Project III

Stage II Report

Dubai City Bus

Submitted by **Arjun Bavalia**
146390006
Mobility & Vehicle design
2014-16

Guided by **Shri. Dhrubajyoti Deb**
(AGM-PD Styling, Ashok Leyland)
Co-guided by **Prof. Nishant Sharma**
(Associate Professor, IDC IIT Bombay)

INDUATRIAL DESIGN CENTRE,
INDIAN INSTITUTE OF TECHNOLOGY BOMBAY,
POWAI, MUMBAI-400076, MAHARASHTRA (INDIA)

Approval Sheet

The project titled "Dubai city bus" by Arjun Bavalia is approved for the partial fulfillment of the requirement of degree of Master in Design in Mobility & vehicle design.

Guide_____

Co-guide_____

Chairperson_____

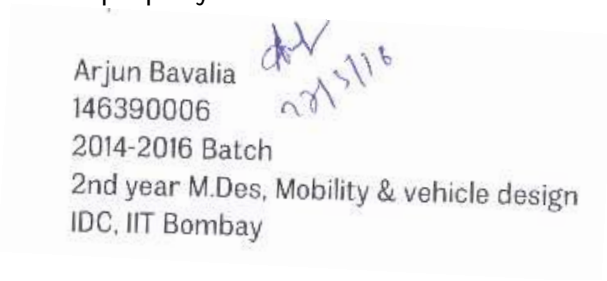
Internal Examiner_____

External Examiner_____

Date 27/06/2016

Declaration

I declare that this written submission represents my idea in my own words, and where others' ideas or words have been included, I have adequately cited and referenced the original source. I also declare that I adhered to all principles academic honesty and integrity and have not falsified, misinterpreted or fabricated any idea/ data/ facts/ sources in my submission. I understand that any violation of the above will be cause for disciplinary action by the institute and can also invoke penal action from the sources from which proper permission has not been taken, or improperly cited.



Arjun Bavalia
146390006
2014-2016 Batch
2nd year M.Des, Mobility & vehicle design
IDC, IIT Bombay

Acknowledgement

I am thankful to Prof. Nishant Sharma who has insisted and supported me to take up this project. I am thankful to my mentor Shri. Dhrubajyoti Deb (AGM, PD-styling, Ashok Leyland), Shri. Sathiya Seelan G (GM, PD-styling, Ashok Leyland), Shri. Dhanasekaran A (Manager, PD-styling, Ashok Leyland) who has given an eminent guidance and support to execute this project.

I am thankful to Samar Naik who always supported and motivated directly and indirectly during this project.

I am thankful to staff of PD-styling studio (Ashok Leyland) and remaining coordinating staff who are supporting me in this project directly and indirectly.

I am thankful to Virginia Vicente Luis (Spain) who always morally encouraged and supported.

I am very much thankful to my colleagues, friends, for their encouragement and support.

I am thankful to late Prof. Ramachandran Kaidru who is always stayed in our learning and who is not in this project but I am debt of what I learned from him in my program and which I applied and give justice to my project.

At last but not least I am always grateful and thankful to my family especially my mother who has always supported and encouraged.

Dedicated to.....

My Mother Smt. Kanchanben

&

Virginia Vicente Luis

Abstract

When we say Dubai, few things starts to coming in our mind like a dream city, tall buildings, night life, desert, beaches, super cars, luxury hotels etc. And yes it is true that Dubai is one of the city in the world which has shown enormous amount of change within past 45 years which makes it unique in the world.

Dubai is the place where the people from various countries comes as tourists or for employment. To cater their need in transportation Dubai is developing towards integrated transportation system which connects Metro to water transport through surface transport. In the surface transport the feeder buses caters the need for integration and connects entire city along with taxi.

This project is a hypothetical academic based project to design a city bus for Dubai. It is not just a city bus but it is a city bus for Dubai. The bus should express Dubainess at the end of the day and which make it different from rest of the city buses running in other cities in the world. It is a 24+D city bus. It starts with the understanding about Dubai and find some design attributes for the design and study about few transportation evolution in the world like in aviation, rail etc. Background study of the users is carried out and on that basis persona decided which makes the research more comprehensive.

The project phases and deliverable includes exploration, conceptualization of ideas, final concept rendering, a mock up scale model of exterior and a scale mockup of typical seating pitch represents key design aspects.

Content

IR-01

1. Ashok Leyland

Ashok Leyland is an Indian automobile manufacturing company based in Chennai, India. Founded in 1948, it is the 2nd largest commercial vehicle manufacturer in India, 4th largest manufacturer of buses in the world and 16th largest manufacturer of trucks globally. Operating six plants, Ashok Leyland also makes spare parts and engines for industrial and marine applications. It sells about 60,000 vehicles and about 7,000 engines annually. It is the second largest commercial vehicle company in India in the medium and heavy commercial vehicle (M&HCV) segment with a market share of 28% (2007–08). With passenger transportation options ranging from 19 seaters to 80 seaters, Ashok Leyland is a market leader in the bus segment. The company claims to carry more than 60 million passengers a day, more people than the entire Indian rail network. In the trucks segment Ashok Leyland primarily concentrates on the 16 ton to 25 ton range of trucks. However Ashok Leyland has presence in the entire truck range starting from 7.5 tons to 49 tons.

Ashok Motors was founded in 1948 by Raghunandan Saran, an Indian freedom fighter from Punjab. After Independence, he was persuaded by India's first Prime Minister Nehru, to invest in modern industrial venture. Ashok Motors was incorporated in 1948 as a company to assemble and manufacture Austin cars from England, and the company was named after the founder's only son Ashok Saran. The company had its headquarters in Rajaji Saalai, Chennai (then Madras) with the plant in Ennore, a small fishing hamlet in the North of Chennai. The Company was engaged in assembly and distribution of Austin A40 passenger cars in India.

