

# THE EXPANSION OF THREE-WHEELER TRANSPORT SERVICES: THE CASE OF QINGQIS IN PAKISTAN

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## ABSTRACT

Since the 1950s, there has been steady growth three-wheeler transport services in Africa, Asia and Latin America. This trend has accelerated in the past two decades, following rapid increases in the production of affordable motorcycles and three-wheelers in Asian countries.

In many Asian cities and some rural areas, three-wheelers complement other, more conventional, forms of public transport such as taxis, minibuses and buses. In Pakistan, Qingqi is a generic term (proprietary eponym) for a motorcycle-based three-wheeler, used for urban or rural public transport services. Qingqis usually have three forward-facing and three rear-facing passenger seats. Initially, imported from China, they are now manufactured in Pakistan, with about 70,000 made each year. They provide widespread but controversial transport services in many large cities and rural areas. Their rapid growth demonstrates their popularity with users. Many under-privileged young men benefit from employment opportunities. Due to over-crowded buses, women often prefer Qingqis (despite unwelcome visibility on rear-facing seats).

Regulation is a key issue. Qingqis are frequently disparaged in the media which demands modern, quality transport services. Qingqis are often not considered authorised vehicles; they are banned from some routes and locations. Many operators are poor, under-age, risk-taking youths with little training. They work long hours and maximise incomes by overloading, stopping anywhere and congregating around markets and terminals. They seldom conform with regulatory, fiscal and operational requirements for public transport operators, and may be targets for police officers extorting '*bhatta*' payments. Qingqi transport associations may self-regulate for route allocation and regulatory compliance.

Disorderly behaviours of some Qingqis drivers raise safety concerns. Lack of safety protection leads to poor outcomes for passengers involved in collisions. Urban congestion is an issue (although other vehicles may be as culpable). Pollution from Qingqi petrol engines is a concern, but low-occupancy cars and elderly buses may be more damaging.

On-going research, funded by UKAid, is examining technological, economic, social, environmental and safety aspects of Qingqi operations. Their advantages and disadvantages are being identified from the different perspectives of the regulators, owners, operators and the diverse users (disaggregated for gender, age, disabilities, trip-purpose, etc). The research is providing evidence-based understanding of the current role of Qingqis, in order to identify appropriate policies and strategies for Qingqis (or suggested alternative means of public transport) that will be acceptable to, and affordable by, the key stakeholders.

# 1. INTRODUCTION: GROWTH OF THREE-WHEELER TRANSPORT SERVICES

## 1.1. Development of motorcycles and three-wheelers in industrialised countries

The first motorised three-wheeler, the Butler Petrol Cycle, is reported to have been designed in England in 1884, although this never went into mass production [1]. Early prototype motorcycles powered by steam or by petrol were also created around the same time in France, Germany and USA. The first mass-production of motorcycles was started at the Hildebrand and Wolfmüller factory in Germany in 1894. Within a decade of this, many of the famous old motorcycle brands, including Triumph, Royal Enfield, Norton, Indian and Harley-Davidson were being mass-produced in England and USA [2].

During the first half of the twentieth century, numbers of motorcycles increased steadily, with production dominated by manufacturers in Europe and the United States. A wide range of three-wheeler vehicles were produced, but in much smaller numbers. Designs included motorcycles with side-cars, vehicles with two front wheels and one rear wheel, and others with one front wheel and two rear wheels. Motorcycles with sidecars were considered robust and have been used by the military, including as military ambulances, since the First World War. Many three-wheelers were used for urban freight movements or for personal (and family) mobility. They were not generally considered as public transport vehicles.

## 1.2. Growth of motorcycles and three-wheelers in low-income countries

During the second half of the twentieth century, there was a gradual shift of geographic focus (southwards and eastwards) in the manufacture and use of motorcycles and three-wheelers. Large-scale production declined in Europe and USA, and expanded in Japan, India and China. This trend is continuing, although Japanese designs are increasingly made outside Japan, through collaborative ventures in China, India, Vietnam, Indonesia and other countries.

