A Review of Trends and Patterns of Vehicle Registration and Vehicle Ownership in Developing Countries: Evidence from Bangladesh

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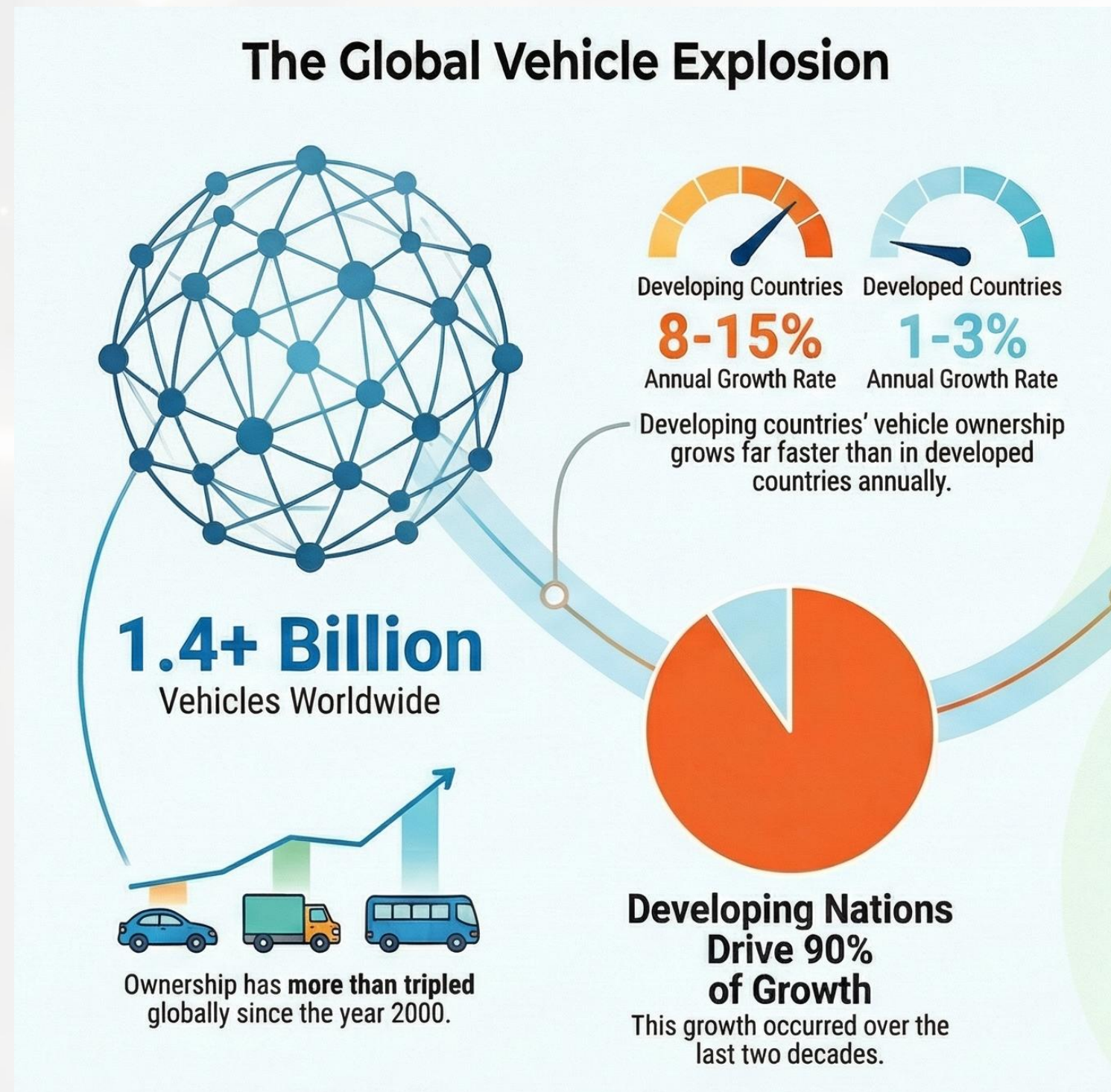
Introduction

Fig: Traffic Congestion Growth in Dhaka City

- Global motor vehicle ownership has increased **more than 3 times since 2000**, reaching **over 1.4 billion vehicles worldwide***(World Bank, 2022)*.
- Developing countries account for **over 90% of the global growth** in vehicle registrations during the last two decades *(International Road Federation, 2021)*.
- Vehicle ownership in developing countries grows at an average rate of **8–15% per year**, compared to **1–3%** in developed countries *(World Bank)*.
- Bangladesh has experienced **rapid motorization**, with registered motor vehicles increasing from **about 2 million in 2010 to over 6 million by 2023** *(BRTA Annual Reports)*.
- Motorcycles constitute **more than 60%** of newly registered vehicles in Bangladesh, reflecting affordability and weak public transport alternatives *(BRTA)*.
- Rapid growth in vehicle ownership has created **severe congestion, air pollution, and safety challenges**, especially in major cities like Dhaka.

OBJECTIVE

1 To examine trends in vehicle registration & vehicle ownership patterns in developing countries like Bangladesh

OBJECTIVE

2 To identify key influencing factors & discuss planning with policy implications

Conceptual Framework

Component	Relationship	Quantitative Evidence	Key Reference
Economic Growth	Relationship between economic growth, income and vehicle ownership	1% increase in GDP per capita leads to 1.2–1.8% increase in vehicle ownership in developing countries. Bangladesh GDP per capita rose from USD 781 (2010) to USD 2,700+ (2023).	Dargay et al. (2007); World Bank (2023)
Urbanization	Relationship between urbanization and travel demand	Urban population in Bangladesh increased from 28% (2000) to 39% (2022). Urbanization increases motorized travel demand by 30–60%.	World Bank; UN-Habitat (2020)
Policy & Infrastructure	Relationship between transport policy & infrastructure and vehicle choice	Cities with weak public transport show 2–3 times higher private vehicle ownership. Road expansion induces 5–10% additional traffic within few years.	World Bank (2019); Litman (2015)
Household Characteristics	Relationship between income, household factors, and ownership decision	Income, number of workers, and licensed drivers significantly increase probability of car and motorcycle ownership.	Choudhury & Flavia (2019)

Factors Affecting Vehicle Ownership & Vehicle Registration

01 Household Income

02 Urban Form & Density

03 Public Transport Quality

04 Fuel Price & Taxation

05 Cultural & Social Factor

Vehicle Ownership and Registration in Developing Countries (MALAYSIA)