1.1 Milestones of Ashok Leyland

IR-02

1948-The Birth of Ashok Motors

Ashok Motors was founded by Raghunandan Saran was set up in collaboration with Austin Motor Company, England and incorporated on September 7th for the assembly of Austin cars.

1949-The first A40 assembled

Production began in September at the factory situated at Ennore, south of Madras, and soon the first indigenously assembled A40 Austin car was rolled out.

1950-Ashok Motors and Leyland, UK agree to collaborate

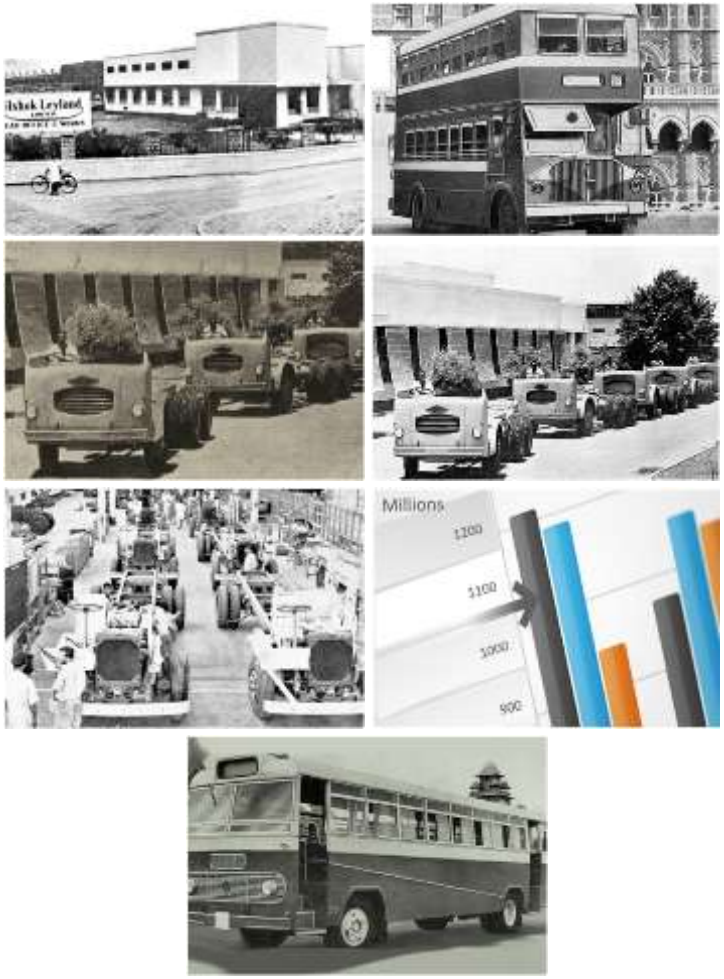
An agreement was reached between the two companies and Ashok Motors got sole rights to import, assemble and progressively manufacture Leyland trucks for seven years.

1951- Assembly of Leyland chassis commences

The first Leyland chassis assembled by Ashok Motors at Ennore were four Comet 350 engines tippers.

1954- Government approval for manufacture of commercial vehicles

The Government approved the progressive manufacture of Leyland commercial vehicles and a license for the manufacture of 1000 Comets a year was granted.



IR-03

1955- Ashok Motors becomes Ashok Leyland

Named after Raghunandan's son, Ashok, the company was renamed 'Ashok Leyland' with equity participation from Leyland Motors, Ltd.

1967- India's first double-decker arrives

'Titan'-The first Indian-made double decker with 50% indigenous components was launched.

1969- A revolution in steering

For the first time, power steering was featured on commercial vehicle

1970- A specially designed vehicle for the Indian Army

1000 numbers of 6x4 'Hippo' tipper was designed and delivered to the Indian Army based on its specific requirements.

1972- Production target upped to 10,000 vehicles a year

The license to manufacture 10,000 vehicles a year was granted.

1974- Turnover tops Rs. 1,000 million

Ashok Leyland's turnover for the first time crossed RS. 1000 million

1976- The Viking appears

The 'Viking', the first ever bus with an alternator and a unique front overhand that facilitated front entry hit the Indian roads.

IR-04

1978- A Cheetah bounds into the frame

India's first rear-engine bus- 'Cheetah" was introduced with mixed reactions from drivers. While it cut off much of the heat, their complaint was that they "could not hear engine!"

1980- Hosur plant starts operations

The company's second plant- Hosur 1 – was inaugurated by M.G. Ramachandran, the then Chief Minister of Tamil Nadu.

1980- The major new truck introductions

India's first 13-ton truck-'Tusker' with a 125 hp engine was launched followed by the country's first multi-axle truck-'Taurus'.

1982- India's first Vestibule bus introduced

India's first vestibule or the articulated bus was introduced ushering in a whole new concept in urban travel.

1982- Manufacturing footprint expands northwards

Two new manufacturing facilities at Bhandara (Maharashtra) and Alwar (Rajasthan) were inaugurated in March and August respectively.

1990- Technical Centre ready

The Company's Technical Centre at Vellyvoyalchavadi, on the outskirts of Madras was ready equipped with much-needed testing tracks.

IR-05

1993- First Indian auto company to receive ISO 9002 certification

This was followed two years later with the ISO 9001 certification.

1995- First driver training facility set up

The most comprehensive driver facility in India's private sector was set up at

1996- Hosur Plant II inaugurated

The second plant at Hosur was inaugurated by the then Prime Minister, Deve Gowda, in December.

1997- The Stallion rides for the Indian Army

The stallion, an all-terrain logistic vehicle, was inducted into the Indian Army.

1997-India's first CNG bus launched

As a major step in developing alternate fuel for mass transportation, India's first CNG-powered bus was handed over to the BEST (Brihan Mumbai Electricity Supply and Transport), Mumbai

2002- Another innovation in alternate fuel technology

The country's first Hybrid Electric Vehicle was developed and showcased at Auto Expo 2002

2005-A Stag crosses the border

When the Srinagar-Muzaffarabad road route was open for traffic, the first vehicle to cross from the Indian side was a Stag bus, flagged off by Prime Minister Dr. Manmohan Singh.