The cost of motorcycles and three-wheelers declined relative to people's incomes, and the numbers in use has increased rapidly, particularly in the past thirty years. For example, in many African countries, such as Tanzania, the motorcycles available to buy in the 1980s were Japanese, at a cost of more than USD 2000. Now, Chinese and Indian motorcycles are available for about USD 600, making them much more affordable [3]. Motorcycle numbers have risen both in numbers and as a proportion of the national fleet in very many countries in Asia, Africa and Latin America. For example, in Tanzania, motorcycles comprised about 2% of the national fleet in 2000 but by 2015, they had jumped to 57% of motor vehicles [2]. In India, there are now about 150 million motorcycles, representing about 80% of the motorised vehicles on the roads. In certain countries, including India and Nepal, motorcycles are mainly used for personal transport. However, in many countries, motorcycles are also very important as transport services. Indeed, their rapid growth in sub-Saharan Africa since the beginning of the twenty-first century has largely been fuelled by the expansion of motorcycle taxis services, that allow purchase costs to be paid for from the income gained by motorcycle taxi fares [3].

The use of three-wheelers for transport services started to take off around 1950, when the Indian Bajaj company started to sell three-wheelers using Italian Piaggio scooter components ('scooter' three-wheelers had been used in Italy as low-cost freight vehicles). The Bajaj scooter-based three-wheeler had one rear seat to take 2/3 people and started to be used widely as a low-cost, point-to-point urban taxi. They began to replace the bicycle rickshaws and became known as 'auto-rickshaws'. Bajaj also adapted the German Tempo freight three-wheeler to become a higher capacity vehicle with two rear seats that could

carry six passengers, which was more appropriate for route-based transport services operations. Bajaj soon became the largest manufacture of three-wheelers in the world. By 2018, India was making over one-million three-wheelers a year, of which about one third were exported, including to many African countries [4, 5]. In many Asian countries, three wheelers started to be used as urban transport services, using Bajaj designs, local adaptations and/or local innovations. Examples of Bajaj-type three-wheelers are shown in Figure 1.



Figure 1 - Examples of 'Bajaj' type urban three-wheelers in Nepal, Tanzania and Liberia

### 1.3. Diversity of designs and powers sources for three-wheelers

In the Philippines, some side-car-based passenger three-wheelers were developed, following the widespread use of bicycle-based three-wheel taxis. Similarly, some side-car-based three-wheeler transport services were initiated in Timor Leste (see Figure 2).



Figure 2 - Examples of side-car public transport three-wheelers in the Philippines and Timor Leste

Several innovative attempts were made to make three-wheelers using motorcycle components. By the 1980s, motorcycle-based flat-bed freight trucks started to be manufactured on a large scale in China, with exports to other Asian countries. This led to a wide variety of derivative designs, using mainly Chinese motorcycle components and rear axles. Examples of local body designs from Lao PDR and Myanmar [6] can be seen in Figure 3.





Figure 3 – Motorcycle-based three-wheelers in Lao PDR, China and Myanmar'

In recent years, China has been promoting the use of electric powered motorcycles, although electric three-wheelers have not spread widely in China, as three-wheelers are not generally permitted as transport services vehicles there. Nevertheless, batteries and electric motors are being exported from China for use in electric three-wheelers. Bangladesh already has large numbers of 'Tom-tom' battery-powered passenger three-wheelers, and smaller numbers are being used in Nepal (see Figure 4). Equivalent vehicles are likely to spread in other countries if such vehicles are seen to have comparative advantages and/or governments intervene through subsidies or prohibition of fossil-fuel three-wheelers.



