1	0	0	0	0	0	0	1	0	0	0	1	3	2	X	1	1	4	1	1	3	2	2	1	3	31
PSDF	5	4	0	0	0	0	1	0	1	0	0	0	1	2	1	1	X	0	2	1	1	4	3	1	1	5	34
PAMA	0	0	0	0	0	2	2	0	2	2	2	0	0	0	1	1	0	X	5	1	1	1	1	1	1	2	25
PAAPAM	3	2	2	1	4	2	3	1	4	2	3	3	3	2	3	4	2	5	X	2	2	2	1	3	3	3	65
GOVT. UNIVERSITIES	1	1	1	1	2	0	2	1	3	2	1	2	1	1	2	1	1	1	2	X	2	0	0	0	1	2	31
PVT. UNIVERSITIES	3	1	0	1	2	0	2	2	3	2	0	2	1	0	0	1	1	1	2	2	X	2	1	0	0	2	31
Private BDS	3	2	0	1	1	0	2	2	2	3	1	2	2	1	0	3	4	1	2	0	2	X	1	0	2	1	38
Banks & Financial Institutions	3	1	1	0	0	1	1	3	3	1	2	3	2	1	0	2	3	1	1	0	1	1	X	3	1	1	36
Raw Material Suppliers	1	3	3	3	0	0	0	0	1	1	1	0	3	1	0	2	1	1	3	0	0	0	3	X	1	0	28
Certification Agencies	0	1	4	1	1	0	1	1	1	2	0	0	2	1	0	1	1	1	3	1	0	2	1	1	X	1	27
Foreign Donors / NGOs	3	3	3	2	2	4	3	3	4	4	1	3	3	4	3	3	5	2	3	2	2	1	1	0	1	X	65
TOTAL	45	45	32	26	31	21	35	28	53	40	18	32	42	28	31	31	34	25	65	31	31	38	36	28	27	65	X

Legend	
0	No Cooperation
1	Weak
2	Fair
3	Good
4	V. Good
5	Excellent

The cooperation matrix is used to analyze and gauge the relationships between different cluster actors, in order to enhance competitiveness and potential for future collaboration between different actors. The evaluation is being done based on the secondary sources, field survey and discussion with the actors.

If we look at the cooperation matrix, it depicts that SMEDA has a very good relation with PAAPAM and donor agencies. SMEDA supports the industry in terms of various support programs which are already discussed in 'Institutional Setup' of this report. However, with collaboration of PAAPAM, SMEDA and International Donor Agencies like JICA or GIZ a 'Technical Support Program' for local OEMs may be introduced to support the local OEMs in terms of vendor development and their backward linkages which is auto parts manufacturers as well.

Similarly Engineering Development Board, being an apex body to support the engineering industry in Pakistan has a fair relationship with BOI, TDAP and NPO, which needs to be developed in the future for support of the industry in terms of productivity, better marketability, increased export potential and facilitation of new assemblers (OEMs) in the local market.

PSQCA, being an important actor, is mandated to implement and enhance quality infrastructure within the industry; it has a good linkage with EDB, which needs to be enhanced for development and implementation of quality standards for vehicles in Pakistan which, at present are absent. Also, PSQCA has fair relationships with PAAPAM, but no relationships with TEVTA, PVTC and PSDF, which is imperative to produce 'Knowledge Workers' for the industry, in order to integrate quality within production lines of the industry.

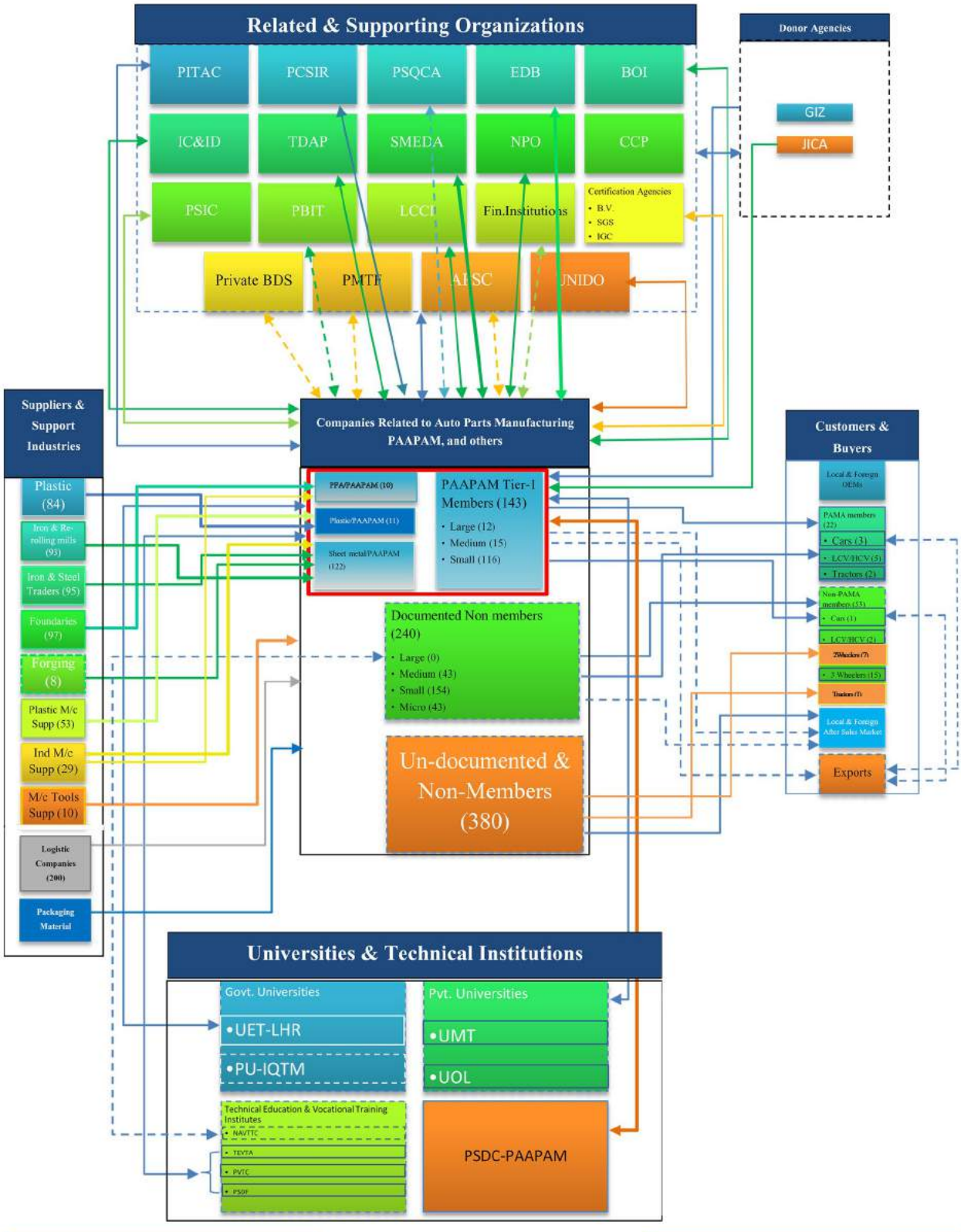
PAAPAM has a weak relationship with PBIT and weak relationships with government and private universities. Although MoUs have been signed between PAAPAM and universities as discussed in earlier section of this report but it is limited to 'Student Support' only. A research program may be initiated with the collaboration of PAAPAM or Universities (Government and private) funded by a donor agency like JICA or GIZ. Another option is that the 'Productivity, Quality and Invention (PQI)' initiative under Federal Ministry of Science and Technology, which also includes the component of innovation may be enhanced to support the industry in this context.