Fig- Highest Car ownership Rates in ASIA

Source- Seasia

- **Total Vehicles (2023):** ~36 million
  - Cars: ~17.2 M
  - Motorcycles: ~16.8 M
- **High Car Ownership:** ~535 cars per 1,000 people (2nd in Asia)
- **Growth Trend:** Steady increase from ~28 M (2017) → 36 M+ (2023)
- **EV Adoption:** Rising but still small share of total vehicles
- **Drivers & Challenges:**
  - Driven by income growth, affordable cars, and convenience
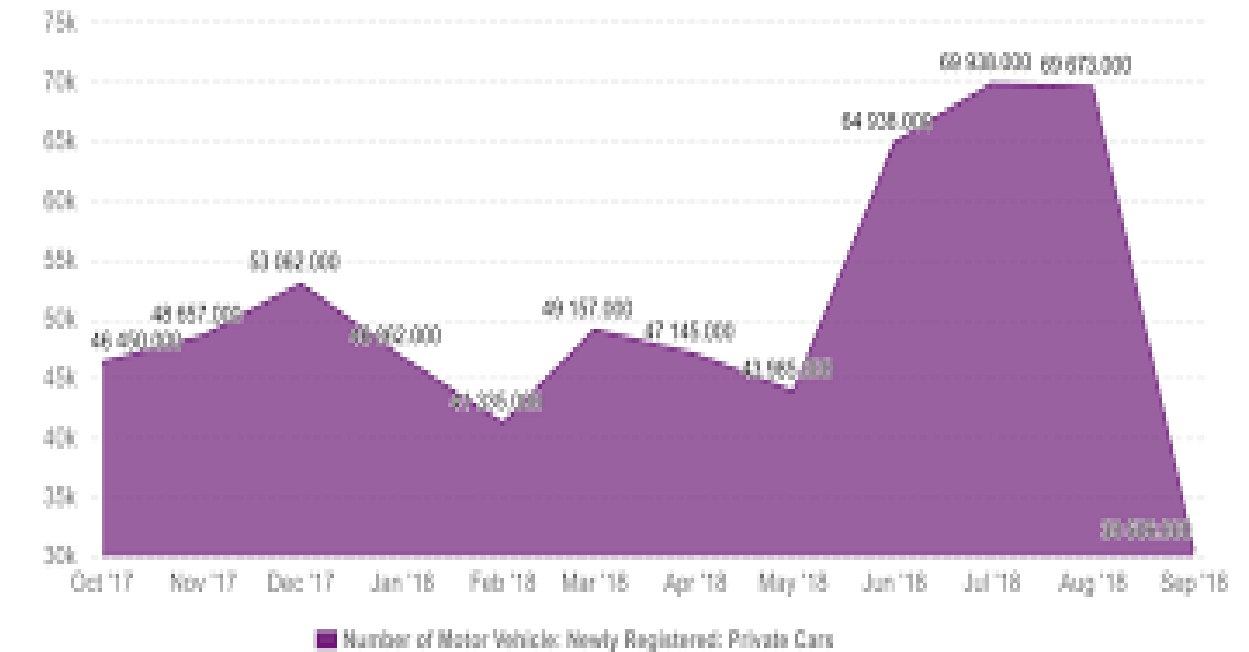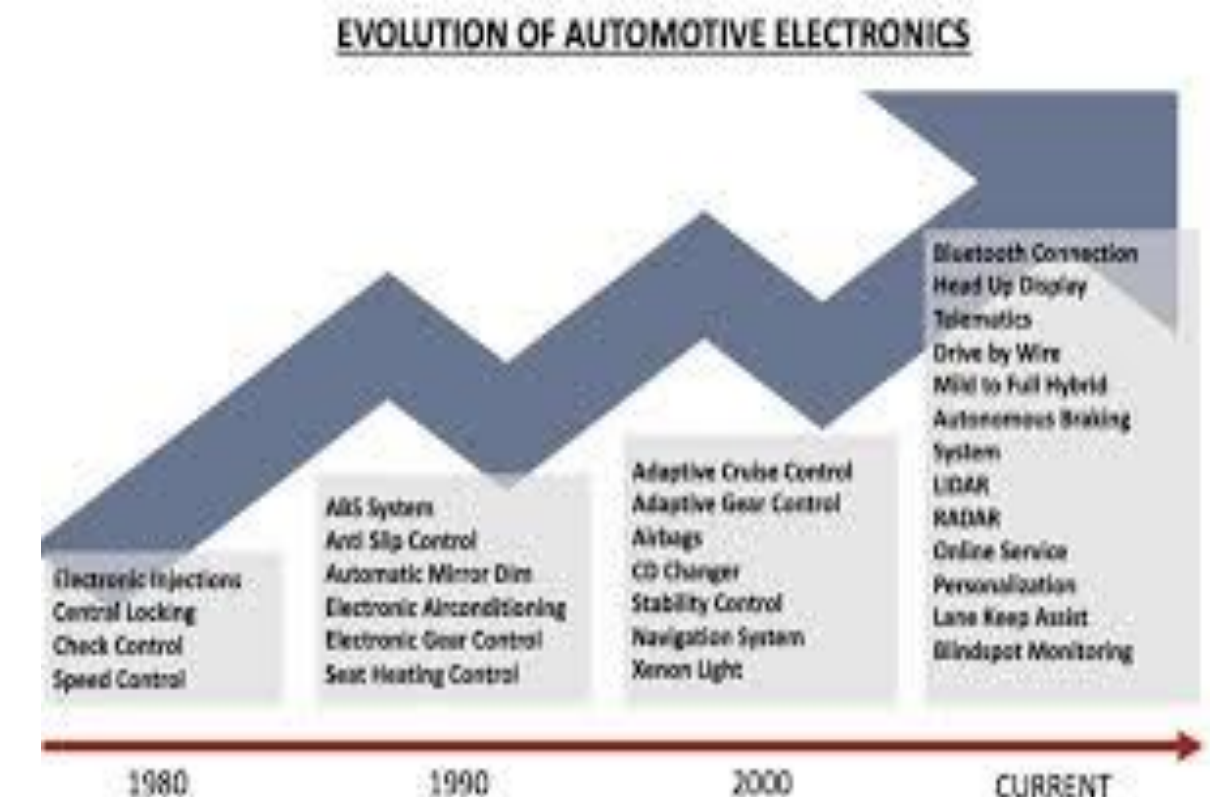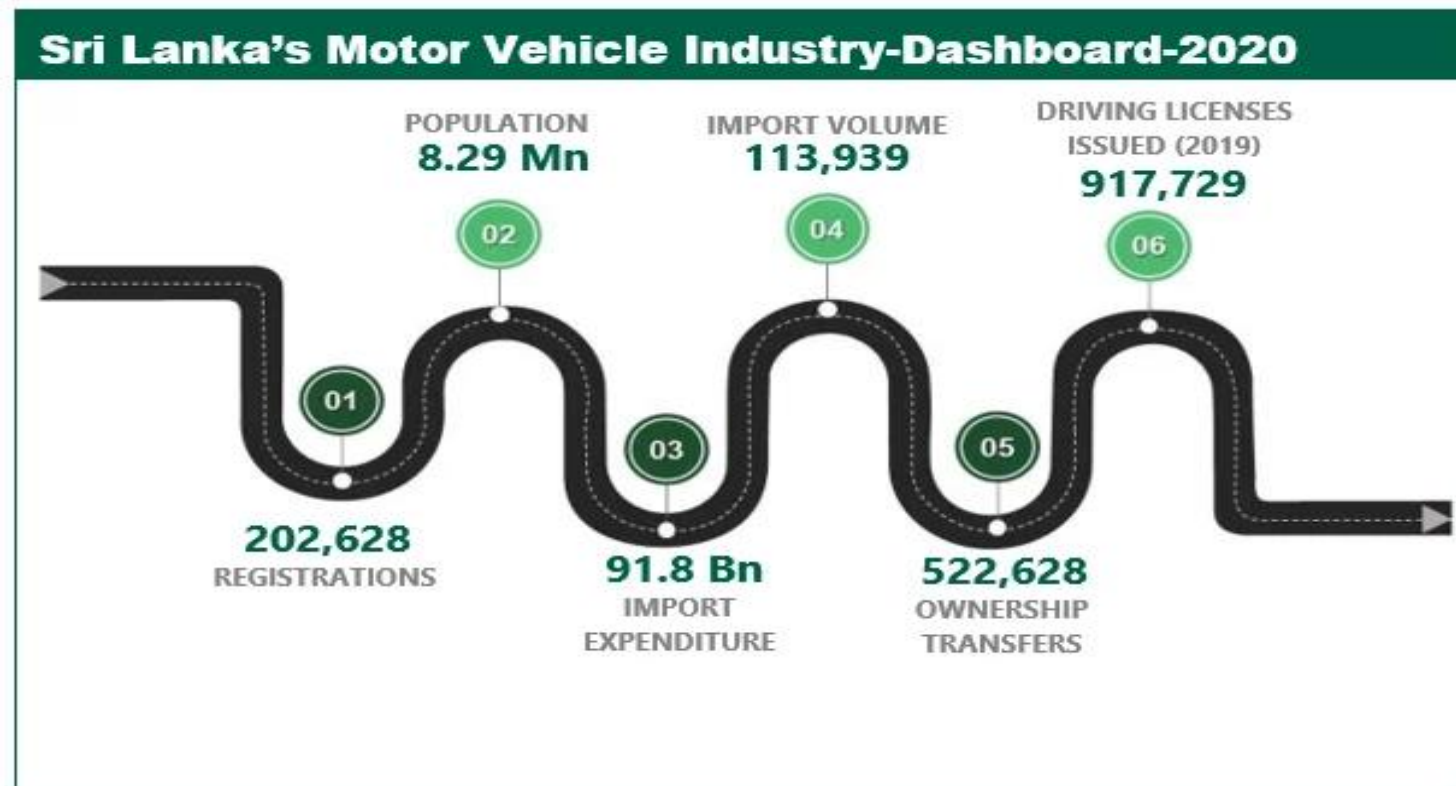 - Leads to urban congestion & infrastructure pressure

Fig- Number of motor vehicle: Newly registered
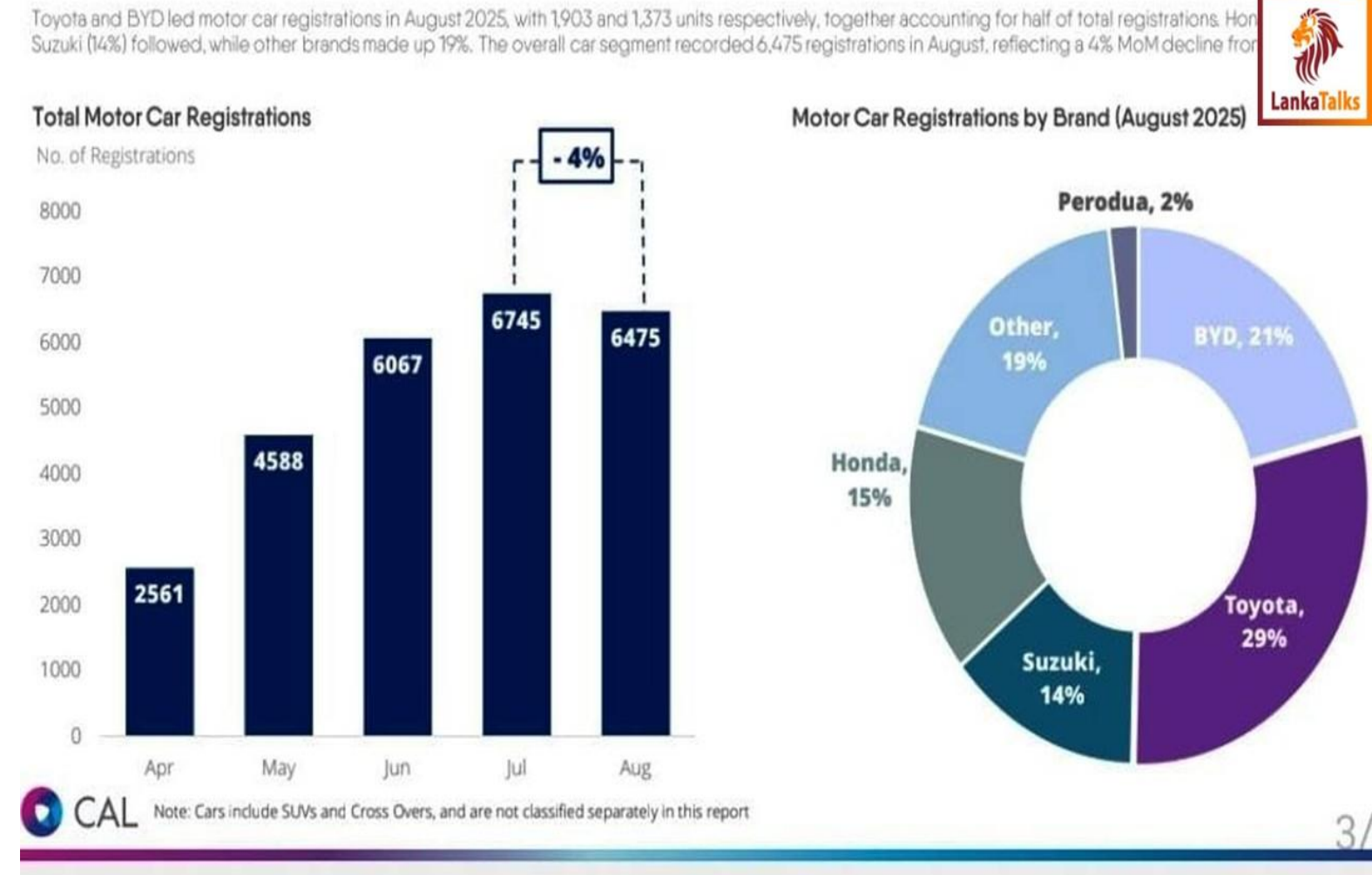Source- https://www.ceicdata.com/