Figure 4 - Examples of electric three-wheelers in Bangladesh, Nepal, China and India

In many low-income cities in Asia and Africa, scooter-based 'auto-rickshaws' or 'Bajajs' provide low-cost taxi services, that tend to be popular with users, but may antagonise car-owners who may see them as badly-behaved and the cause of urban congestion. Some countries have banned them as transport services (eg, China [7] and Ghana [8]), and many countries have limited their operations, prohibiting them from particular roads or areas. Some cities, including Kathmandu and Monrovia have route-based three-wheelers, usually using higher-capacity motorcycle-based vehicles, sometimes with sideward-facing bench seats (see Figure 5).



Figure 5 – Route-based three-wheeler public transport in Nepal, Ethiopia and Myanmar

The use of three-wheeler transport services in rural areas is less common, but is spreading in many countries, including Bangladesh, Ethiopia, Ghana (although currently banned), Myanmar, Nepal and Pakistan (see Figure 6). Rural three-wheeler services tend to use motorcycle-based designs, that are able to carry larger loads and cope with rougher roads. although scooter-based three wheelers operate on rural roads in Ethiopia and Nepal [9].



Figure 6 – Examples of rural three-wheelers in Nepal, Bangladesh and Ethiopia (two types)

Three-wheeler public transport is now well established in urban and rural areas in numerous countries in the global south. Three-wheelers are used as point-to-point low-cost taxis or route-based public transport services in Africa, Asia, Latin America (see Figure 7), the Caribbean and the Pacific. They may be powered by petrol (most common), diesel (declining), compressed gas or batteries (increasing).



Figure 7 - Examples of three-wheelers in Colombia (two types), Nicaragua and El Salvador

#### 1.4. Three wheelers in Pakistan

During the 1960s, 'Bajaj' scooter-based three-wheelers increased in numbers in Karachi and other large cities in Pakistan. They were used as a faster and more 'modern' means of point-to-point transport than the widely-used bicycle rickshaws. Motorcycle-based three-wheelers were imported into Pakistan from China by the Jinan Qingqi Motorcycle Company. Plum Qingqi was established in Pakistan to produce three-wheelers from a factory in Lahore, in Punjab Province. The three-wheelers used Chinese motorcycle components and locally-manufactured superstructures. The bodies had three forward-facing seats behind the driver, and three rear-facing seats behind these. These 6-seater vehicles started to replace the 6-seater, horse-drawn 'tangas' used in the Punjab at this time [10].

These motorcycle-based three-wheelers had 'Qingqi' painted on the side, to identify the brand and soon the three-wheelers became known in Pakistan as 'Qingqis'. Qingqi is now a commonly-used generic term ('proprietary eponym') for a motorcycle-based three-wheeler. It may also be used in relation to autorickshaws, particularly as Plum Qingqi also manufactures small-wheeled auto-rickshaws that also bear the Qingqi brand name. The success of three-wheelers led to several formal-sector manufacturers entering the market. The manufacture of three-wheelers in Pakistan was estimated to have doubled between 2008 and 2014, and in 2015 annual production was estimated to be about 70,000 (Qingqis and auto-rickshaws) from 12 major companies [11]. The informal manufacturing sector is also very important in Pakistan, and artisanal 'Qingqis' started to be produced in small workshops from motorcycle components, new or recycled axles and locally-made bodies. So, the 'Qingqis' now seen in rural and urban areas may be of authorised designs manufactured by Plum Qingqi or from a variety of formal or informal workshops. Examples of the various designs are shown in Figure 8.





Figure 8 - Examples of Qingqi three-wheelers in Punjab Province, Pakistan

The Plum Qingqi factory initially sold Qingqis with 70 cc or 100 cc motorcycle engines, but now 150 cc or 200 cc engines are more common in Qingqis. This has allowed some workshops to build nine-seater models to allow more passengers to be carried [12]. In addition to the typical six-seater model there are freight versions without fixed passenger seats. There are also some new four-seat versions, manufactured in response to a Supreme Court Judgement on Qingqi specifications [13].