The role of common facility centers is very important to support the industry in terms of provision of access to latest manufacturing technologies, capacity building and technical advisory services. Auto Parts Support Center-APSC working under PSIC is currently dormant and is not depicted in the matrix. It can have an essential role for the development of the cluster, which can establish its linkages with relevant stakeholders like PAAPAM, PSQCA, NPO, TEVTA, PVTC, PSDF, LCCI, donor agencies and certification agencies as well as to provide support to the industry in the above mentioned areas.

TEVTA has a weak relationship with NPO and also with the sister organization PSDF which needs to be enhanced in order to better equip the industry with a better skillset. TEVTA also signed an MoU with PAAPAM as mentioned previously, but that has not yielded any result yet. A better collaboration with PAAPAM is required, in order to develop the required skillset for the workforce to be produced for the industry, as with the advent of new OEMs in the market and opportunities provided by CPEC, skilled workforce with targeted skillset will be required by the industry.

Private BDSP like SGS and Bureau Veritas will be required to collaborate more with PAAPAM and Universities, so as to support the industry in terms of technical support. Also, financial institutions can be tapped by private BDSPs to provide their services on more attractive grounds.

4.6 Current Cluster Map for Auto Parts-Lahore



Legend

A thin-bordered rectangular box for a group of stakeholders the firms in a group are near similar and are not necessarily linked to each other.	
A thick/dotted-bordered rectangular box for showing a well poorly functioning network of inter-related stakeholders	
A thick/dotted one-sided arrow to show a well/underdeveloped linkage between two stakeholders, the point of the arrow meets thestakeholder that recieves good/services from the stakeholder.	
A thick/dotted two-sided arrow to show a well/underdeveloped linkage between two stakeholders that have a subcontracting linkage between two stakeholders that have a subcontracting relationship	
Parenthesis to show the number of stakeholders in group/network	( )

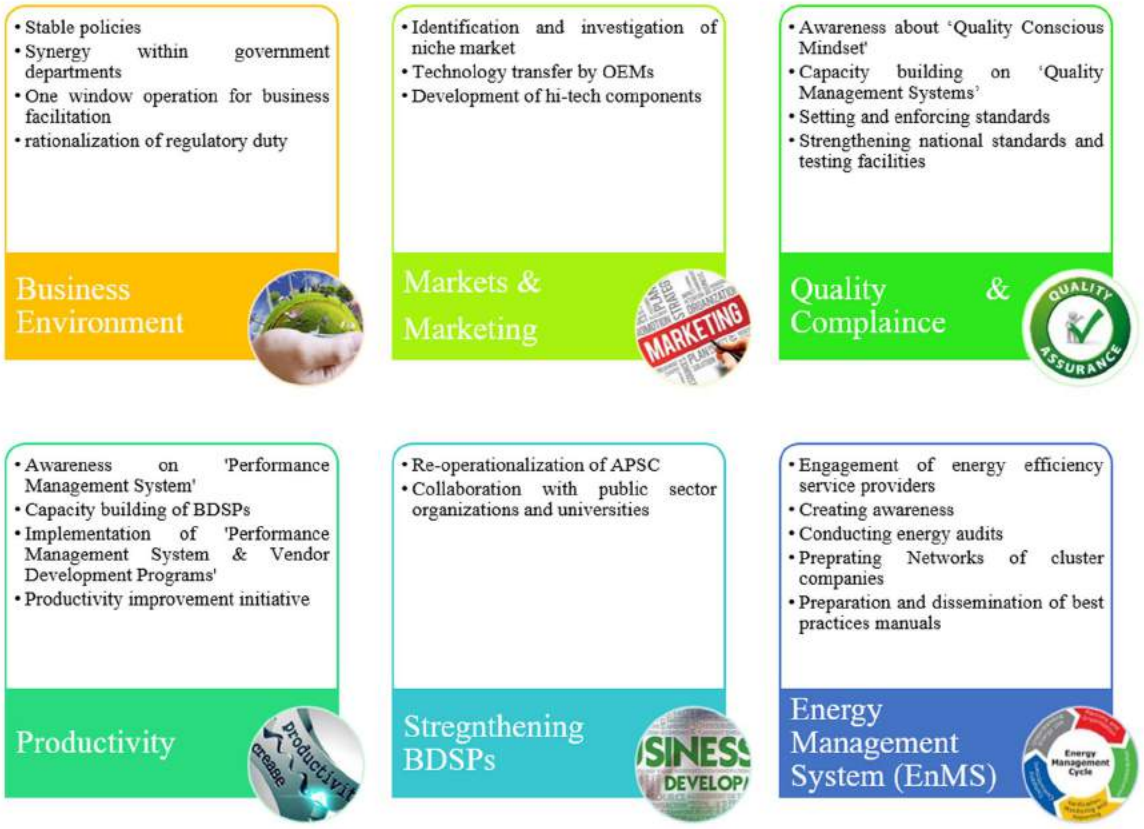
Sources:

- PAAPAM
- PAMA
- Directory of Industrial Establishments In Punjab
- Pakistan Plastic Manufacturers Association-PPMA
- Pakistan Foundry Association-PFA
- Diagnostic Study for APM Mandi Baha-ud-Din 2016

5. Recommendations & Action Plan

5.1 Recommendations

In the view of the analysis; key constraints, the challenges ahead and possible intervention areas to find solutions to these challenges and problem areas are provided as recommendations;