Vehicle Ownership and Registration in Developing Countries (SRILANKA)

- **Total Vehicles (2023):** 8 million
  - Motorcycles: 4.8M
  - Three-wheelers: 1.18M
  - Cars: 0.9M
- **Two-wheelers dominate**: most households prefer motorcycles for affordability.
- **Cars & SUVs**: growing with rising income, but fewer than motorcycles.
- **Three-wheelers**: key for informal transport & small businesses.
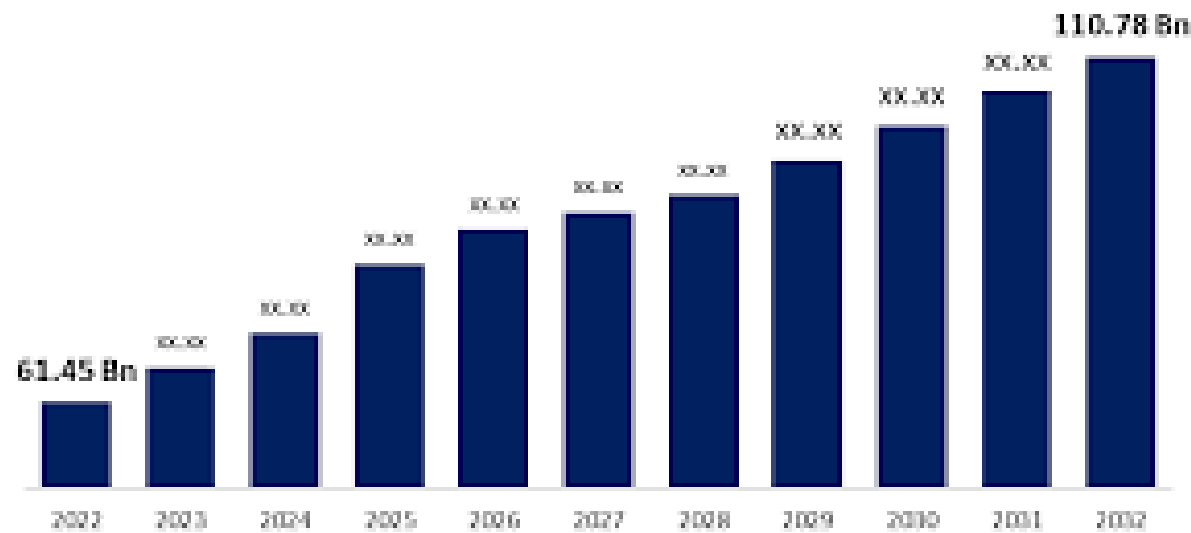

Source- economy.lk

Source- www. lankatalks.com

- **Trends/Drivers:**
  - Rapid growth in urban areas (206 vehicles per 1,000 people).
  - Ownership influenced by **income, import policy, taxes**.
  - Rising urbanization leads to congestion & pollution challenges.
- **Key Insight:** Motorcycle-led growth is typical in developing countries; cars follow as income rises.
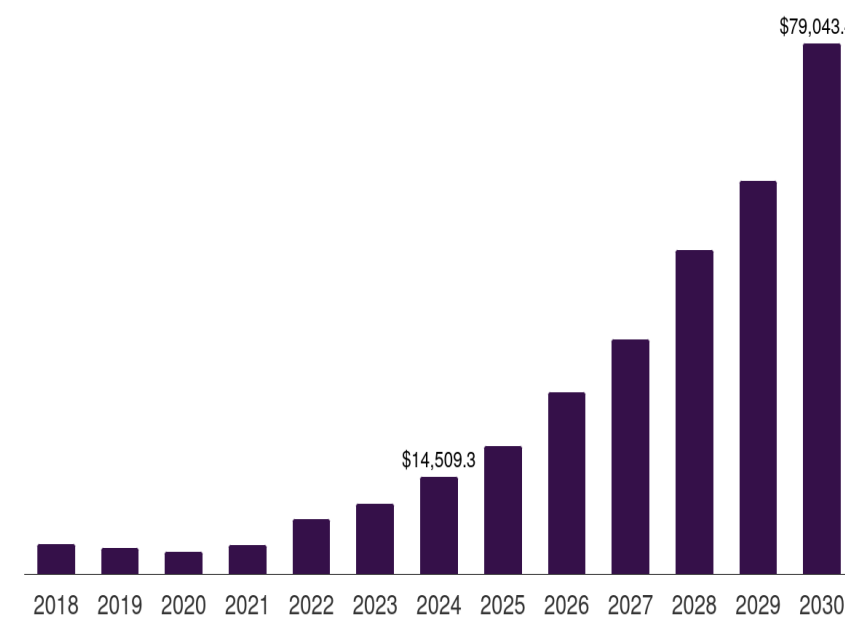
Vehicle Ownership in Developed Countries (JAPAN)

Japan Used Car Market

110.78 Bn

61.45 Bn

2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032

Japan electric vehicle market size, 2018-2030 (US$M)

HORIZON
GRAND VIEW RESEARCH

$79,043.4

$14,509.3

2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

https://www.grandviewresearch.com/horizon/outlook/electric-vehicle-market/japan

8.6%

Japan Market
CAGR, 2025-2030

Source- www. grandviewresearch.com

Total Vehicles: 82 million (2020)

- **Household Ownership:** 78 % have ≥1 car; rural households often >1 car
- **Historical Growth:** Rapid rise 1960– 2020 (1.4 M → 82 M)
- **Recent Trend:** Growth slowing / stabilising due to aging population & urbanisation
- **Vehicle Mix:** Kei cars popular; hybrids rising; EVs gradually increasing

seasia
stats

Highest Car Ownership Rates in Asia, 2015-2020

Number of registered vehicles in use per 1,000 people, including both passenger cars and commercial vehicles as of 2020

	Country	Value
1	Japan	612
2	Malaysia	535
3	Syria	472
4	South Korea	458
5	Taiwan	344
6	UAE	343
7	Thailand	277
8	Kazakhstan	226
9	China	223
10	Iran	183
11	Iraq	111
12	Indonesia	78
13	Vietnam	50
14	Philippines	38
15	India	33
16	Pakistan	20

Source: International Organization of Motor Vehicle Manufacturers (OICA), Visual Capitalist

Fig- Highest Car ownership Rates in ASIA

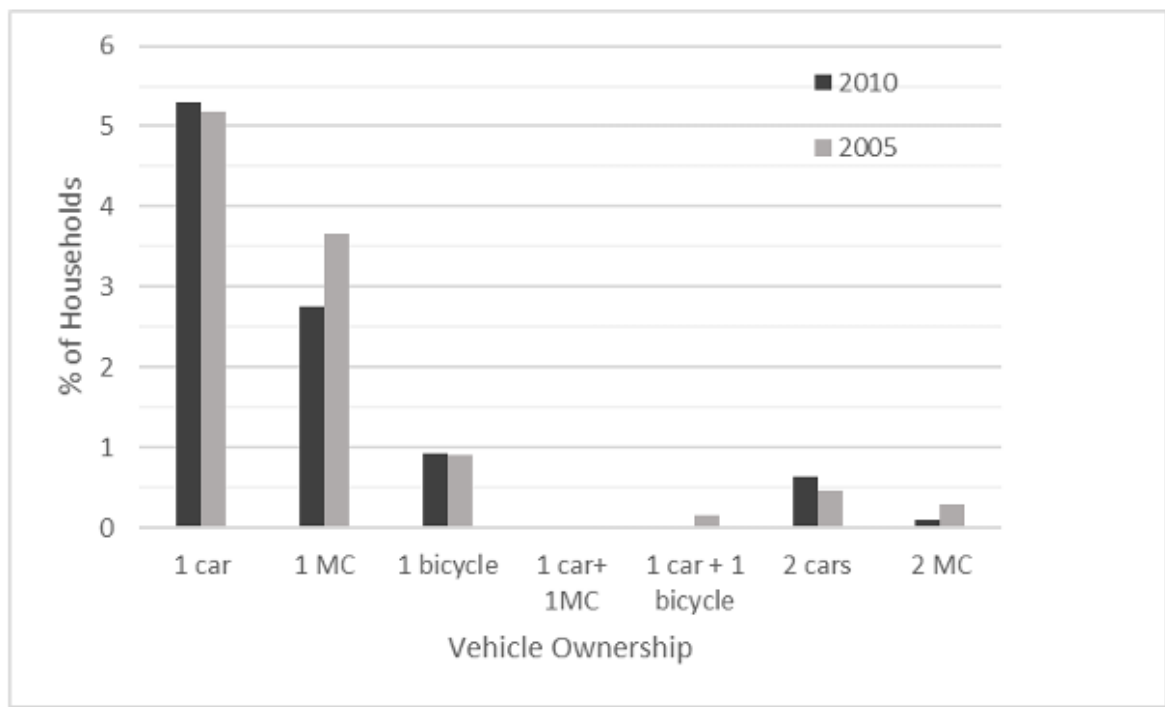Source- Seasia

Vehicle Ownership in Bangladesh (Overview)