It is difficult to know the precise number of three-wheelers in Pakistan as the national statistics do not make clear distinctions between motorcycles and three-wheelers. Some three wheelers are formally registered as motorcycles (which attracts a lower tax). Many of the Qingqis made in small workshops, may never be registered officially. The growth of motorcycles and three-wheelers, and also the lack of one clear three-wheeler category, is shown in Table 1.

Table 1 – Official statistics [14] of registered motorcycles and three-wheelers in Pakistan (2004-14)

Year	“Motor Cycles 2 wheels”	“Motor Cycles/ Motor Rickshaws”	“Others 3 Wheels”	Total
2004	2,609,442	138,153	848,688	3,596,283
2014	10,341,326	429,319	1,376,369	12,147,014
Increase (%)	296	211	62	238

## 2. QINGQIS IN URBAN AREAS OF PAKISTAN

### 2.1. Technologies, operators and methods of operation

The formal-sector manufacturers use modern design and testing systems and endeavour to conform to official standards and regulations, when these are clearly established. The leading manufacturers of the Qingqis claims that its engines and frame designs have been developed by highly skilled technicians who build a number of complete prototype models for rider testing in advance of any manufacturing run. All the advantages and efficiencies of modern high technology design and production are said to have been fully incorporated, together with feedback from riders [15]. The informal sector workshops use artisanal skills and innovations, and modify their designs in respond to market demand and customer feedback.

This has led to various confusing situations. In 2005, the government banned two-stroke three-wheelers from major cities of Punjab. The scooter-type auto-rickshaws were modified to run on compressed natural gas (CNG). In response, local workshops modified the bodies of two-stroke Qingqis to look more like CNG auto-rickshaws, so that operators were less likely to be harassed by police. Such innovations illustrate the expertise of small-scale

workshops in meeting the wishes of the operators, even if these do not conform to the prevailing standards and regulations [16].

Clearly the Qingqis have been a successful means of urban and rural public transport in Pakistan. They provide much employment, they have many users and they generally complement other, more conventional, forms of transport such as taxis, minibuses and buses. However, they also have detractors, who complain about the disorderly behaviour of some operators, the tendency to overload (a characteristic shared by many other transport services in Pakistan), the poor health and safety outcome if they are involved in collisions and their contribution to urban congestion. Their image may appear more modern than the cycle rickshaws and horse-drawn *tangas* they have replaced, but some people consider that modern public transport systems should not be based on intermediate means of transport.

In general, their low fares, easy availability and their flexibility in carrying people and goods to their desired destinations has made Qingqis popular with their users. The press reported that their numbers have multiplied everywhere in Pakistan in 2010-2011, so that they had become easily available in the urban areas, particularly where other forms of transport (buses) did not provide frequent services [17]. However, the Lahore Transport Company (LTC) claimed that it lost its profitable bus routes due to saturation of Qingqis. New bus operators appeared unwilling to take over their routes due to this issue. Similar situations were said to exist in other urban areas. It was proposed that in all such situations Qingqis could run under an effective and appropriate organizational and management structure ('Qingqi Transport system') that would address all the operational and safety issues [16].

## 2.2. Safety issues and concerns

Qingqi three-wheelers are intrinsically less stable than four-wheel vehicles, and can roll over if they go fast on sharp curves or turn while braking hard. Unlike modern cars, there is no 'crumple zone' to absorb impacts. While their open sides make access easy, the driver and passengers are directly exposed to dust and fumes (as are bicycles, motorcycles and bicycle rickshaws). It is reported that many operators are children below eighteen years' age and are driving illegally [18, 19]. Qingqis are frequently overloaded, particularly in those urban and peri-urban areas where no other public transport modes are available [16]. Whether the behaviour of Qingqi drivers is significantly worse than other road users is a matter of conjecture: certainly, many examples can be observed of opportunistic and selfish actions of Qingqi drivers. However, similar lack of consideration can also be seen in the much larger numbers of motorcyclists. Similarly, the behaviour of some drivers of trucks, buses and private cars is un-empathetic, but these larger vehicles are less manoeuvrable, so they cannot weave and change direction as easily as can motorcycles and three wheelers.