Key Constraint 1: Business Environment
Challenges:
• Auto parts cluster is segmented and highly concentrated market with limited innovation and quality. • Long tariff protection kept the industry immature • Frequently changing policies remained a critical issue for the industry. • OEMs monopoly dictates prices of auto parts and components. • Local manufacturers use obsolete technologies. • Locally manufactured auto parts are exported to international after sales market only. • Local vending industry is unable to connect to GVCs. • Lahore automotive industry has a trade imbalance of imports and exports of parts. • CPEC will bring radical changes to the auto parts sector of Pakistan to create linkage with GVCs. • Regulatory Duty on steel has increased from 15% to 30%.
Recommendations:
• The government needs to provide reliable and competitively priced energy and physical infrastructure. • Any changes in the policies, should be stable, planned in phases, so as the industry can adjust and plan accordingly. Synergy within the government departments is required in order to resolve the bottlenecks.

- The Government needs to play the role of a facilitator through regular consultations of industry and academia in order to ensure identification, creation and meeting targets to diversify exports.
- A one window operation through which permits and licenses can be efficiently acquired, contracts are enforced and assets are protected is required.
- Need to devise programs to facilitate backward linkages between FDI and local industry pertaining to CPEC.
- Need to rationalize regulatory duty, to lower the cost of production.
- Re-operationalization of Pakistan Steels to provide steel to the industry on competitive rates.
- Research programs with Universities/R&D institutions for product and process development.

Key Constraint 2: Markets and Marketing

Challenges:

- Rapidly changing global technological trends have not been realized by local manufacturers.
- OEMs do not support the industry by transferring the technology of hi-tech components.
- High price of locally manufactured parts as compared to imported parts.
- Lacking production of high-tech (dynamic) parts.
- Manufacturers focus on selling parts only to OEMs and do not explore opportunities for export markets.
- Product development is weak and mainly bound to OEMs orders.
- SMEs mostly have marketing plans and departments, they are only fulfilling the selling function.

Recommendations:

- Identification of target market for exports and establishing mechanism for exports where comparative advantage exists especially for 2/3 wheelers.
- Strategies to encourage OEMs to bring technology of hi-tech components to Pakistan spurring employment and business opportunities.
- To enhance exports and decrease current trade deficit hi-tech components may be set as a target by the local manufacturers.
- Increase in efforts for positive image building of the auto parts sector is required.
- Strengthening marketing by improving innovation support system.

Key Constraint 3: Quality and Compliance

Challenges:

- High defect rates due to non-standardized manufacturing techniques and methodologies.
- Absence/weak implementation of quality management systems.
- Weak enforcement of national quality standards.
- Low exports due to non-compliance to international sector specific standards (such as ISO/TS-16949).
- Non-availability of BDSPs related to international sector specific certifications.

Recommendations:

1. Creating awareness in the industry regarding 'Quality Conscious Mindset'.
2. Capacity building of the industry on 'Quality Management Systems'.
3. Setting and enforcing standards in the automotive sector is critical to link with global value chains.
4. National standards and testing facilities following the international best practices need to be strengthened.
5. Collaboration with public organizations to develop BDSPs providing sector specific certification services.

Key Constraint 4:Productivity
Challenges:
• Auto parts cluster and local OEMs (2/3 wheelers) have not been able to adopt best practices related to operations management. • Absence of vendor development program in Local OEMs (2/3 wheelers). • Lower labor productivity incurring high production wastages resulting in higher cost of production • Shifting burden of keeping high inventory levels to the auto parts producers as the OEMs have adopted Just in Time (JIT) approach. • Cut throat competition due to low priced products (for 2/3 wheelers) generating healthy practices.
Recommendations:
1. Creating awareness along the supply chain of Local OEMs on performance management, productivity and vendor development programs. 2. Capacity building of BDSPs on 'Performance Management & Productivity Improvement Methodologies' and 'Vendor Development'. 3. Implementation of 'Performance Management System' and 'Vendor Development Programs' in local OEMs (2/3 Wheelers). 4. Productivity improvement initiative for the auto parts manufacturers (this initiative will complement the ongoing productivity programs and will extend the outreach to the vendor base of local OEMs).

Key Constraint 5: Strengthening Business Development Service Providers-BDSPs
Challenges:

• The industry has limited access to quality business development services in following areas:
  ○ Designing of production tooling (dies and molds)
  ○ 3D printing/prototyping
  ○ Machining facilities (CNC)
  ○ Finishing and polishing of production tooling (dies and molds)
  ○ Inspection / testing
  ○ Surface treatment of production tooling (dies and molds)
  ○ Heat treatment
  ○ Supervisory/shop floor training
  ○ Technical consultancy service
• Auto Parts Support Center-APSC was established to address these issues but the center is dormant currently.

Recommendations:
1. Re-operationalization of the APSC to bridge the prevailing business development services gap. 2. Collaboration with public-sector organizations and universities to strengthen the service portfolio of APSC.

Key Constraint 6:Energy Management System (EnMS)
Challenges:
• Auto parts manufacturing is an energy intensive industry utilizing mix of gas, electricity and petroleum products. • On one hand, enterprise level consumption of energy mix is sub-optimal, on the other hand increasing cost of energy mix further exacerbates affordability and competitiveness. • Lack of awareness and capacity constraints on part of manufacturers to adopt best practices in energy management. • Limited support from the government to increase energy efficiency consciousness, viz a viz capacity development programs.
Recommendations:
1. Engagement of energy efficiency services providers (ESCos) and public sector organizations (NEECA, NPO, SMEDA, Energy Department Govt. of Punjab) to create awareness in the cluster regarding energy efficiency. 2. Conducting energy audits in networks of cluster companies through ESCos and public sector organizations. 3. Preparing network of companies for implementation of energy management systems. 4. Preparation and dissemination of energy efficiency best practices manuals.