Figure 01 Vehicle Ownership Distribution

Vehicle Ownership Patterns (Figure 1)

- Only 6% of households own at least one car
- <1% own two or more cars
- Bicycle ownership is very low; no household owns more than one
- Despite flat terrain, bicycles are unpopular due to:
  I. Lack of cycle lanes (safety issues)
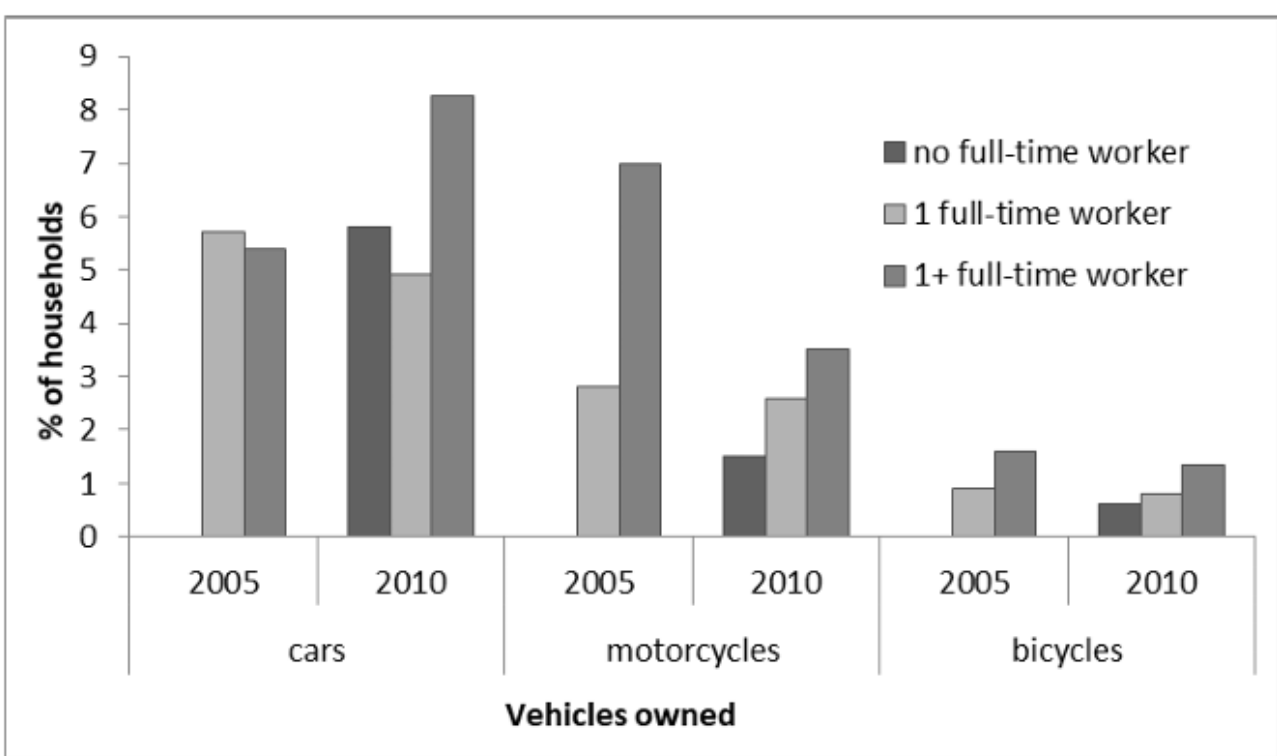 II. Theft risk (no proper racks)
  III. Cultural barriers for women riders

Vehicle Ownership by Demographics (Figure 2)

- Car & motorcycle ownership highest in households with ≥2 full-time workers
- Indicates a strong link with household income
- Some households with no full-time workers still own vehicles (likely part-time workers or retirees)
- Larger households own more vehicles due to higher mobility needs
- Weak link between driving license and car ownership

Figure 2a Vehicle Ownership and Number of Workers

Figure 2b Vehicle Ownership and Household Size

Figure 2c Vehicle Ownership and Licensed Drivers

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Bangladesh Transport Context