## 2.3. Environmental and congestion issues

Environmental pollution in urban areas in Pakistan is an increasing problem, and Qingqis contribute to this (although their numbers are small compared with motorcycles). Poor vehicle maintenance and lack of annual testing is likely to exacerbate noxious emissions. A study conducted in Lahore revealed that noise levels had exceeded the permissible limit of 85 dB(A) at many points in the city. The maximum average recorded noise level was 104 dB(A), and the ineffective silencers of many Qingqis was considered to have contributed to this [19].

In congested, slow-moving traffic, Qingqis are relatively efficient in their use of road space per passenger (and much more efficient than low-occupancy cars). However, the behaviour of their drivers can contribute to congestion. Hassan and Raza [12], pointed out that Qingqis stop anywhere on the road, sometimes two abreast, thus impeding traffic flows, particularly

around shopping centres, markets and transport terminals. In the absence of proper terminals or 'taxi ranks' for Qingqis to park and wait, they make use of roads, roundabouts and pedestrian sidewalks, and contribute to congestion and poor traffic flows. Their small size and manoeuvrability, allows them to even drive against the legal direction of traffic that again contributes to congestion and poor road safety [12].

#### 2.4. Attitudes and perspectives of different stakeholders

A study in Karachi found that Qingqi users were supportive of the transport mode, which was convenient, comfortable and affordable, compared to minibuses. Qingqis made it easy to travel with friends, something that students felt was important. Users felt they should not be banned but should be regularised, perhaps with a special lane allocated to Qingqis. Qingqis have also encouraged women to travel. Females consider it a safer mode of transport as they do not have to mix with men, as they generally have to on buses and minibuses [12,20, 21]. Women often plan to travel together to share a Qingqi which is less intimidating than a bus, although they do not like the fact that they are more visible to the public on the back of Qingqis and may be the target of visual or verbal abuse. In any case, buses tend to be cheaper and many urban women are therefore forced to travel by bus for economic reasons [12]. A survey in Lahore found that most users of public transport were in favour Qingqi services in the city [19].

Qingqi operators combine to form associations or unions for mutual support, self-regulation and to promote their interests when authorities try to restrict their operations [22]. The unions often resent the total or partial bans that are imposed on their services from time to time. However, transport regulators, officials and police often consider them as unsafe, unreliable and undisciplined means of transport that increases traffic congestion, and so they should not be permitted in the main urban traffic corridors and they should not use roundabouts as parking places. Some people feel they should simply not be authorised in modern Pakistan, while others consider they do have a role in those areas not well served by other transport services [12].

#### 2.5. Regulatory framework

Several media reports and transport studies have emphasised on the need to regulate the informal Qingqi sector. Tahir et al. [16] suggested a combination of regulation and self-regulation, with agreements with Qingqi associations, on areas of service and routes from which they were banned. Hassan and Raza [12] suggested the need for studies to improve Qingqi design, safety and emissions, with the aim of developing appropriate standards.

In a Supreme Court Judgement in 2015 (Civil Petitions No.423-K & 472-K of 2015), mention was made of fitness certificates, operating licenses and a maximum of four passenger seats per vehicle [13]. How this judgement will lead to compliance and an enforced regulatory framework is still unclear [23, 24, 25]. The major Plum Qingqi manufacturer has recently produced modified designs to comply with the Supreme Court Specifications, including reduced seating, rear lights and a door on the back with a latch. It is not clear how such models will sell, and if so, whether other workshop will adjust them to the wishes of the operators. Qingqis made in smaller workshops are still being registered as motorcycles, apparently so they are not subject to the design and loading regulations intended for three-wheelers. Without a clear and enforced regulatory framework, small-scale manufacture and Qingqi operations continue as before, with some local enforcement, some police harassment and widespread unregulated use.