Annexure 1

List of Courses Developed by Deutsche Gesellschaft für Internationale Zusammenarbeit-GIZ

S. No.	ISCED Classification & Title of qualification	NVQF Level	Total credits	Code
0715 Mechanics and metal trades				
1.	National Vocational Certificate Level 2 in Mechanical Technology (Welding)	2	80	0715MMT01
2.	National Vocational Certificate Level 2 in Mechanical Technology (Machinist)	2	160	0715MMT02
3.	National Vocational Certificate Level 2 in Mechanical Technology (Machinist/Machinist Green Skills)	2	322	0715MMT03
4.	National Vocational Certificate Level 2 in Mechanical Technology (Wilder & Fabricator)	2	320	0715MMT04
5.	National Vocational Certificate Level 3 in Mechanical Technology (Mechanical Manufacturing)	3	308	0715MMT05
0716 Motor vehicles, ships and aircraft				
1.	National Vocational Certificate Level 2 in Automotive Technology (Auto Electrician)	2	80	0716MSA01
2.	National Vocational Certificate Level 2 in Automotive Technology (Automobile Mechanic)	2	77	0716MSA02
3.	National Vocational Certificate Level 3 Automotive Technology (Automotive Technician)	3	320	0716MSA03

NVQF- National Vocational Qualifications Framework

Annexure 2

A Comprehensive Comparison Between Auto Industry Development Plan 2007-12 & Automotive Development Policy 2016-21

Area	AIDP 2007-12	ADP-2016-21
Goals of policy/programme	➢ To provide pre-announced tariffs and to focus on the policy and administrative issues which could lead to sustainable development and growth. ➢ To achieve a critical mass of production, double the contribution of auto industry to GDP from the existing 2.8%, by the year 2011-12 with high focus on investment, technology up gradation. ➢ To increasing its exports to US$ 650 million, enhancement in jobs alongside the development of critical components to further increase the competitiveness of domestically produced vehicles.	➢ To increase automotive production gradually by 2021 Cars/vans/jeeps 350,000 LCVs 79,000 Trucks 12,000 Buses 2,200 Tractors 88,000 Motorcycles 2.5 Million ➢ To increase contribution to GDP from 2.3% to 3.8% ➢ To increase contribution to manufacturing from 22% to 30% ➢ To increase direct indirect employment from 2.4 Million to 4 Million.
Historical Perspective	➢ AIDP 2007-12 was launched as policy interventions to ensure consistent Government policies ➢ To enable OEMS to make long and short-term decisions to develop critical components and to acquire technology transfer. ➢ To facilitate safe transition from deletion to TBS. ➢ To expand the capacity of OEMs and vendors. ➢ It included both tariff (implemented through the budget of 2007-2008) and non-tariff measures. Reasons of failure 1) Weak Implementation mechanism (AIDC, formulation of standards and specification not addressed). 2) Changing scenario (production and volume targets on assumptions of continued car financing and leasing). 3) Lack of adaptability. 4) Consumer welfare was ignored as issue of affordability and quality not resolved. 5) Lack of funds (Govt. funds were not released). 6) For New investors policy the Conditions laid down for new investors were not realistic. 7) Lack of consistency. (lack of support from Government funding, local industry to maintain status quo)	➢ ADP (2016-21) to induce growth and facilitate new investments. ➢ Need for growth oriented and investor friendly automotive policy that is predictable, cohesive and responsive to the changing needs of sector along with consumer preferences and demands.
Tariff Structure for the	CBU up to 800 cc 50% 1) CBU 801-1000cc 55% 2) CBU 1001-1500cc 60%	➢ Tariff regime must create balance between 1) Industry requirements and consumer welfare

Area	AIDP 2007-12	ADP-2016-21
development of Automotive Sector with rational	3) CBU 1501-1800cc 75% 4) CKD non-localized 32.5% 5) CKD localized 50% 6) Components 10% 7) Sub Components 5% 8) Raw material 0%	2) Protection & competition 3) Imports and local manufacturing 4) What can and what cannot be indigenized. ➢ Tariff Rationalization Vehicle assembly development will come from two parallel streams. 1) Development through advancement of technology, indigenization in existing OEMS. 2) New investments with an aim to subsequently reach to indigenous manufacturing. ➢ Since existing OEMs will have comparative advantage and new entrants will need full support to catch up with existing OEMS new policy will facilitate. This will increase size, volume, quality, technology along with participation in GVC. ➢ To attract investments, tariff threshold has been reduced for both localized and non-localized components. This will assist new players to achieve indigenization and also enable existing players to get non-localized components at reduced rates. ➢ For localized parts import duties were reduced to improve indigenous competitiveness. ➢ To eliminate mis-declaration the import duty on inputs was adjusted. Previously there was duality having two different rates for localized and non-localized parts of cars. ➢ Present duty structure shall continue for new investors for seven years. ➢ CBU rates also rationalized to control the prices.
		1) To reduce the landed price, CBU duty rates of 1800CC and below rationalized. 2) Import duty rates on localized (45%) and non-localized (30%) parts lowered to improve indigenous competitiveness. 3) Duty rates of components and sub components rationalized (20%) to eliminate mis-declaration. 4) Due to overall Government Policy 0% tariff slab replaced by 1%.
Rationale for tariff structure: Motorcycles,	1) CBU Motorcycle 65% 2) CBU M/cycle Rickshaw 65% 3) CBU Auto Rickshaw 50% 4) CBU Cargo Loader 60%	1) CBU rate 50% fixed uniformly for two and 3 wheeler to prevent mis-declaration. 2) Duty rate of non-localize components, rationalized and fixed at 15 % and duty
Motorcycle rickshaw, auto rickshaw, 3 wheeler cargo loader	5) CKD (Non Localized) 15 to 20% (Motor Cycle Motorcycle Rickshaw Auto Rickshaw 3 Wheeler Loader) 6) CKD Localized 47.5/50% 7) Components 10% 8) Sub Components 5% 9) Raw material 0%	rates of localized components reduced to 45% to prevent mis-declaration. 3) Duty rates of components and sub components rationalized (10%) to eliminate mis-declaration. 4) Due to overall Government Policy 0% tariff slab replaced by 1%.