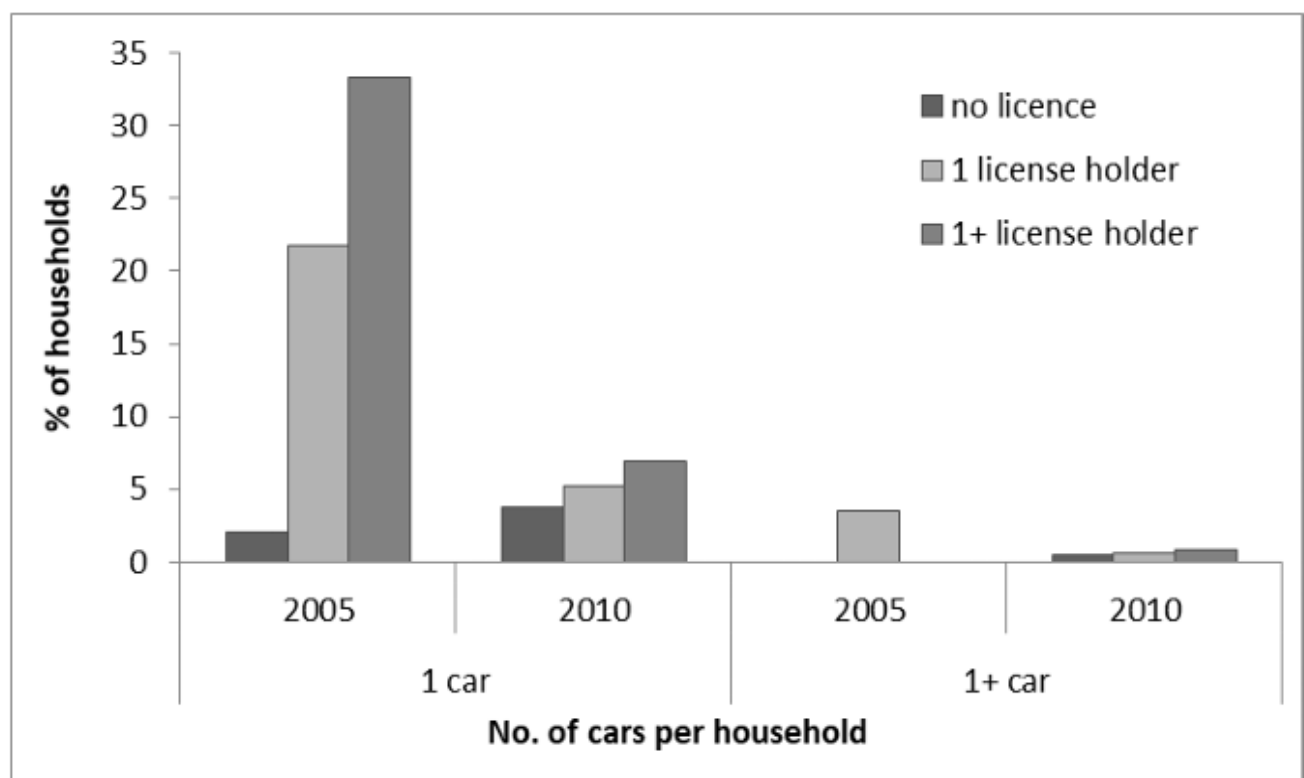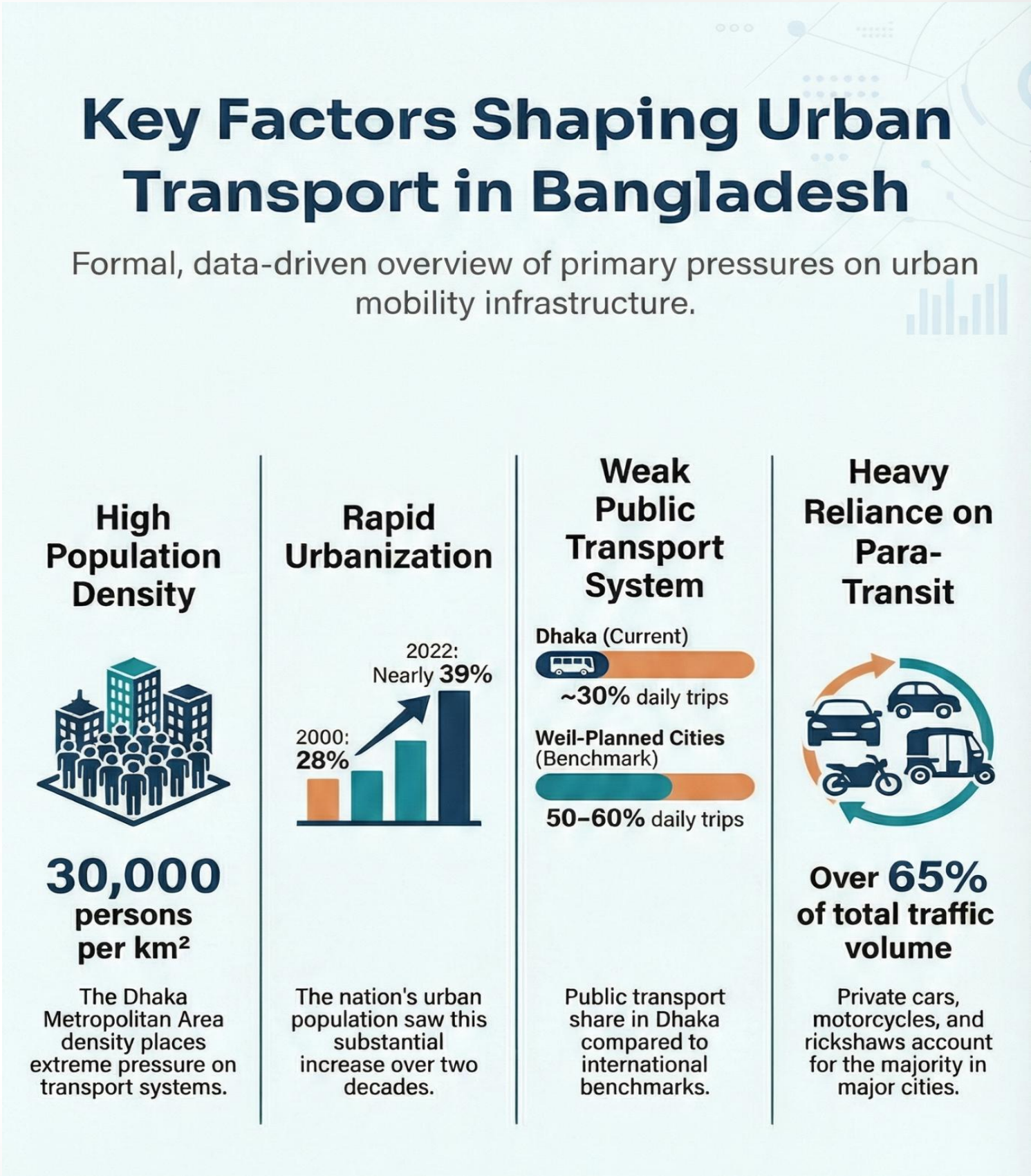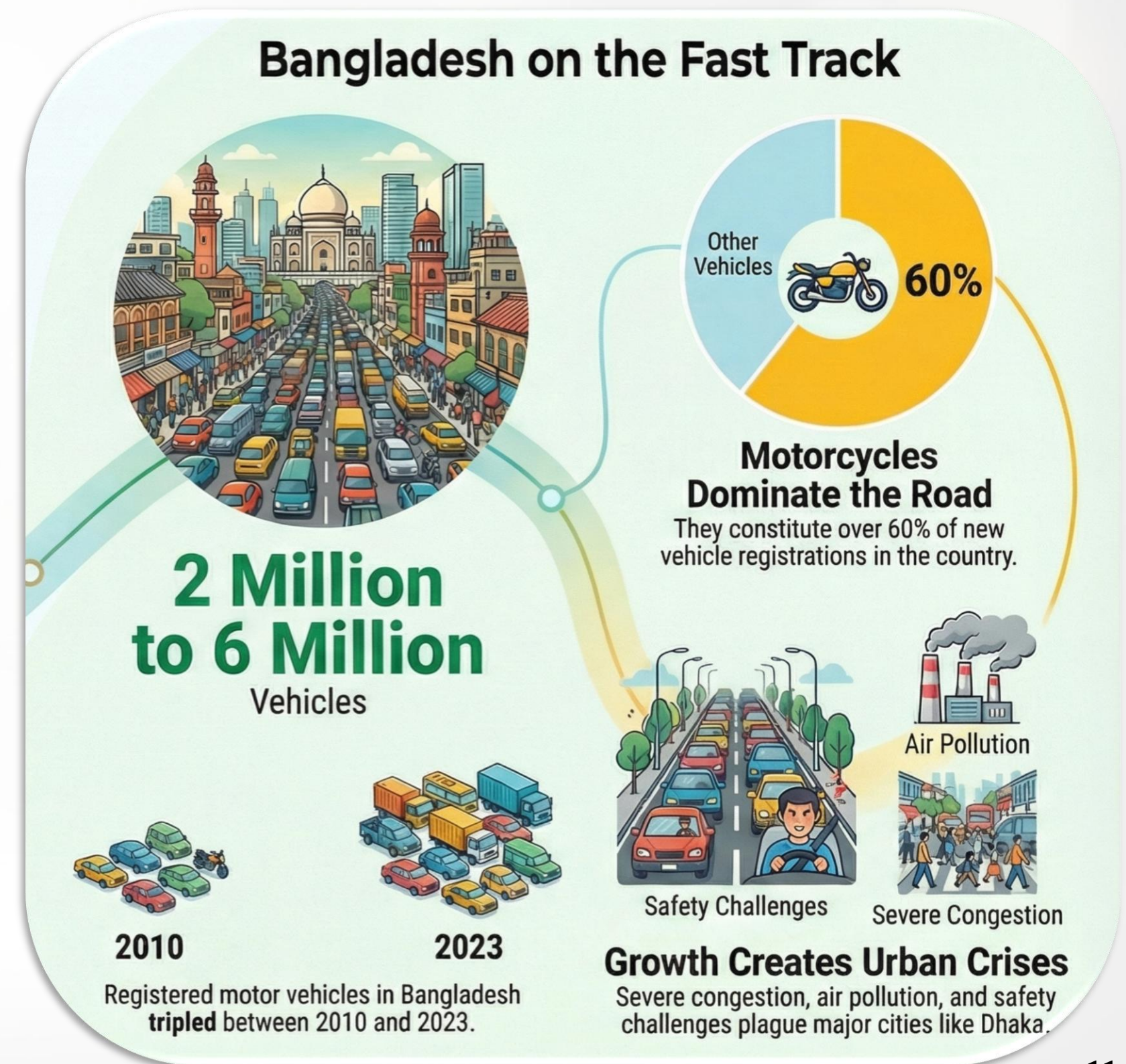•Rapid urbanization has increased travel demand, with the urban population rising from 28% (2000) to 39% (2022) and Dhaka growing at 3–4% annually, mainly due to rural–urban migration (World Bank; UN-Habitat).

•Bangladesh is among the world's most densely populated countries (1,265 persons/km²), while Dhaka exceeds 30,000 persons/km², placing severe pressure on road space and transport infrastructure (World Bank; BBS).

•Public transport remains inadequate, serving only 30% of daily trips in Dhaka compared to 50–60% in well-planned cities, with bus services characterized by low reliability (<50%) and poor operational quality (RSTP Dhaka; World Bank).

•Limited mass transit has led to heavy dependence on private and para-transit modes, which account for over 65% of urban traffic, while motorcycles comprise more than 60% of new vehicle registrations nationwide (BRTA; RSTP).

Key Factors Shaping Urban Transport in Bangladesh

Formal, data-driven overview of primary pressures on urban mobility infrastructure.

High Population Density

30,000 persons per km²

The Dhaka Metropolitan Area density places extreme pressure on transport systems.

Rapid Urbanization

2022: Nearly 39%

2000: 28%

The nation's urban population saw this substantial increase over two decades.

Weak Public Transport System

Dhaka (Current) ~30% daily trips

Well-Planned Cities (Benchmark) 50–60% daily trips

Public transport share in Dhaka compared to international benchmarks.

Heavy Reliance on Para-Transit

Over 65% of total traffic volume

Private cars, motorcycles, and rickshaws account for the majority in major cities.

Source: World Bank (2019–2023); BBS; UN-Habitat (2020); RSTP Dhaka; BRTA Annual Reports

Trend of Vehicle Registration in Bangladesh

❑ Vehicle registration in Bangladesh shows a sharp increase after 2010, with the total number of registered vehicles rising from around 2 million in 2010 to over 6 million by 2023, reflecting rapid motorization (BRTA Annual Reports).

❑ Motorcycles dominate new vehicle registrations, accounting for more than 60% of newly registered vehicles nationwide, due to lower purchase cost, ease of use, and inadequate public transport services (BRTA).

❑ Dhaka Metropolitan Area holds the highest share of registered vehicles, concentrating over one-third of the country's total registrations, driven by higher income levels, employment concentration, and intense travel demand *(Source: BRTA; RSTP Dhaka)*.

Bangladesh on the Fast Track

Other Vehicles

60%

Motorcycles Dominate the Road
They constitute over 60% of new vehicle registrations in the country.

2 Million to 6 Million
Vehicles

2010   2023

Registered motor vehicles in Bangladesh **tripled** between 2010 and 2023.

Air Pollution

Safety Challenges   Severe Congestion

Growth Creates Urban Crises
Severe congestion, air pollution, and safety challenges plague major cities like Dhaka.