### 3. QINGQIS FOR RURAL TRANSPORT SERVICES IN PAKISTAN

#### 3.1. A research study on Qingqis as rural transport services in Punjab Province

All the Pakistan research studies cited in this paper, have focused on the role of Qingqis in urban areas. Cities are where Qingqis are concentrated, due to the large transport demand and are where issues such as congestion, pollution and crashes are most pronounced. There appears to be little, or no, research work on the role of Qingqis in meeting the travel needs and demands of rural areas of Pakistan. Therefore, the National Transport Research Centre (NTRC) requested the Research for Community Access Partnership (ReCAP) which is funded by UKAid to initiate a research project to investigate the use of Qingqis as a mode of public transport in Punjab Province. The research started in December 2018 and will finish in September 2019.

Punjab Province has about 110 million people and is heavily urbanised, with 17 of the 25 large cities in Pakistan, including the four most populous cities after Karachi (Lahore, Faisalabad, Rawalpindi and Gujranwala). However, 60% of the population live in rural areas. While all of Punjab Province is all part of the Indus basin hydrological system, there are geographical and developmental variations. There are hilly areas to the north and southwest, and arid areas to the south east. In general, the south of the province is poorer and less-developed than the north. People living in southern and western Punjab tend to be more dependent on agriculture due to lower levels of industrialization in those regions [25].

There are thirty-six districts in Punjab, and to ensure a range of socio-economic and physical conditions, initial appraisal studies have been undertaken in villages in one northern district (Jhelum), one central district (Kasur) and one southern district (Lodhran), as shown in Figure 9. The villages studied appeared relatively representative of their local rural areas. They were not on major highways and were not very close to large cities. They were connected by low-volume rural roads to nearby market towns which acted as transport hubs for the rural transport services. Within the villages were some privately-owned vehicles (mainly motorcycles), and several types of transport services were in use with different transport niches including Qingqis, pickups, minibuses and midi-buses (Coasters). The minibuses and midi-buses were mainly operating as medium distance commuter services to cities.

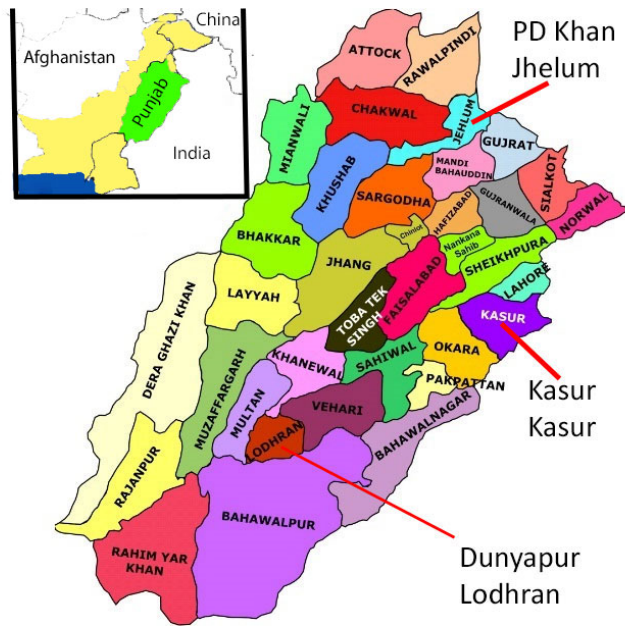


Figure 9 – Map of Punjab Province showing districts and research locations [27]

The following paragraphs summarise the initial findings from the first appraisal visits. The researchers will follow these up with more structured surveys, building upon rapid appraisal methodologies [28, 29] to gather both quantitative and qualitative data on the usage of Qingqis and alternative transport modes, and the costs, benefits and issues surrounding their operations.