Area	AIDP 2007-12	ADP-2016-21
Rationale for tariff structure : Tractors	1) Components 0% 2) Sub Components 0% 3) Sub Assembly 0% 4) CKD Non Localized All - 0% 5) Raw Material 0%	1) Duty rates of components and sub components rationalized (1%) to eliminate mis-declaration. 2) Due to overall Government Policy 0% tariff slab replaced by 1%.
Rationale for tariff structure : Prime Movers	1) CBU below 280 HP 30% 2) CBU 280 HP and Above 15% 3) CKD (Non Localized) below 280HP 10% 4) CKD (Non Localized) 280HP & above 0% 5) Components 0% 6) Sub Components 0% 7) Raw Material 0%	1) CBU below 280HP and above made uniform (20%) to avoid ambiguities and mis-declaration. Similarly import duty on CKD (Non-localized) below and above 280HP was fixed at 5% to facilitate low cost assembly of vehicles. 2) Duty rates of components and sub components rationalized (1%) to eliminate mis-declaration. 3) Due to overall Government Policy 0% tariff slab replaced by 1%.
Rationale for tariff structure: Buses	1) CBU 20% 2) CBU (dedicated LPG or LNG buses) 0% 3) Components 10% 4) Sub Components 5% 5) Raw Material 0%	1) CBU rate maintained at 20% to provide protection against imports. 2) CNG category buses supplemented with LPG/LNG/HEV to conserve environment and non-availability of vehicles. 3) Duty rates of components and sub components rationalized (1%) to eliminate mis-declaration. 4) Due to overall Government Policy 0% tariff slab replaced by 1%.
Rationale for tariff structure: HCVs (Rigid Trucks- Above 5 Tons GVW)	1) CBU (above 2 axels) 30% 2) CBU (2 axels) 30% 3) Components 10% 4) Sub Components 5% 5) Raw Material 0%	1) New description of HCVs (Rigid Trucks- Above 5 Tons GVW) 2) Two different duty rates have been applied, to promote assembly of trucks above 2 axels CBU rates are lowered to 20% 3) To discourage import of trucks below two axels the CBU duty was maintained at 30%. 4) Duty rates of components and sub components rationalized (10%) to eliminate mis-declaration. 5) Due to overall Government Policy 0% tariff slab replaced by 1%.
Rationale for tariff structure: Trailers	1) CBU 15% 2) CKD Non localized 5% 3) CKD localized 35%	1) Old duty structure has been maintained.
Entry Threshold for New Investment for Market Expansion	1) Productive Asset Investment Incentive ➢ For encouraging the production of high value-added components not already localized but which the industry planning to develop locally. ➢ The main structure was to generate customs duty credits in proportion to the value of productive assets installed. ➢ The credit can be used to offset duty on eligible imports of other inputs. ➢ Problem was to determine exact ratio for the calculation of customs duty credits. ➢ Ministry of Industries and Production (MOIP) and Federal Board of Revenue (FBR) were directed to jointly determine the exact details for this system. ➢ ECC and FBR dropped it before it	➢ Investment can be made in following forms 1) CBU(trading activity) 2) SKD (no longer in vogue) 3) Assembly through substantial imported/local components (CKD operation) apply to new investors 4) Assembly through substantial indigenized components (adds more value) ➢ Previously incentives were offered to new entrants but with many qualification that is why it attracted little investments. ➢ Import of 100% CKD was allowed at leviable customs duty on non-localized parts for 3 years which was very high. ➢ Strict conditions were attached to the policy that investor must have a global presence with sales of half a million.

Area	AIDP 2007-12	ADP-2016-21
	2) Technology Acquisition Support Scheme ➢ To improve performance and bring in new technology. ➢ Physical productive assets were excluded as they are covered in PAII. ➢ Procurement of technologies through licensing and patents or manufacturing rights. ➢ 50% matching grant to be provided by Government Budgetary support had to be provided by MOST but no head was created by Ministry Of Finance. 3) Auto Cluster Development ➢ To bring together the fragmented auto parts manufacturers (KHI-LHR) ➢ For mutual support, learning and operate more efficiently as a linked chain, supplying to each other and jointly to the car manufacturers. ➢ Clusters were formed in Qasim, Karachi and Rachna Industrial Estate in Lahore 4) Auto Industry Investment Policy ➢ To attract new entrants, Original Equipment Manufacturers ➢ Those were already well established globally. ➢ Offered them allowance to import 100 per cent CKD kits, at the applicable customs duty, for a period of three years.	along with extended period of 5 years and it has lowered the entry threshold.
New Investment policy	**Productive Asset Investment Incentive (PAII)** was targeted towards encouraging the production of high value added components which were not already localized, but which the industry was planning to develop locally with following objectives ➢ To expand and modernize capacities in auto parts manufacturing. ➢ To encourage localization of auto parts for the local production of vehicles and for export. ➢ To encourage development of critical components and achieve competitiveness. ➢ To promote interdependence between assemblers and auto parts manufacturers. **Technology Acquisition Support Fund (TASF)** Like the PAII, the TASF also aimed to provide investment support to improve the performance of existing auto parts and to introduce new technologies. Physical productive assets were not included in this scheme (as they were already covered under the PAII). Instead, the focus was on the procurement of technologies through licensing and patents or manufacturing rights.	➢ Separate treatment and greater incentives in the early years for new entrants to introduce its brand, develop market niche create distribution and after sales service networks and develop a part manufacturing base. **Investment categories (A&B)** A) Greenfield Investment ➢ For installation of new and independent assembly and manufacturing plants for production of vehicles not already being assembled in Pakistan. B) Brownfield Investment ➢ For revival of existing assembly non-operational on or before July 01-2013 **Incentives of Category A** ➢ Duty free import of plant and machinery on one time basis ➢ Import of 100 vehicles CBU at 50% of the prevailing rate, for test marketing. ➢ Concessional rates of 10 % for non-localized and 25% on localized parts for 5 years for cars and LCVs. ➢ For manufacturing of trucks, buses & prime movers, import of all parts. ➢ On non-localized parts prevailing customs duty rates apply for 3 years. ➢ No changes in existing motorcycle industry policy.