Vehicle Registration System in Bangladesh

Vehicle information Management Process

1 Vehicle Registration

2 Traditional Paper Based Process

3 Blockchain & It's Impact

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Vehicle Registration System in Bangladesh

Vehicle Registration

Personal Information	Vehicle Price	Color
RTA requires different information from the vehicle owner, such as the name of the owner, father/husband's name, address, sex, phone/mobile number, nationality, guardian's name, and Date of birth.	Every motor vehicle has a particular price. While registering the motor vehicle through RTA, vehicle owner is required to provide the price of that particular vehicle. As proof, an invoice is required to be submitted by the new owner of the vehicle.	As a part of the process of vehicle registration, the new owner is bound to provide the visual aspect (color) of that vehicle. Details are important for different parts of the vehicle, for example, the color of the cabin and the body of that particular vehicle.

Vehicle Registration System in Bangladesh

Vehicle Registration

Judicial/Non-Judicial Stamp	Tax	Signature
The RTA requires judicial and non-judicial Stamp throughout the registration process. In case of changing, ownership buyers must provide non-judicial Stamp with pictures and additional proof of the owner's affidavit.	Every registered motor vehicle have to pay a certain amount of tax to RTA per year. The rate of the tax depends on the type of the motor vehicles. Not only types but also size,weight,seat number etc.	Throughout the process, RTA requires several specimen signature. Signature is required in almost all documents, e.g., new registration, changing ownership.

Traditional Paper Based Process

In a traditional paper-based system, an owner needs to download the registration form from the RTA website or RTA office. After collecting the registration form, an applicant needs to download the application(changing ownership) form from the RTA website or RTA office. After providing the required information on a particular form, the applicant needs to provide mandatory documents required by the RTA. Then RTA verifies the applicant's form and provided documents. If everything is OK, then the RTA accepts the request. In this modern era, it is one kind of inconvenience for the vehicle owner to collect the form, fill it up, and submit thereby. Besides, in the traditional paper-based system, there is a lot odf scope of corruption and other unauthentic processes.

Blockchain & Its Impact

Blockchain(BC) is a distributed ledger technology that has brought an enormous revolution in modern technology in recent years. In this process, BC works with blocks. In BC, a block is nothing but a collection of data. Different fields of data being added to a single block, connecting one after another in chronological order, ensure the authenticity and immutability of data. The very initial/first block in the BC is known as Genesis Block. A distributed ledger in BC refers to a ledger that is shared across the network among all peers/blocks in the network, and each peer/block holds a copy of the complete ledger of that BC. A simple BC-based data structure or ledger is presented in figure.
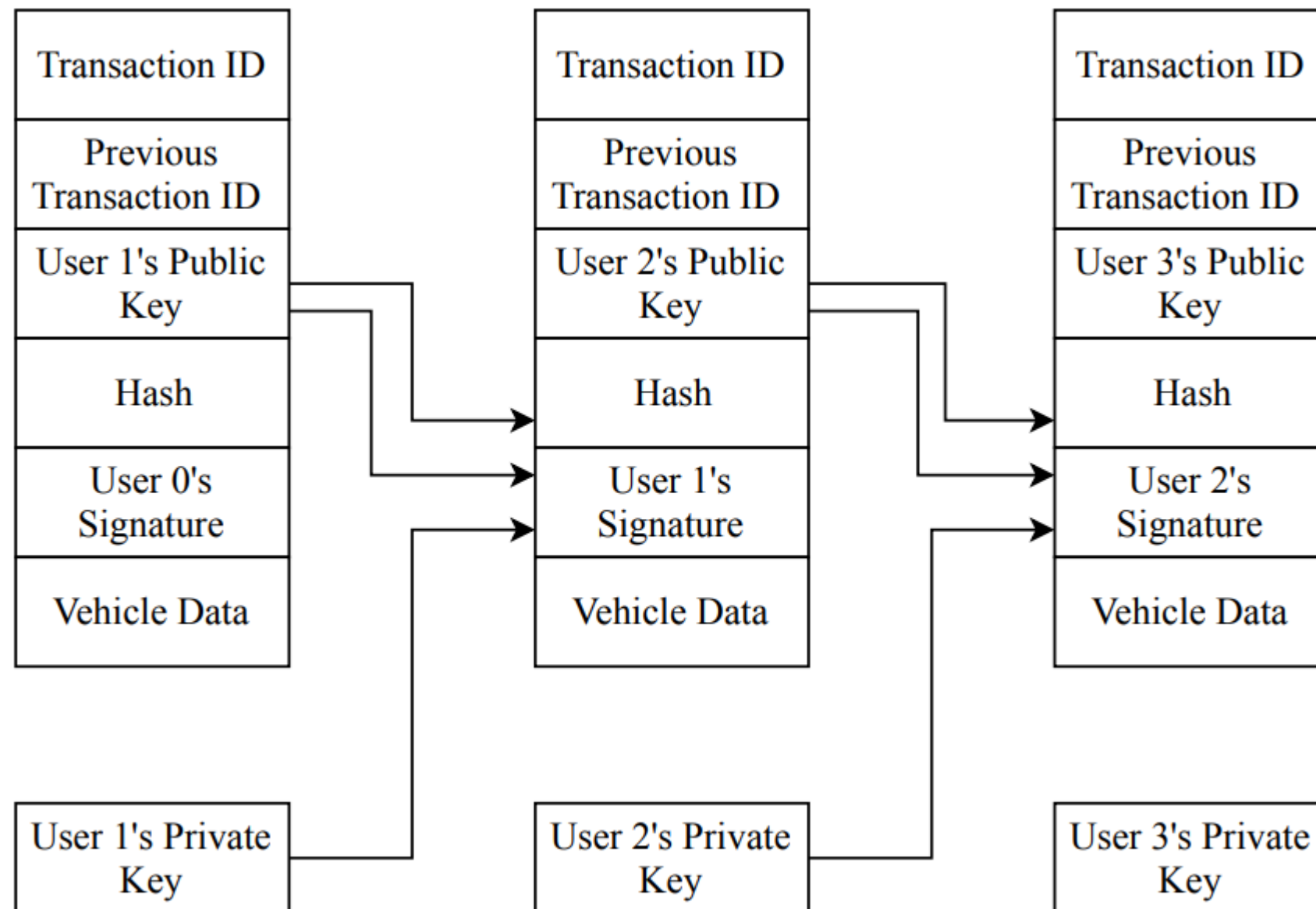
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Figure: Example of Transaction Block