IR-06

2006- Acquisition of AVIA

The truck business of Czech Republic-based AVIA came into the Company's fold

2006-Agreement inked with Ras Al Khaimah Investment Authority

For the setting up of a bus assembly plant in the UAE, which was later inaugurated by Highness Sheikh Saud Bin Al Qasimi, Supreme Council Member and Ruler of Ras Al Khaimah

2007- Joint Venture forged with Nissan Motor Company, Japan

For manufacturing and marketing of Light commercial vehicles.

2007- Joint venture with Continental AG, Germany

The JV was with then Siemens VDO, for the development of automotive infotronics.

2007- Carrying the dreams of a nation

An Ashok Leyland double decker bus carried the victorious World T20 cricket team, under the leadership of M S Dhoni, on their lap of honor through the streets of Mumbai.

2007- Joint venture with the Alteams Group, Finland

For the production of HPDC (High Pressure Die Casting) extruded aluminum components.

2008- Joint Venture inked with John Deere, USA

For the manufacture of construction equipment products.

IR-07

2008- Albonair, GmBH established

For the development of clean and green technologies.

2010-India's first Hybrid CNG Plug-in Bus

Showcased at Auto Expo 2010 and later did service during the Commonwealth Games moving VIPs and media at Pragati Maidan, New Delhi.

2010- Pantnagar plant inaugurated

The company's modern, technologically world-class and largest plant went on stream with a capacity to touch 75,000 vehicles.

2010- The U-truck platform launch

The new, future ready U-truck platform entered the market with the promise of a holistically superior level of trucking.

2010- Stake in Optare plc.

As part of its global bus strategy, the Company bought 26% stake in Optare plc, a well-known bus maker in the UK. Subsequently, the stake was increased to 75.1% in January, 2012.

2011- A full range player with DOST

Entry into the Light commercial vehicles segment.

IR-08

2011- Enters the construction equipment space

October 2011 saw the launch of a new brand-LEYLAND DEERE-and unveil of the first of the first product from the Ashok Leyland-John Deere joint venture- the 435 Backhoe loader.

2012- Jan Bus

World's first single step entry, front engine, fully flat floor bus unveiled by Union Minister Shri Kamal Nath.

2012-U-3723

Introduced India's first 37-tonne haulage truck with the highest payload of upto 27 tonnes

2013-Neptune Engine

Launched the future-ready electronic fuel efficient engine with CRS with its protected upto BS-VI

2013- BOSS

Launched the next generation intermediate commercial vehicle.

2013- STILE

A stylish Multi-Purpose (MPV) based on a contemporary, award winning vehicle platform and the most fuel efficient vehicle in its category.

IR-09

2014- CAPTAIN

CAPTAIN truck series launched

2014-MiTR Bus

Launched MiTR-a new age LCV bus, ergonomically designed to offer superior comfort and utility to passengers and operators. MiTR offers class-leading comfort with parabolic suspension in front & rear-an industry first. It is powered by advanced ZD30 Common Rail diesel engine that ensures superior fuel efficiency

2014- Partner Truck

Launched the next generation LCV Truck-Partner powered by advanced ZD30 Common Rail diesel engine, that ensures superior fuel-efficiency and better turnaround time. India's first air-conditioned LCV goods vehicle which features modern Euro cab with spacious car-like interiors and offers global levels of performance and efficiency.

IR-10

1.2 About Hinduja Group

The **Hinduja Group** is a global conglomerate company headquartered in London, United Kingdom. The company was founded in 1914 by Parmanand Deepchand Hinduja, who was from a Hindu family based in India. Initially operating in Mumbai, India, he set up the company's first international operation in Iran in 1919. The headquarters of the group moved to Iran where it remained until 1979, when the Revolution forced it to move to Europe.

Srichand Hinduja and his brother Gopichand moved to London in 1979 to develop the export business; Prakash manages the group's finances in Geneva, Switzerland while the youngest brother, Ashok, oversees the Indian interests. The brothers are all devout Hindu, vegetarian and teetotalers, and dress in similar ways, with a preference for black suits and round glasses.

Under the leadership of its chairman, Srichand, today the Hinduja Group has become one of the largest diversified groups in the world. The group employs over 70,000 people and has offices in cities of the world and all the major cities in India. In 2014, Srichand and Gopichand Hinduja emerged as the richest men in Britain with a net wealth of about $20 billion.

The Hinduja Group bought into Ashok Leyland, India's second largest HCV manufacturer, in 1987. It was the group's first foray into India.

The company has a large export market, including a 65% plus market share in Sri Lanka (in the 16 ton plus category) and enjoys a similar market share in the bus segment in Dubai. During 2003-2005, the company executed an order of 3322 trucks for Iran under the UN's oil and food programme, the largest ever in the Indian commercial vehicle industry.

The company is a pioneer in CNG (Compressed Natural Gas) buses and special vehicles for the armed forces, both of which have opened up additional export opportunities for the company.

The company had acquired 100% of the paid-up capital of Defiance Testing and Engineering Services, Inc. (DTE) based near Detroit, Michigan, USA, in May 2007. DTE provides independent testing services for leading auto OEM's and their tier 1 and tier 2 suppliers. In October, 2013, Ashok Leyland sold DTE to Exova, a testing services company based in the UK.

IR-11

1.3 Styling Studio

Ashok Leyland styling studio started in 2007. It is a team of 13 members who has played a role in giving a new shape in the growth of the company. They have succeed in creating a new design language which has not only given recognition in the Indian market but also at International level. The design language followed by Ashok Leyland starts with **Simple, Confident, Calm**, subtle, elegance, robust.