Area	AIDP 2007-12	ADP-2016-21
	Auto Industry Investment Program The policy targeted potential new entrants in the vehicle assembly/manufacturing sector. It was intended for Original Equipment Manufacturers that were already well established globally, and offered them allowance to import 100 per cent CKD kits, at the applicable customs duty, for a period of three years.	**Incentives of Category B** ➢ 10 %Customs duty for import of non-localized parts and 25% for import of localized parts for manufacturing of cars and LCVs for 3 years. ➢ For manufacturing of trucks, buses & prime movers, import of all parts. On non-localized parts prevailing customs duty rates apply for 3 years.
		Eligibility Criteria ➢ Board of investment as single point of contact. ➢ New investor will submit 1) Detailed Business Plan 2) Relevant documents for manufacturing of vehicles. ➢ EDB will assess the business plan, verify the investor's in-house manufacturing facilities. ➢ EDB will determine the eligibility of investor under Category A or B. ➢ Ministry of industries and production will approve a new investor on recommendation of EDB. ➢ New Investors policy will be reviewed by AIDC for any modification.
		Withdrawal of incentive ➢ In case of deviation from approved commercial operation schedule the incentives shall be withdrawn. ➢ Suitable action shall be initiated by EDB after verification.
Import Policy for used Vehicles	The implementation of import policy order (2012-15) was made complicated due to several import schemes and frequent changes in parameters of those schemes.	➢ Import of all types of vehicle shall be regulated by the following used vehicle import policy. Used vehicles can only be imported into Pakistan under following schemes: 1) Personal baggage scheme 2) Transfer of residence scheme 3) Gift scheme ➢ Age limit continue to be 3 years for cars ➢ Age limit continue to be 5 years for buses, vans, trucks, pickups, SUVs ➢ Special purpose vehicles (Prime Movers, Concrete Mixers, Dumpers, others including water sprinklers not older than 5 years shall be maintained Along with following conditions. ➢ Import duty schedule for all types of vehicles in USD terms will be issued by FBR on 30th June every year. ➢ No relaxation in age and applicable duties. ➢ SOPs will be defined by Ministry of Commerce to prevent misuse of facility. ➢ Brand New CBU can be imported by individuals other than expatriate Pakistanis on payment of prescribed import duty.
Consumer Welfare	➢ Consumer welfare issues have been previously ignored. ➢ Vehicles assembled/manufactured in Pakistan were deemed to be high priced and lower in quality standards.	Following measure were adopted by ADP to address previous issues: ➢ 50% of the total price shall be made as advance payment.

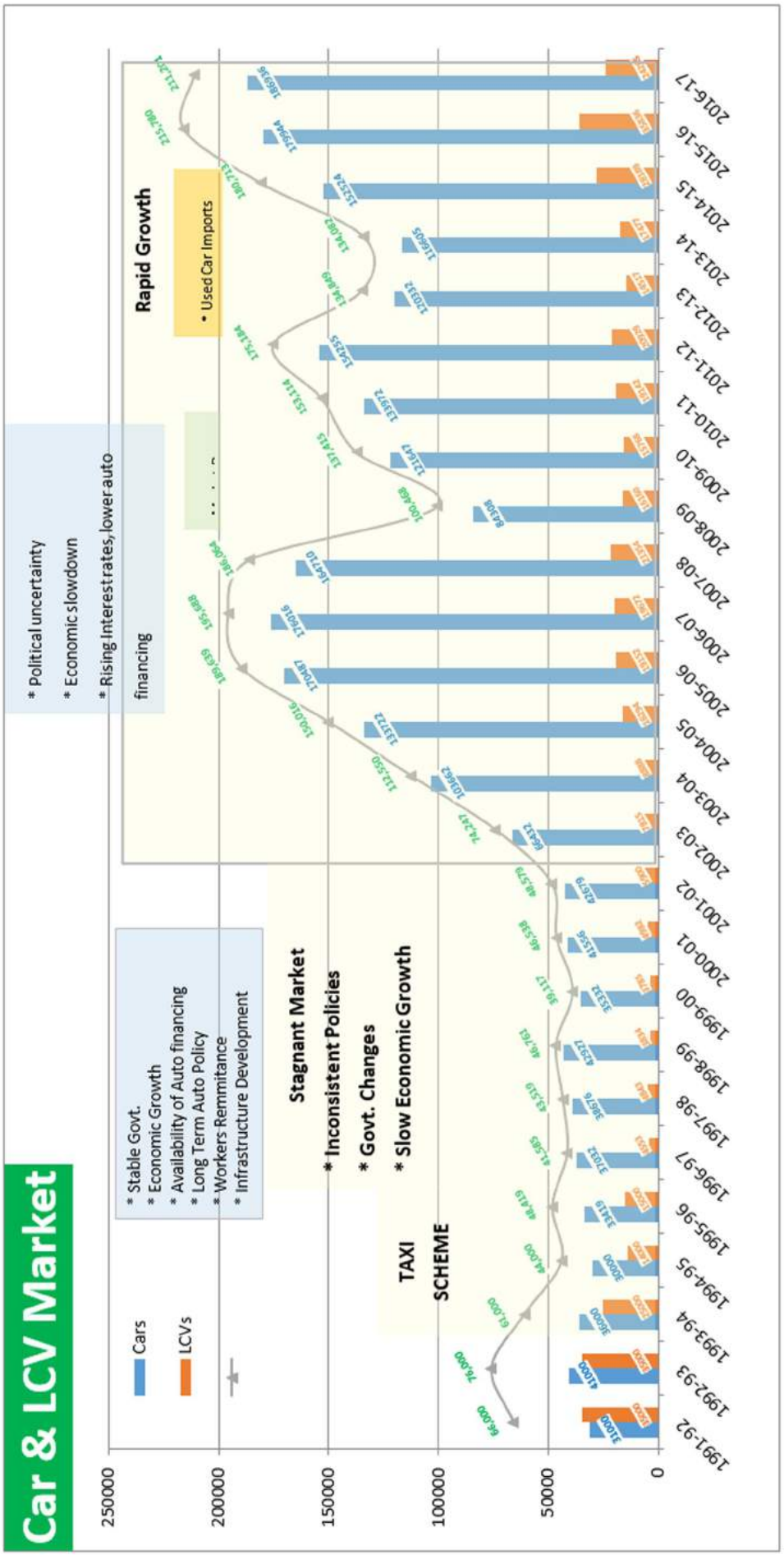
Area	AIDP 2007-12	ADP-2016-21
	➢ Customers had to pay full amount including duties and taxes at the time of booking the car and delivery was made after many months. ➢ In case of change in price before delivery customers were made to pay the price as of the date of delivery. ➢ There was no feedback system in place to take note of customers complaints	➢ At the time of booking delivery time of 2 months will be fixed and in case of any delay discount shall be given at the KIBOR + 2% of the date of delivery. This will shorten the delivery lead time. ➢ Safety regulation will be developed and enforced. ➢ OEMs should install immobilizers in cars. ➢ According to global practice, product recall system will be implemented.
Regulatory Mechanism for Quality, Safety and Environmental Standards	➢ Two regulations, Motor vehicle rules 1969 for safety and EPA's Euro II emission requirements, ➢ They were not according to global requirements. ➢ For safety, environmental protection and sustainable motorization growth in Pakistan, review was needed.	➢ The following two options could have addressed the previous issue. (Being more feasible second was adopted) ➢ 1) Provinces may amend the Motor Vehicle rules 1969 according to global practices but it will require extensive and duplicated efforts for studying global practices, modification of existing rules, coordination and development of procedures and standards. ➢ 2) Participation in UN/ECE WP.29 and step wise adoption of its technical regulations. ▪ To adopt and implement appropriate UNRs step by step and government certification system will be implemented. ▪ Participate in WP.29's IWVTA (International Whole Vehicle Type Approval) scheme and adoption of its Global Technical Regulations being selected mostly for UNRs.
		➢ To ensure safety and environmental protection different countries adopt and implement regulations so to import or make conforming vehicles. ➢ WP. 29 is working to harmonize the vehicle certification regulations of the member countries to alleviate the difficult testing process for the vehicles imported from member countries. ➢ ADP puts pressure for development and implementation of national regulation in accordance with UNRs. ➢ For newly built and imported road vehicles Government shall initiate certification (type approval) to certify their conformance and allow them to be sold without testing. ➢ To help developing overseas market, Government certification will be needed to use IWVTA scheme.
		➢ For development UNRs based national regulations, Pakistan's own regulations and industrial standards will only be