### 3.2. Technologies, operators, methods of operation and safety issues

From the initial village surveys, it is clear that the Qingqi is widely used in rural areas of Punjab Province, with designs and operational systems adapted to the local context. There are both passenger and there are freight services (loader Qingqis), which may carry both passengers and freight. Some are owner-operated and many are leased on a daily (or weekly) basis from local businessmen. Most Qingqis operate on specific routes between the villages and nearby towns, and they may be chartered by individuals/groups or carry passengers 'on-demand', but usually waiting for a full load.

From discussions with operators, users and regulating officials, it appears that most Qingqis do not comply with current regulatory standards for three-wheelers and most are registered as motorcycles. Lack of regulatory compliance and enforcement is typical of rural transport services in many Asian countries [30]. While people talked about poor operator behaviour, including the tendency to overload, no one mentioned, or could recall, actual crashes involving Qingqis on the small rural roads. On these roads there is little traffic (so few interactions between vehicles) and travel speeds are slow. Therefore, the initial impression (to be researched in more depth) is that safety does not appear to be as much an issue as it is in towns and cities (numerous vehicle interactions per minute) or on main roads (fast traffic speeds).

### 3.3. Perspectives of the Qingqi operators

Initial interviews with operators of rural Qingqis in Punjab Province found that many operators are poor, under-age youths with little education or training. They work long hours and maximise incomes by overloading, stopping anywhere and congregating around

markets and terminals. On the routes on which they operate, there may be no alternative transport services, apart from medium-distance minibuses or midi-buses taking commuters to and from cities. However, they may have to compete among themselves for the small rural transport market, limiting their earnings. Operators also reported that while local police and officials do not enforce compliance of administrative requirements (insurance, licenses, etc.) or regulatory standards, they do require regular payments (*bhatta*) to allow for continued operations ('*bhatta*' payments are a form of corruption and cannot be considered as enforcement). There appeared to be no associations or unions linking the various rural Qingqi operators, to assist them or provide self-regulation. Some operators suggested there should be official transport terminals, with drinking water available for both passengers and themselves.

#### 3.4. Perspectives of the Qingqi users

In the initial visits, all the users interviewed appreciated the Qingqis in their villages. In most cases, it was their only option for day-to-day transport to and from the local town and for moving goods. Qingqis were able to operate along poor roads in difficult terrain and provided transport services to allow men, women and children to reach work, educational institutions, health facilities and to engage in social and small-scale business trips. They could also be available for emergency transport. Further research will investigate whether issues of affordability and social norms are restraining women from using Qingqi services. Some villagers had access to motorcycles, and these were the most common vehicles on the rural roads. No evidence was seen or heard of rural women driving motorcycles. The rural women and girls had very few travel choices: if they did not have a male relative with a motorcycle who was willing to take them, their only transport option was likely to be a Qingqi. It is important to note that travel needs and mobility requirements of females have been consistently overlooked not only in rural but urban areas of Pakistan [31]. Female respondents from Sattoki village said that the transport problems had resulted in high school dropout rates and losing employment opportunity for females.

While most people spoke highly of Qingqi services, which they considered invaluable in the prevailing circumstances, there were some expressions of frustration regarding their use and operation. The operators wished to maximise their income on every trip, and they did this by waiting for a full load (leading to delays in departures) and/or carrying more people than was comfortable for the passengers.

#### 3.5. Perspectives of the authorities

Discussions with stakeholders from regulatory side (local officials and police officers) confirmed the utility of Qingqi as a paratransit mode, particularly in absence of alternative transport services. It was admitted that these vehicles offered many mobility solutions for poor villagers. However, it was acknowledged that regulatory compliance was low, with many under-age and untrained drivers, operating vehicle without driving licenses. Most did not appear to conform to 'normal' regulatory, fiscal and operational requirements for public transport operators. The regulators emphasised the importance of finding alternative modes of transport that could provide more satisfactory transport services in the rural areas (although it was not clear how changing the vehicle type would automatically lead to compliance and enforcement).