1.4 Products of Ashok Leyland

Ashok Leyland has three ranges of Products which includes Trucks, Buses and Light commercial vehicles. It has wide ranges in each class. Also it has ranges of product for defense vehicles like artillery vehicles and rescue ambulances.

Light Commercial vehicle

Buses

Defense vehicle

Medium & Heavy Commercial vehicle

1. Project Brief

Design a city bus for Dubai

It has to be unique for Dubai and should propose a new definition following semantics of bus.

It has to be fully built solution (fabrication) with few tooled up parts.

It should be post contemporary rendition.

CAPACITY: 25 seater

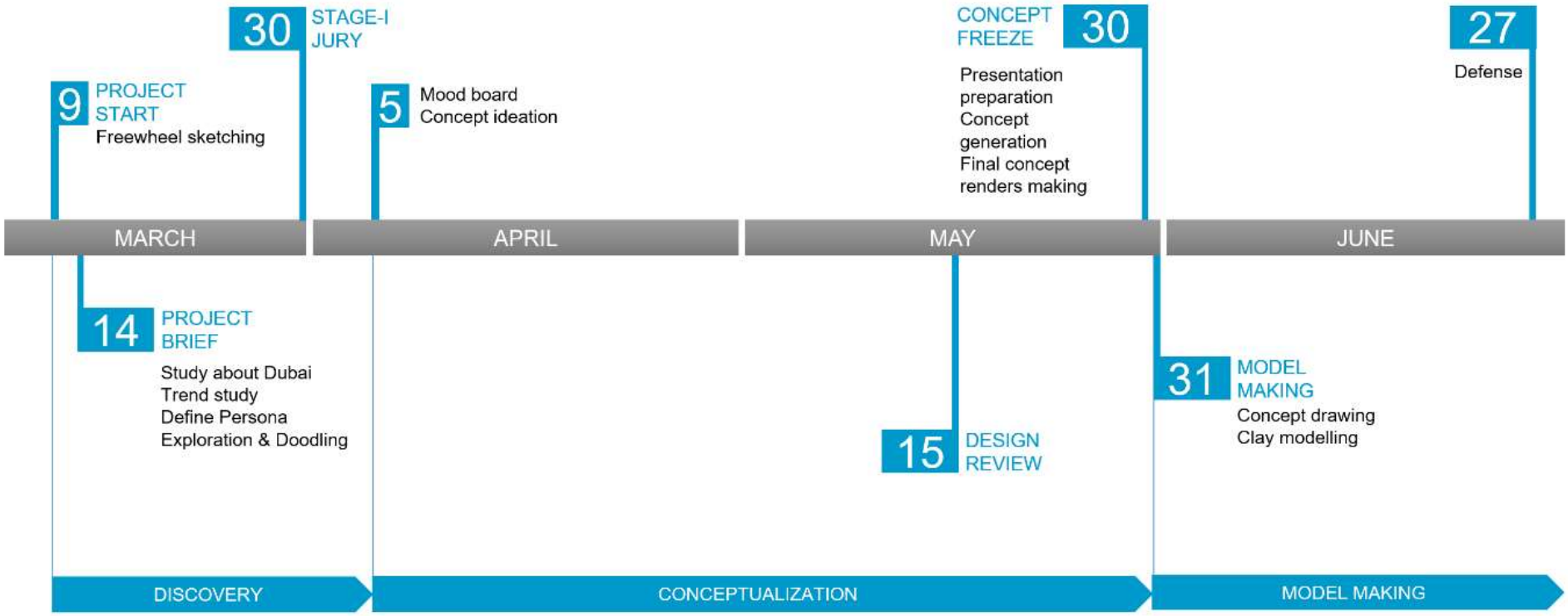
DELIVERABLES:

Exterior: Scaled mock up model

Interior: Scaled mockup of typical seating pitch (section)