Area	AIDP 2007-12	ADP-2016-21
		modified according to specific conditions and needs. ➢ On the basis of test reports of qualified organization or labs abroad, member countries are allowed to certify vehicles. So Pakistan can implement vehicle certification system without huge cost and resources.
Action plan	**Auto Cluster Development** It was envisioned that as the assemblers of vehicles are mostly located in and around Karachi and Lahore. The car and HCV assembly is mostly based in Karachi while the 2-Wheelers/ 3- Wheelers and agricultural tractors are located in Lahore. The same is the case with the vendors of such vehicles except that many vendors of car/ LCV are based in Lahore as well. The vehicle assemblers play a pivotal role in development of vendors through knowledge transfer, supply chain management, products and processes development.	➢ Pakistan to take membership in WP. 29 initially as an observer then gradually develop regulations based on UNRs with aim of becoming the party to IWVTA. ➢ EDB to take lead role in developing and enforcing the regulations through concerned Ministries/ Provincial Governments. ➢ Motor vehicle Ordinance 1965, Motor Vehicle Rules 1969 and National highway safety ordinance 2000 shall be reviewed. ➢ Representatives of related Government Bodies, Auto industry and academia shall form a committee. ➢ The committee will discuss and recommend of the following; 1) Review and selection of UNRs to be adopted as Pakistan regulation. 2) Priority of the regulations to be enforced. 3) Deliberation on related administrative mechanisms e.g. Vehicle certification/examination system Accreditation of testing facilities P-NCAP (Pakistan new car assessment program) for confirmation and monitoring. Mandatory periodic vehicle inspections Application of Regulations to vehicles in use Recall/Product liability 4) Road map for development and implementation of the regulations. ➢ The implementation schedule shall clearly set out for each regulation with consent of stake holders so the vehicle manufacturers can be prepared for new requirements and make long term plans.
Out Line of WP29 of UN/ECE	N/A	➢ Any country member of United Nations may participate fully or in consultative capacity in the activities of WP.29 and become contracting party to the Agreements administered by WP.29 ➢ Major objectives of WP.29 are harmonization of global vehicle regulations and mutual recognition of vehicle certification to make the international trade procedures smooth.

Area	AIDP 2007-12	ADP-2016-21
Establishment of Support Institutes	Establishment of: • Auto Industry Skill Development Company (AISDC) to steer the initiative on HRD on sustainable basis, setting up of AISDC was envisaged. Also for overall management of o Automotive Testing & Training Centre Ltd (AT&TC), Karachi o Pak German Auto Training & Testing Institute, Lahore (Spinning Machinery Corporation) • Automotive Centers of Excellence	➢ To meet the quality and safety requirements, manufacturers in Pakistan have to test their products from raw material to finished products. ➢ Pakistan does not have internationally recognized automotive institute and testing facilities. ➢ AT&TC Automotive testing and Training Centre is inactive due to lack of high level of technology and skills required to run its operations. ➢ Planning, implementation of activities relating to the development of automobile industry, research, education and technical guidance relating to quality improvements, safety inspection and environment preservation along with the development of database will be achieved through merger of Pakistan Automotive Institute (PAI) and AT&TC, as a subsidiary of Pakistan Industrial Development Corporation. ➢ Interventions by stakeholders and donors will create the source of funding.
Other Interventions		Truck Financing by Commercial Banks; ➢ To help industry to improve its production capacity and to facilitate the individual HCV buyers. ➢ ADP envisage to extend consumer financing to individual customers for commercial vehicles. Incentivize Fleet operations; ➢ Due to mega projects like CPEC and Lahore-Karachi Motorway, ADP envisage to corporatize the trucking sector by providing incentive to fleet operation schemes through allocation of dedicated funding by SBP/IFIs with reduced interest rates. ➢ It will enhance the volumes of the industry and enable it to absorb fixed cost to reduce overall cost.
Auto Industry Development Committee (AIDC)	➢ Auto Industry Development Committee (AIDC) as forum for government-industry dialogue. ➢ Encourage private-public partnerships ➢ Deliberate on quality and standards, identify opportunities for trade and provide advice on WTO commitments, investment, trade policy etc. ➢ Two Centers of Excellence in Karachi and Lahore which were not formed. Policy was meant to be updated in 2012 ➢ Used car imports would not be used as a policy instrument.	➢ Under EDB, AIDC shall continue to play its advisory role. ➢ For the implementation of policies of ADP, EDB shall request AIDC to give suggestions/advices on technical issues whenever required. ➢ The final decision shall be with EDB/Ministry of industries and production. ➢ AIDC will keep effective communication with the industry and encourage PPP for sustainable development of auto sector.

Area	AIDP 2007-12	ADP-2016-21
	➢ Industry was operating in an outdated and unstable policy environment. ➢ No subsequent ownership and implementation of AIDP 2007-12 was that it was followed by a change in government, and there was no subsequent ownership and implementation. ➢ Benazir Bhutto's assassination and the global financial crisis also transpired that year, both contributing to an unstable business environment.	Major function of AIDC shall be; ➢ AIDC will have regular deliberations on safety, quality, standards, safety, consumer protection and regularity frame work of the Government to encourage enhancement of safety and environment performance of locally made parts and vehicles. ➢ AIDC shall continuously analyze the emerging global trends and do out of box thinking to identify opportunities for local auto industry and define its direction of growth development and competitiveness. ➢ AIDC shall make recommendations to the government on the issues relating to fiscal policy, investment opportunities, exports development, trade policy initiatives, FTAs and other regulatory and administrative matters which may affect directly or indirectly the growth and sustainable development of auto industry. ➢ AIDC shall provide vision for the development of the auto sector and will continue reviewing the progress, effectiveness of incentive regime and to recommend corrections and improvements in the ADP where ever necessary. ➢ AIDC shall also promote industry-university linkages and create awareness within the academia about needs of the industry. ➢ The consensus on the issues deliberated in AIDC will be on basis of views of majority of participating members in the meeting. ➢ The chair shall have a casting vote. ➢ However, the final decision shall be with EDB/Ministry of industries and production keeping the national interest in view. ➢ The committee shall through consensus appoint sub-committees for effective implementation of the ADP. ➢ Each sub-committee however, shall be headed by a member of AIDC. ➢ The TORs of such sub-committee shall be jointly developed by the AIDC at the time of their constitution. ➢ The chair may opt additional members depending upon need, expertise and skill of such members relevant to the agenda of the meeting or for some other issues and initiatives as deemed necessary. ➢ Composition of AIDC will change after every two years. ➢ The committee shall meet at least once in a quarter or as convened by the chair.