Discussions with the Excise and Taxation Department of the Government of Punjab suggested that a Qingqi can be registered as an authorised vehicle 'Qingqi' or as a motorcycle. In the light of the Supreme Court verdict [13], only Qingqis purchased from approved manufacturers (such as Plum Qingqi) are entitled to be registered as 'Qingqis'.

The buyer first needs to obtain vehicle fitness certificate and to renew their license. They must then annually obtain a certificate of fitness and buy an annual token. Those Qingqis that are locally manufactured and/or assembled can be registered as 'motorcycles'. For most operators it is preferable to register their Qingqi as a motorcycle, as they pay lower fees, have no need of fitness certificates and get a token valid for the life of the vehicle. The registration classes used in national statistics for motorcycles and three-wheelers were shown in Table 1.

#### **4. RESEARCH NEEDS, TRANSPORT OPTIONS AND REGULATORY FRAMEWORK**

The initial findings have highlighted some of the advantages and disadvantages that are associated with Qingqi services from the perspectives of the operators, the users and some regulatory officials. It is evident that the sector is informal and somewhat controversial, with several conflicting interests of the various stakeholders. The on-going research will endeavour to provide evidence-based understanding of the current role of Qingqis in rural transport services in the Punjab. The research will investigate the current rural transport demand, and the ways this is being met. It will study the current operational practices, technologies, costs and profitability of the Qingqi transport services and alternative options. It will consider the effectiveness and relevance of the current regulatory framework and realistic options and mechanisms for the future. To achieve this, it is planned that this research will further look at technological, economic, social, legal, environmental and safety issues and gather information from a wide range of stakeholders, to understand the many Qingqis issues. These will include:

- rural mobility for different people and their goods
- the characteristics of the Qingqi transport services 'niche'
- the Qingqi share of the rural transport market
- supply and maintenance systems for Qingqis
- performance indicators for Qingqis and the main alternatives
- the profitability of the operations and the appropriateness of the tariffs
- safety and security issues
- the relevance of the regulatory framework and issues of compliance and enforcement
- the appropriateness of the current vehicles and alternative options
- different stakeholder views about the various transport modes and options.

This will allow analyses of the comparative advantages of different existing transport modes, as well as alternatives (which might include electric vehicles). The aim will be to provide evidence that can inform future policies and strategies to promote and regulate safe, profitable and affordable rural transport services, appropriate to the transport needs of rural women, men and children.

#### **5. CONCLUSIONS**

In the past two decades, there has been a rapid rise in the use of three-wheelers as transport services in many countries in Asia, Africa and Latin America. Pakistan has also experienced this with an increase in Qingqis providing successful but controversial rural and urban transport services. Qingqis are made by both formal sector factories and informal sector workshops that produce a wide range of designs, many of which do not conform to regulatory standards. The Qingqi operators are in the informal private sector and operate in ways that try to maximise their modest daily earnings, irrespective of whether this contravenes good



traffic behaviour and official loading capacities. The combination of non-standard designs and some anarchical behaviour tends to make Qingqi operations unpopular with regulating authorities. However, they have grown and spread because they serve an important transport role. They are very popular with their many users, albeit with some reservations. Initial appraisal visits to rural areas of Punjab province suggested that currently Qingqis provide important, affordable and indispensable transport services for rural women, men and children, particularly those from families that do not own motorcycles. There are clearly many regulatory and operational issues to consider: the debate as what should be the future for Qingqis in Pakistan is likely to continue. This on-going research will gather evidence about the current Qingqi services, their advantages and disadvantages, and the suitability and economic viability of alternative means of public transport in rural areas. This should promote greater understanding of Qingqis as a form of public transport, and possible technological, operational and regulatory options that could meet the needs of rural people for safe, affordable and appropriate transport services.

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