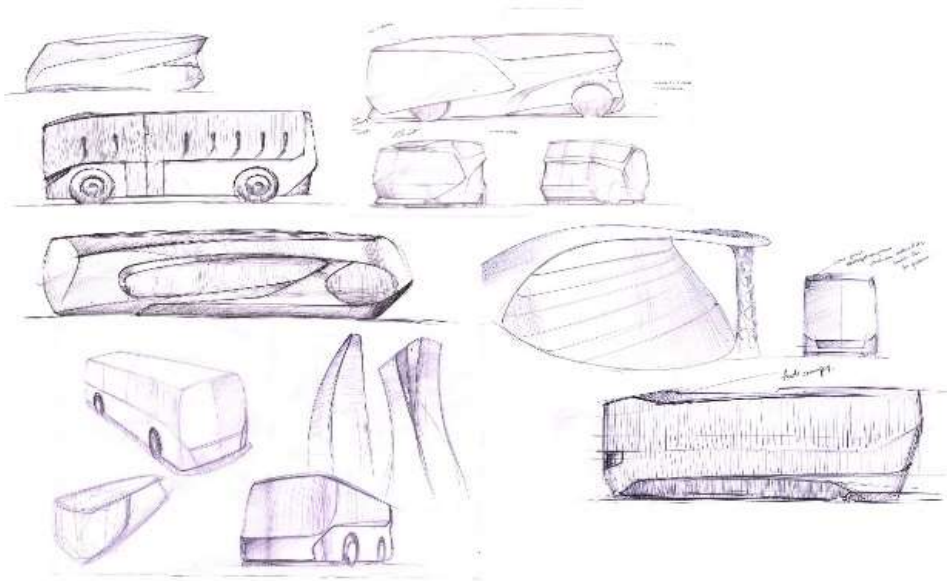
Representing key design aspects

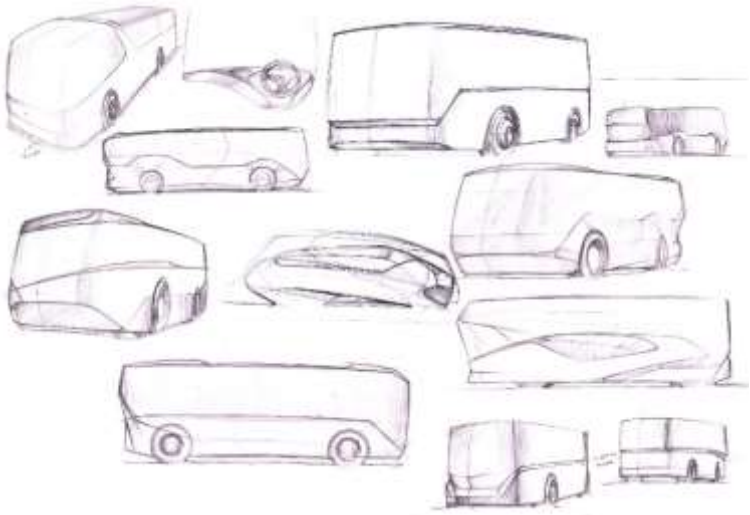
2. Project Schedule

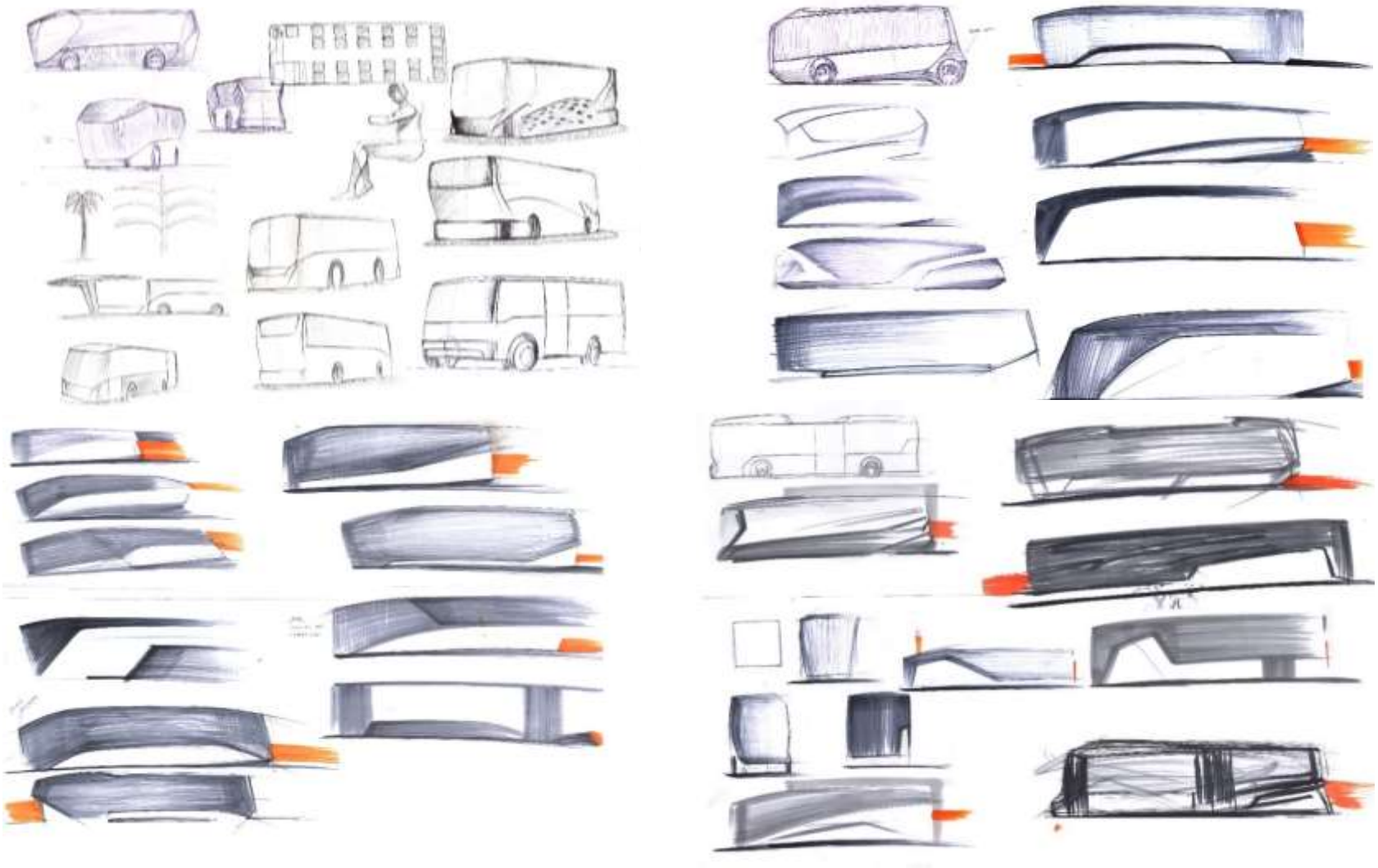


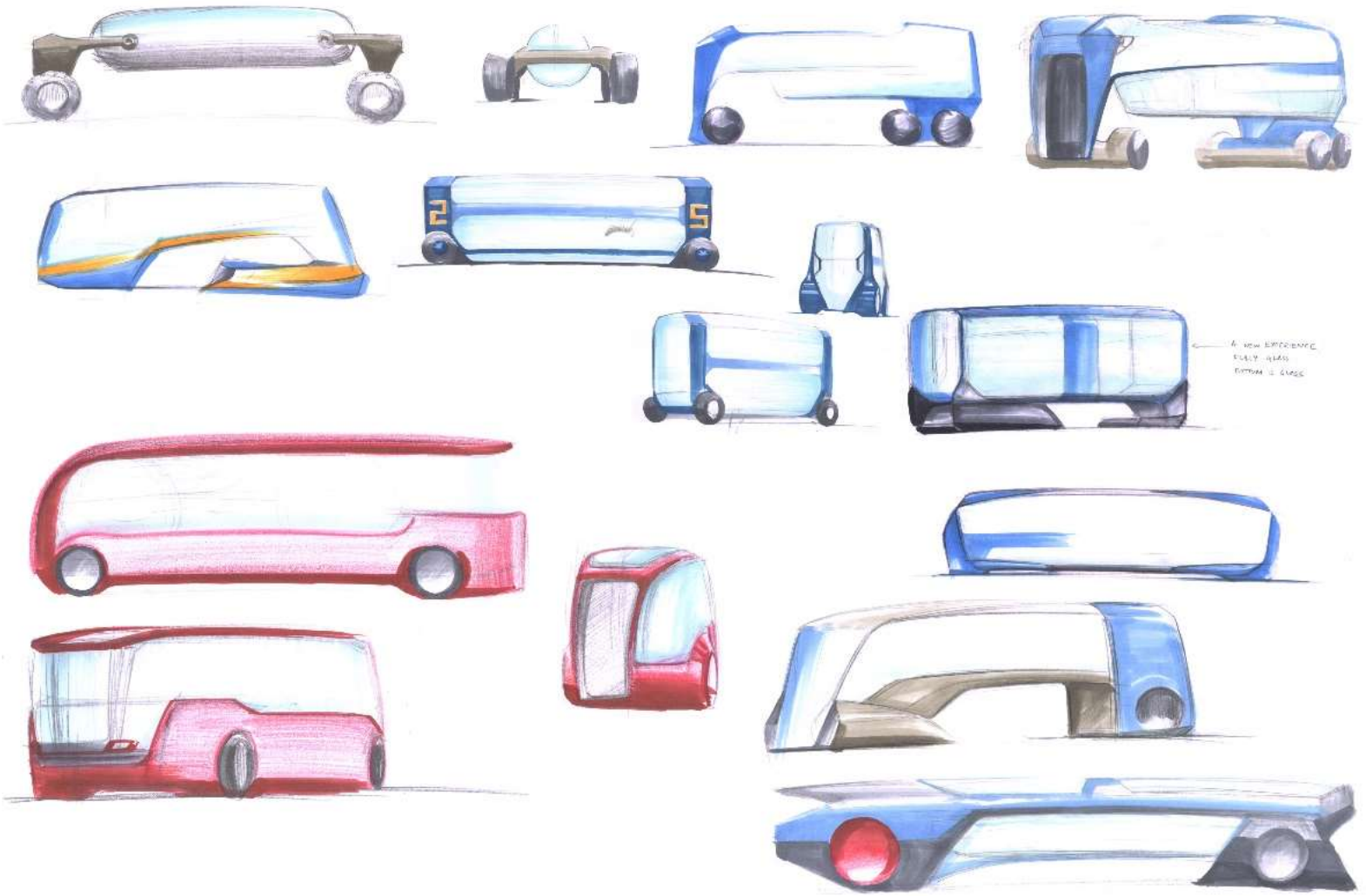
3. Free wheel sketching