BC has some key attributes that proves that Blockchain is better than traditional systems. These attributes have some key benefits. Key attributes of BC e.g., peer-to-peer communication, distributed nature, cryptographically secured, immutability, and consensus are crucial for the RTA to solve the issues of traditional paper-based system and can ensure a smart Vehicle information management system.
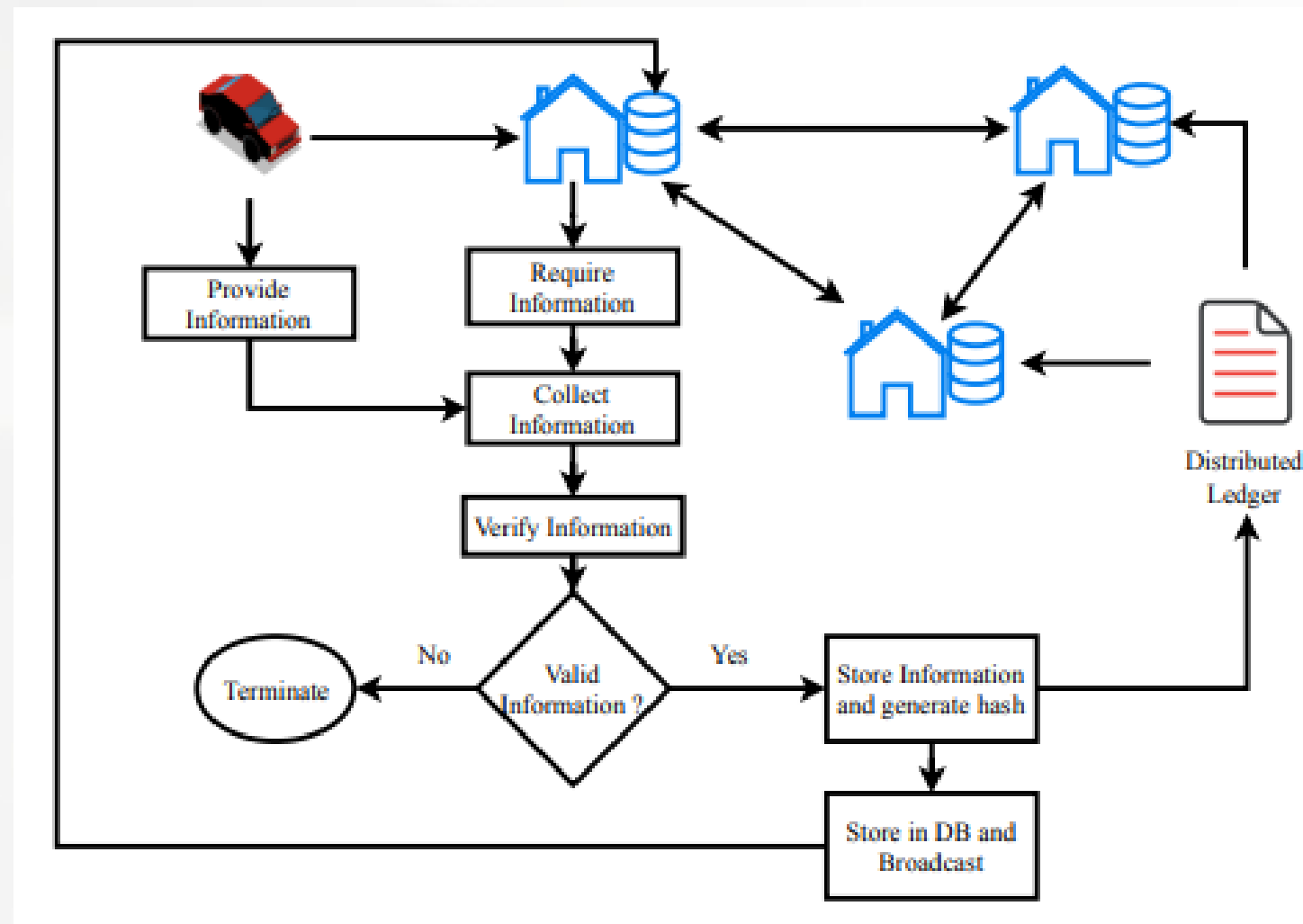
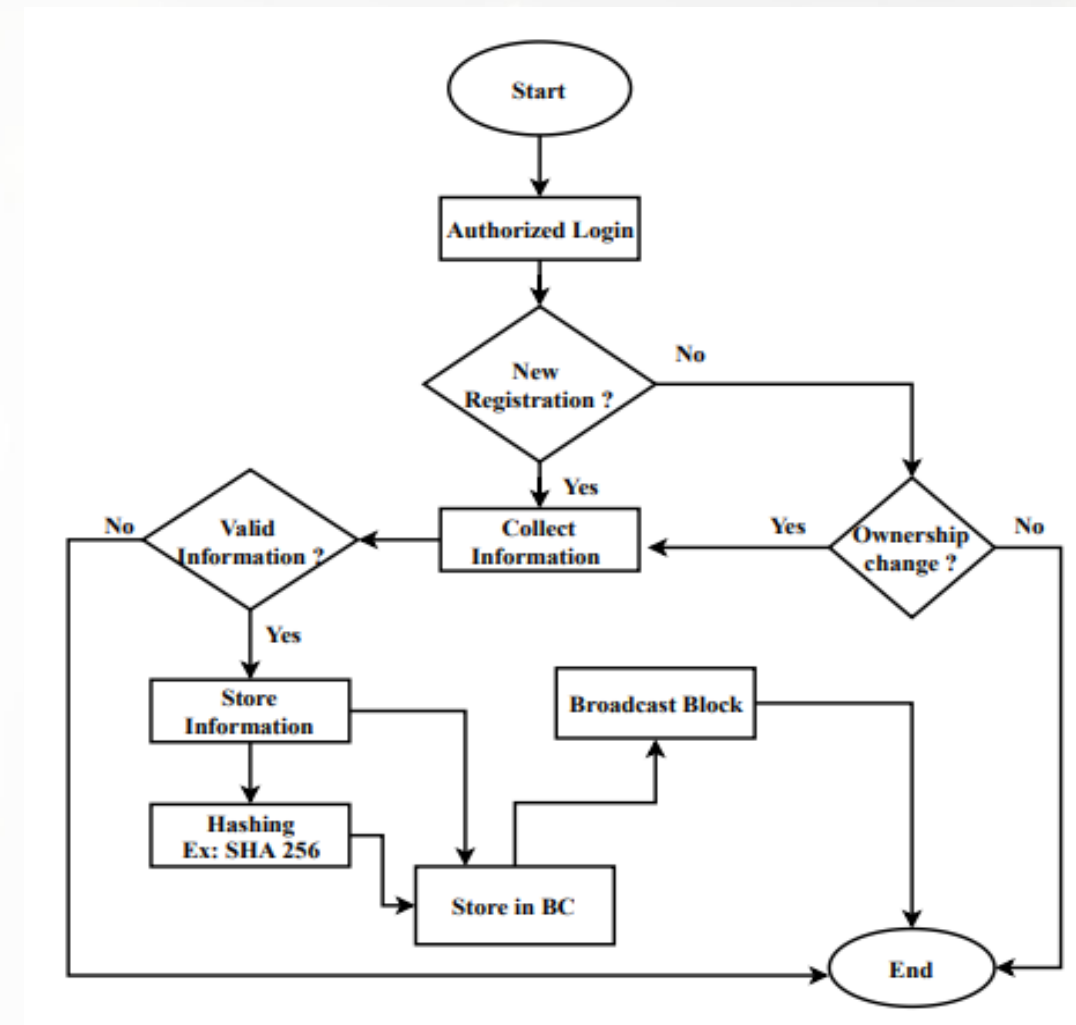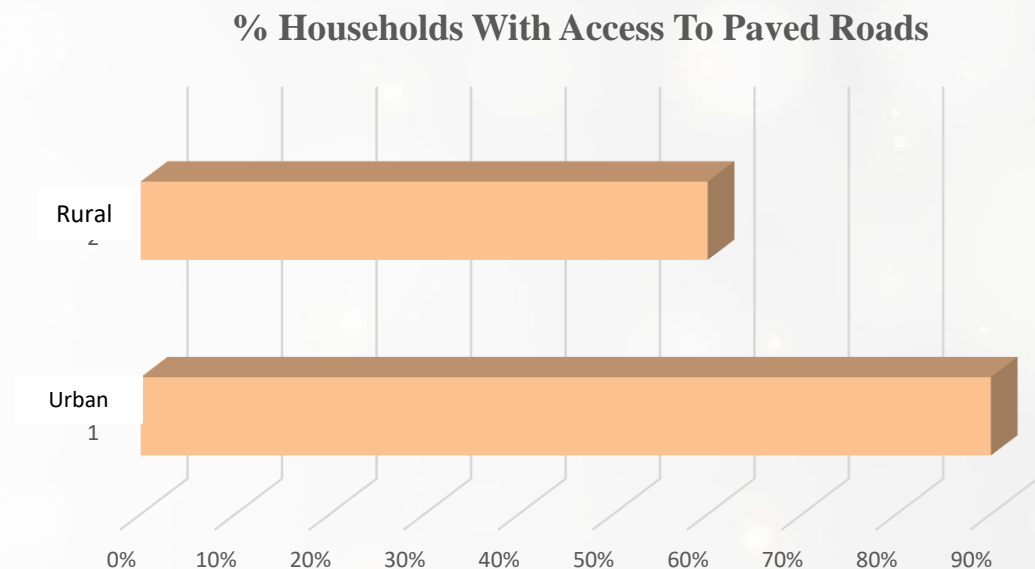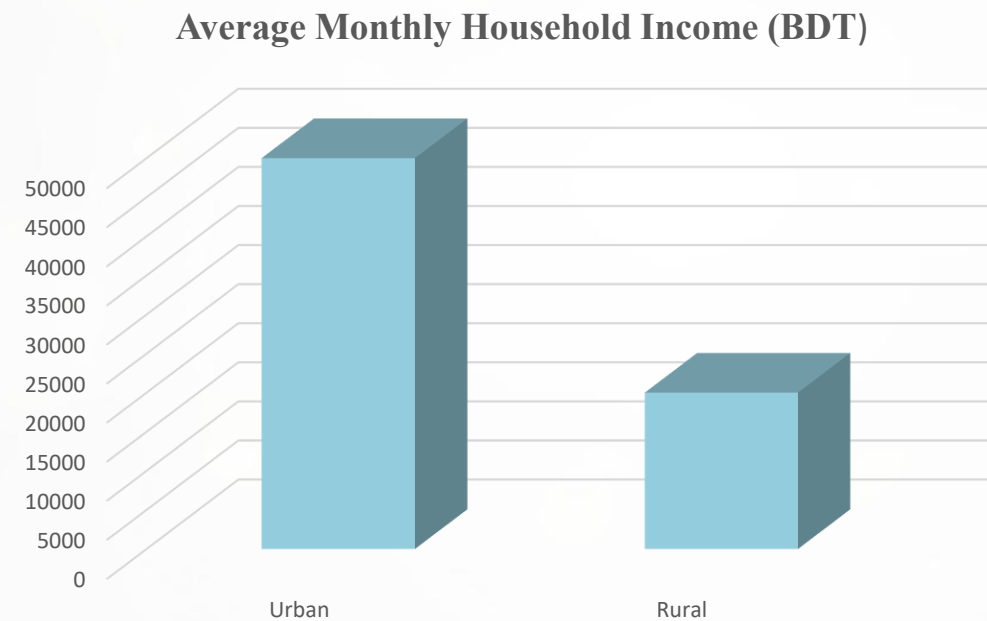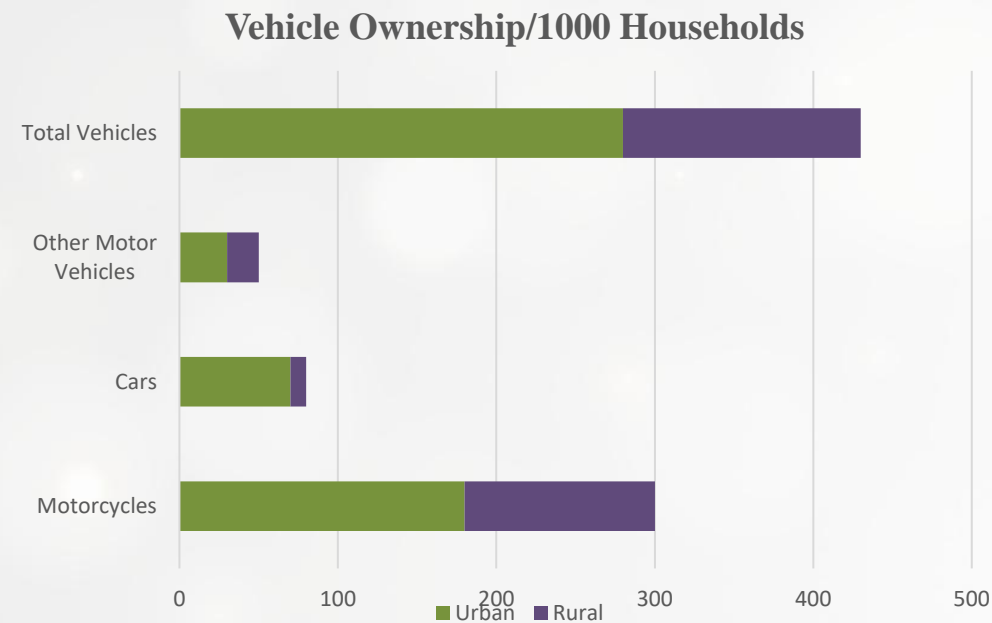Figure: System Architecture