Impact of Policies on Auto Sector of Pakistan



Source: Engineering Development board

Bibliography

1. Bari, F., et al. (2016). "Draft 0Report."
2. Hiraoka, L. S. (2001). Global alliances in the motor vehicle industry, Greenwood.
3. Maynard, M. (2017). "Issue: Global Manufacturing Global Manufacturing."
4. Mohr, D., et al. (2013). "The road to 2020 and beyond: What's driving the global automotive industry." McKinsey&-Company (Pub.), Automotive & Assembly–Latest thinking, available online at http://www. mckinsey.com/~/media/McKinsey/dotcom/client_service/Automotive%20and%0Assembly/PDFs/McK_ The_road_to _2020_and_beyond. ashx, accessed 28(3): 2014.
5. Pasha, H. and Z. Ismail (2012). "Automotive Sector in Pakistan Phase I Report."
6. Qadir, U. (2016). Industrial Policy under Clientelist Political Settlements in Pakistan, Pakistan Institute of Development Economics.
7. Pakistan Association of Automotive Parts & Accessories Manufacturers (PAAPAM)
8. (2016) PC-1 Cluster Development Initiative.
9. (Cluster development for pro-poor growth: the UNIDO approach)
10. (AlixPartners 2017)
11. Competitive Analysis of Auto Sector in Pakistan and China (Jafaray 2016)
12. The Automotive Parts Sector in Pakistan- Export performance and potential — Implications of the WTO Agreements
13. Economic Survey of Pakistan 2016-17
14. Punjab Bureau of Statistics
15. Directorate of Industries, Punjab
16. Technical Education & Vocational Training Authority, Punjab
17. Punjab Vocational Training Council
18. Punjab Skills Development Fund
19. UN Comtrade Database
20. Trade Map-International Trade Center
21. Engineering Development Board
22. Pakistan Automotive Manufacturers Association (PAMA)
23. Association of Pakistan Motorcycle Assemblers-APMA
24. Directory of Industrial Establishments in Punjab
25. http://www.ispiritsolutions.com/blog-global-automotive-industry-trends-forecasts/
26. International Organization of Motor Vehicle Manufacturers
27. Cluster Diagnostic Study Auto Parts Cluster Lahore - 2006
28. Pakistan Plastics Manufacturers Association-PPMA
29. Pakistan Foundry Association-PFA
30. https://www.businessdirectory.pk
31. http://www.incrementalinnovation.com/innovation-management-development/rd-to-innovation
32. State Bank of Pakistan
33. Pakistan Industrial Technical Assistance Center-PITAC
34. Pakistan Standards & Quality Control Authority-PSQCA
35. Pakistan Council of Scientific & Industrial Research-PCSIR
36. Punjab Vocational Training Council-PVTC
37. National Productivity Organization-NPO
38. Size and Growth of Economy of Lahore prepared by Lahore Chamber of Commerce & Industry-LCCI
39. Trade Development Authority of Pakistan-TDAP
40. University of Engineering & Technology, Lahore-UET
41. University of Management Technology-UMT
42. Gujranwala Tools, Dies and Molds Centre-GTDMC
43. Small & Medium Enterprises Development Authority-SMEDA
44. Technical Education & Vocational Training Authority-TEVTA
45. https://tradingeconomics.com/pakistan/labor-force-total-wb-data.html
46. https://www.pakistantoday.com.pk/2017/03/23/pakistan-ranked-147th-on-human-development-index- un-report/
47. https://tribune.com.pk/story/1450757/pakistan-among-least-innovative-countries-world-survey/
48. https://www.pakistantoday.com.pk/2017/08/25/pakistans-population-soars-to-207m-with-2-4-growth/
49. https://www.pakistantoday.com.pk/2017/08/25/pakistans-population-soars-to-207m-with-2-4-growth/
50. United Nations Development Program
51. http://www.theglobaleconomy.com/Pakistan/GII_Index
52. http://www.un.org/sustainabledevelopment/blog/2016/05/unep-report-cost-of-adapting-to-climate-change-could-hit-500b-per-year-by-2050/
53. https://www.globalinnovationindex.org/analysis-indicator
54. Ahmed, M. (2013, October 11). Pakistan badly needs small locally assembled cars. Retrieved from Driven Blog: http://www.driven.pk/blog/pakistan-badly-needs-small-locally-assembled-cars
55. Auto Mark. (2015, August). Auto Industry Policy 2005-6 to 2015-16 (One decade no change). Retrieved from APMA: http://www.motorcycleexport.com/str2/?p=562
56. Auto Industry Development Program (AIDP) 2007-12
57. Automotive Development Policy-ADP (2016-21)
58. Layton, C. and J. Rustandie (2007). Automotive component value chain overview: market justification and marketing strategies for the domestic component upgrading, Jakarta, USAID-SENADA.
59. Competitiveness Support Fund (2007). Policy Analysis on the Competitive Advantage of the
60. Motorcycle Industry in Pakistan: Problems and Prospects. Competition Commission of Pakistan and the United States Agency for International Development, Islamabad
61. Niazi, Javeria and Maham Mustafa Bhatty (2011). Study on Regional Value Chain: Case Study for the Automobile Sector. Institute of Public Policy, Beaconhouse National University; Lahore, Pakistan.
62. Board of Investment, Government of Pakistan. (2013). FOREIGN DIRECT INVESTMENT (FDI) Strategy 2013-17.
63. Competition Commission of Pakistan. (2013). Competition Impact Assessment Report of the Automobile Industry of Pakistan. Islamabad: Competition Commission of Pakistan.