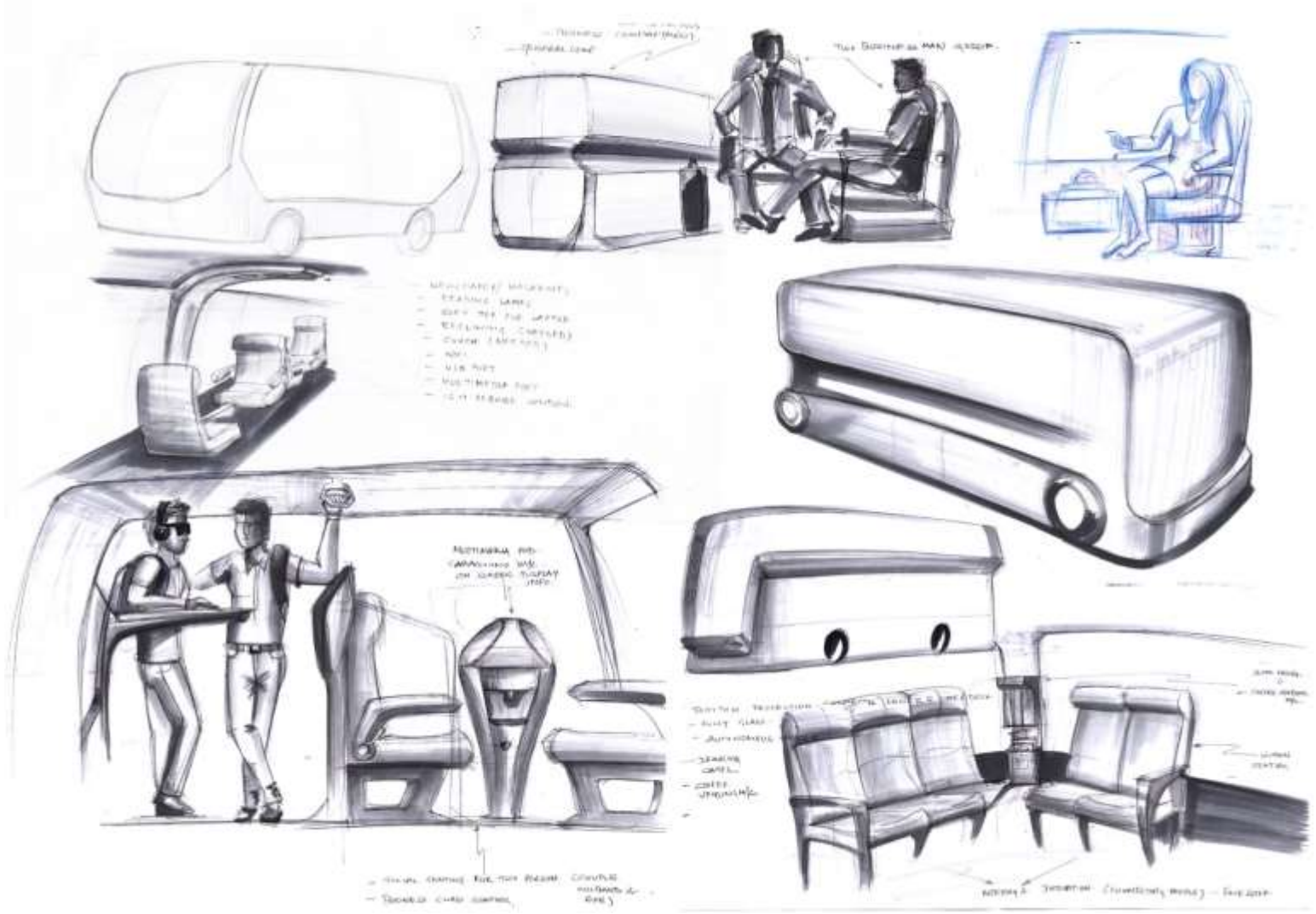
Before starting initial primary research, ideations & explorations based on imagination where done. The idea behind is to ideate some unconventional imagining Dubai, which can be useful in future exploration phases.