Figure: Proposed Flow Chart for Vehicle Registration

In our proposed system architecture, each RTA branch will be considered as a node in the chain. They will be considered as Cluster Head(CH). And every vehicle will be considered as block under any RTA branch(CH). BC among the RTA's will be consortium BC and managed by all the RTA's. Our proposed System architecture shown in the first Figure . And the flowchart of our proposed system shown in second Figure.

Urban and Rural Comparison in Bangladesh

Vehicle Ownership/1000 Households

Average Monthly Household Income (BDT)

% Households With Access To Paved Roads

Source: BBS, BBS (Household Surveys), BRTA, World Bank

Author's Preparation

From the analysis, we can see that
- Urban households own and use nearly twice as many vehicles as rural households.
- Motorcycles dominate rural ownership (Almost 80% share) due to affordability.
- Car ownership is concentrated in urban areas due to higher income and better road access.
- Income level and transport accessibility are the primary drivers of ownership differences

Comparison between Developed and Developing Countries

Table 01: Vehicle Ownership Level

Country Group	Vehicles per 1,000 People
Developed Countries	600
Developing Countries	115
Bangladesh	60

Source: World Bank 2022

Vehicles/1000 People

Developing Countries — 15%
Developed Countries — 77%
Bangladesh — 8%

Table 02: Annual Vehicle Ownership Growth Rate

Country Group	Annual Growth Rate
Developed Countries	1-3%
Developing Countries	8-15%
Bangladesh	10-12%

Annual Growth Rate (%)

Source: World Bank; International Road Federation (2021); BRTA
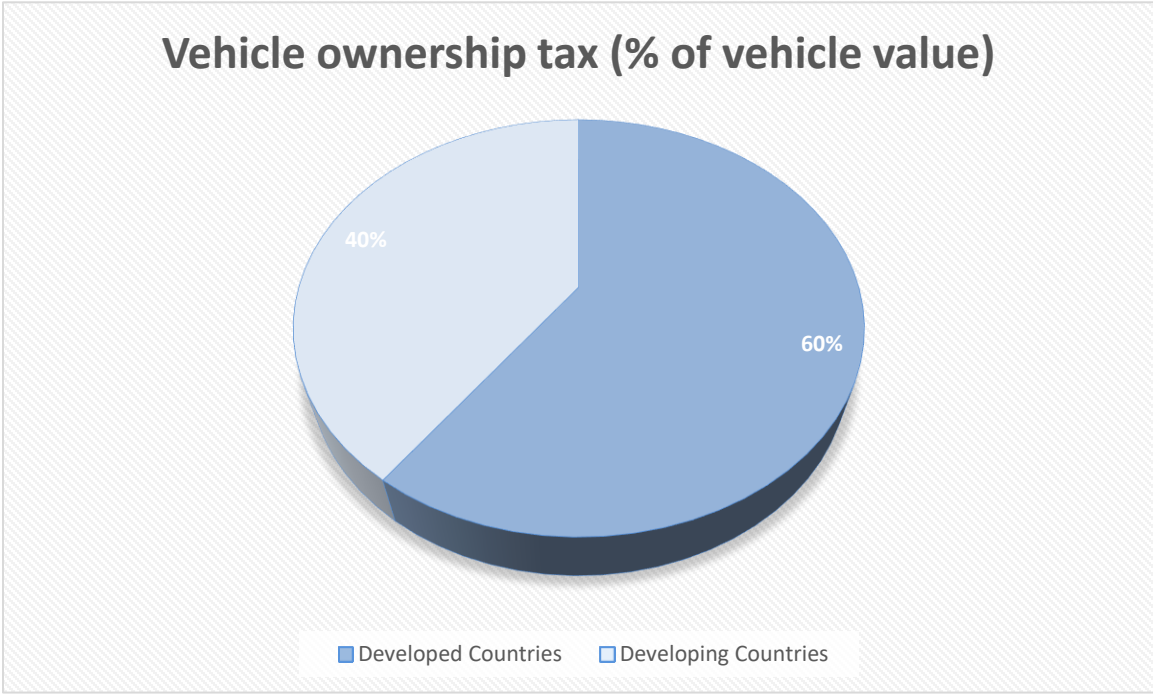*Author's Preparation*

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Comparison between Developed and Developing Countries

Table 03: Transportation Regulation Intensity

Indicator	Developed Countries	Developing Countries
Vehicle ownership tax (% of vehicle value)	20–40%	5–15%
Annual congestion pricing cities (%)	>30%	<5%
Emission standard enforcement	Strict (Euro 6+)	Weak/Partial

Source: OECD (2020); World Bank (2019)

Vehicle ownership tax (% of vehicle value)

40% — 60%

■ Developed Countries   □ Developing Countries

Author's Preparation

Table 04: Public Transport Availability

Indicator	Developed Countries	Developing Countries	Bangladesh
Public transport mode share (%)	40–60%	20–35%	~30%
Rail-based transit length (km per million population)	20–40	2–10	<2
Bus service reliability (%)	>85%	<60%	<50%

Source: UITP; World Bank; RSTP Dhaka

Key Findings Compared to Developed Countries

- Vehicle ownership in Bangladesh has increased rapidly since 2010, with total registered vehicles more than tripling over the last decade (BRTA).

- Motorcycles dominate vehicle ownership, accounting for over 60% of new registrations, particularly in rural and peri-urban areas.

- Urban households own significantly more vehicles than rural households, driven by higher income levels and better accessibility.

- Dhaka Metropolitan Area holds the largest share of registered vehicles, reflecting employment concentration and intense travel demand.

- Income, household size, number of workers, and licensed drivers are the strongest determinants of vehicle ownership

- Vehicle ownership growth in Bangladesh is occurring without a corresponding improvement in public transport capacity, indicating a structural shift toward private and para-transit modes rather than a balanced multimodal transport system.

Impacts and Challenges

Impacts of Rising Vehicle Ownership and Registration

- Traffic congestion has intensified, with average travel speeds in Dhaka falling to below 7 km/h during peak hours (RSTP).
- Increased vehicle use has worsened air quality; transport contributes over 40% of urban PM emissions (World Bank).
- Road safety risks have increased, with motorcyclists accounting for a growing share of traffic fatalities.
- Higher fuel consumption and vehicle use increase energy demand and greenhouse gas emissions.

Transport Planning Challenges

- Rapid motorization is occurring faster than road capacity expansion and infrastructure development.
- Weak and unreliable public transport limits modal shift away from private vehicles.
- Inadequate regulatory measures on vehicle registration and usage encourage uncontrolled growth.
- Limited integration of land use and transport Planning increases trip lengths and vehicle dependency.
- Data scarcity and weak enforcement hinder effective transport policy formulation and implementation.

Policy Implications

Demand Management Policies

- Implement travel demand management measures such as parking regulation and congestion control to reduce excessive private vehicle use and improve network efficiency in highly congested urban areas of Bangladesh.

Vehicle Taxation and Registration Control

- Introduce progressive vehicle taxation and stricter registration controls to moderate rapid growth in private vehicle ownership driven by rising household incomes.

Public Transport Improvement

- Prioritize investment in high-capacity, reliable, and integrated public transport systems to provide viable alternatives to private vehicles, particularly in Dhaka.

Transit-Oriented Development (TOD)

- Promote compact, mixed-use, transit-oriented urban development to reduce travel demand and support sustainable transport modes.

Conclusion

•This study highlights that vehicle registration and ownership in Bangladesh have increased rapidly over the past decade, reflecting broader trends observed across developing countries.

•Despite relatively low per capita vehicle ownership compared to developed nations, Bangladesh is experiencing faster growth rates, particularly in motorcycle ownership, driven by rising incomes, rapid urbanization, and inadequate public transport systems.

•Urban areas especially Dhaka concentrate the highest share of vehicle ownership due to higher economic activity, population density, and travel demand, while rural areas are dominated by motorcycles because of affordability and limited transport alternatives.

•The rapid growth of private and para-transit modes has intensified congestion, environmental pollution, and safety risks, placing significant pressure on already constrained transport infrastructure.

•The findings emphasize the urgent need for integrated transport and land-use planning, strengthened public transport systems, and effective demand management policies to ensure sustainable mobility in Bangladesh.

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