5. City Bus

A bus is a passenger carrier vehicle to transport more than 13 passenger from one place to another place in simple definition. The passenger strength can increase upto 80. There are different types of buses like city bus, school bus, tourist bus, luxury coaches, double decker bus, executive bus, special bus etc. But what makes them different from each other. It is the user profile who is going to use and where it is meant for makes it makes it different form each other.

A city bus is a transit passenger vehicle in the city in which daily commuters commutes form A-destination to B-destination. And to design a city bus it is necessary to understand its user, where it is meant for or uniqueness of Dubai which makes it suitable for Dubai and at the end we can say that – "yes it is a Dubai city bus".

IR-13

IR-14

5.1 Technical Study about buses

What is bus?

A bus is a vehicle which is four or more wheeled motor vehicle designed and constructed for the purpose of transportation of 13 passengers or above excluding driver.

Types of Buses

It can be classified as high and low capacity buses.

High capacity bus: The buses with seating capacity more than 70 passengers plus driver. Such as

Double decker bus

Articulated bus

Double deck articulated bus

Low capacity bus: Low capacity bus are designed and constructed for urban and sub urban transport exclusively for carrying seated passengers. The low capacity vehicles can carry standee passengers if they meet provisions for low capacity standee buses

It includes:

Micro bus: seating capacity of maximum 12 passenger and driver.

Mini bus: Seating capacity between 13 to 22 passenger and driver.

Medium capacity vehicles includes:

Midi bus: seating capacity of between 23 to 34 passenger and driver.

Standard bus: seating capacity between 35 to 70 passenger and driver.

Special purpose buses includes:

Sleeper coaches

School buses

Tourist buses

Prison vehicles

Ambulances

Off-road vehicles

Vehicle designed for security, police, and armed forces.

Buses are also classified according to the construction:

Monocoque construction: A type of bus body structure where the body and base frame are joined together either by welding or other methods to form an integral structure. Theses structural elements consists of pressed grid type of support elements and rectangular sections.

Ladder type chassis construction: The chassis frame of the vehicle and is the main load bearing element. The general construction of ladder frame consists of side and cross members. The side and cross members are connected with special gusset sections or pressed cross member sections. The junction are riveted, bolted or welded.

Buses are also classified based on comfort level:

Non Deluxe Bus (NDX): a bus designed for basic minimum comfort level.

Semi Deluxe Bus (SDX): A bus designed for a slightly higher comfort level and with provision for ergonomically designed seats.

Deluxe Bus (DLX): a bus designed for a high comfort level ad individual seats and adjustable seat backs, improved ventilation and pleasing interiors.

A.C. Deluxe Bus (ACX): a deluxe bus which is air conditioned.

Dubai is located on the southeast coast of Persian Gulf. It is one of the seven emirates which completes UAE

IR-15

6. Dubai

Dubai is the most populous city in the United Arab Emirates (UAE). It is located on the southeast coast of the Persian Gulf and is one of the seven emirates that make up the country. Dubai is located on the emirate's northern coastline and heads up the Dubai-Sharjah-Ajman metropolitan area.

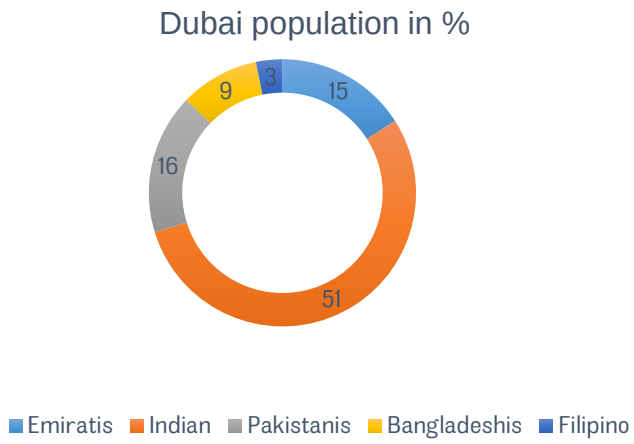
Dubai has emerged as a global city and business hub of the Middle East. It is also a major transport hub for passengers and cargo. By the 1960s, Dubai's economy was based on revenues from trade and, to a smaller extent, oil exploration concessions, but oil was not discovered until 1966. Oil revenue first started to flow in 1969. Dubai's oil revenue helped accelerate the early development of the city, but its reserves are limited and production levels are low: today, less than 5% of the emirate's revenue comes from oil. The emirate's Western-style model of business drives its economy with the main revenues now coming from tourism, aviation, real estate, and financial services. Dubai has recently attracted world attention through many innovative large construction projects and sports events. The city has become iconic for its skyscrapers and high-rise buildings, in particular the world's tallest building, the Burj Khalifa. As of 2012, Dubai is the 22nd most expensive city in the world and the most expensive city in the Middle East. In 2014, Dubai's hotel rooms were rated as the second most expensive in the world, after Geneva.

6.1 Origin of Dubai

IR-16

Many theories have been proposed as to the origin of the word "Dubai". One theory suggests the word was used to describe the souq, which was similar to the souq in Ba. Another theory states that the name came from a word meaning "money", as people from Dubai were commonly believed to be rich due to the thriving trading center of the location.

The history of Dubai can be traced back to the year 1830 when it was taken over by a branch of the Bani Yas tribe from the Liwa oasis, led by the Maktoum family, who still rule the emirate today. In 1894, Sheikh Maktoum Bin Hasher Al-Maktoum, the ruler of Dubai, exempted foreign traders from taxes, making way for Dubai's modern development - starting with local merchants selling items like pearls, fish, spices and dates. Traders from India and Persia were also attracted to Dubai because of the liberal attitudes of the rulers, and soon began to settle in the growing town, which developed a reputation as the leading commercial center for the region. Trade was based around the safe, natural anchorage of the Creek, which was and still is the visual and commercial heart of the city, with numerous dhows still sailing to other countries. Dubai is simultaneously a dynamic, international business center and a relaxing tourist destination. These features make Dubai a truly cosmopolitan place to live; but the rich history of the emirate also provides a culture deeply rooted in the Islamic traditions of Arabia. At the same time, Dubai is a very tolerant and welcoming place for foreigners, with visitors free to follow their own religions. Drinking alcohol in hotels and licensed health and sports clubs is permitted for non-Muslims.



COSMOPOLITAN OF UAE

Dubai is most populous city in the UAE. It has only 15% of UAE nationals. About 85 % is covered by expatriate population. Most of them are Asian and few are Western. It is one of the most attractive and busiest city of UAE.

6.2 Dubai demographics

According to the census conducted by the Statistics Centre of Dubai, the population of the emirate was 1,771,000 as of 2009, which included 1,370,000 males and 401,000 females. The region covers 1,287.5 square kilometers (497.1 sq. mi). The population density is 408.18/km^2 – more than eight times that of the entire country. Dubai is the second most expensive city in the region and 20th most expensive city in the world.

As of 2013, only about 15% of the population of the emirate was made up of UAE nationals, with the rest comprising expatriates, many of whom either have been in the country for generations or were born in the UAE. Approximately 85% of the expatriate population (and 71% of the emirate's total population) was Asian, chiefly Indian (51%) and Pakistani (16%); other significant Asian groups include Bangladeshis (9%) and Filipinos (3%). There is a sizable community of Somalis numbering around 30,000, as well as other communities of various nationalities. A quarter of the population (local and foreign) reportedly traces their origins to Iran. In addition, 16% of the population (or 288,000 persons) living in collective labor accommodation were not identified by ethnicity or nationality, but were thought to be primarily Asian. There are over 100,000 British expatriates in Dubai, by far the largest group of Western expatriates in the city.

IR-17

6.3 Dubai Economy

Dubai has changed dramatically over the last three decades, becoming a major business center with a more dynamic and diversified economy. Dubai enjoys a strategic location and serves as the biggest re-exporting center in the Middle East.

Its low logistical and operational costs and excellent infrastructure, international outlook and liberal government policies are attracting investors in a big way. Activities such as trade, transport, tourism, industry and finance have shown steady growth and helped the economy to achieve a high degree of expansion and diversification.

The Dubai economy enjoys a competitive combination of cost, market and environmental advantages that create an ideal and attractive investment climate for local and expatriate businesses alike. In fact, these advantages not only rank Dubai as the Arabian Gulf's leading multi-purpose business center and regional hub city, but they place it at the forefront of the globe's, dynamic and emerging market economies.

Dubai, with its ancient commercial and seafaring traditions, has long been recognized as the Middle East region's leading trading hub and has emerged as its key re-export center. In more recent years, the Emirate has become a major venue for a number of growing, profitable industries and activities:

· Meetings, conferences, exhibitions
· Tourism
· Corporate regional headquarters
· Regional transport, distribution and logistics center
· Banking, finance and insurance
· Business and industrial consulting
· Information and Communications Technology
· Light and medium manufacturing

IR-18

This all became possible due to Dubai's warm, welcoming people, world class facilities and infrastructure and farsighted, open and liberal economic policies. Finally, committed to a progressive vision of itself, keen to diversify its economy and diminish its reliance upon shrinking oil revenues, Dubai has begun to develop into the Arabian Gulf's premier international business center. Consider the factors that contribute to this ongoing success story.

6.4 Dubai Culture & Lifestyle

IR-19

Culture in Dubai is rooted in Islamic traditions that form UAE National's lifestyles. Dubai is famously known as the entertainment capital of the Middle East which attracts many party lovers from all over the world especially those who are wealthy enough to splash out on the most expensive places in the city. The UAE culture mainly revolves around the religion of Islam and traditional Arab culture. The influence of Islamic and Arab culture on its architecture, music, attire, cuisine and lifestyle are very prominent as well. Five times every day, Muslims are called to prayer from the minarets of mosques which are scattered around the country. Since 2006, the weekend has been Friday-Saturday, as a compromise between Friday's holiness to Muslims and the Western weekend of Saturday-Sunday.

The city's cultural imprint as a small, ethnically homogenous pearling community was changed with the arrival of other ethnic groups and nationals—first by the Iranians in the early 1900s, and later by Indians and Pakistanis in the 1960s. In 2005, 84% of the population of metropolitan Dubai was foreign-born, about half of them from India.

Due to the touristic approach of many Dubaietes in the entrepreneurial sector and the high standard of living, Dubai's culture has gradually evolved towards one of luxury, opulence and lavishness with a high regard for leisure-related extravagance.

IR-20

Annual entertainment events such as the Dubai Shopping Festival (DSF) and Dubai Summer Surprises (DSS) attract over 4 million visitors from across the region and generate revenues in excess of $2.7 billion.

Emiratis tend to dress in their traditional clothes influenced by their Islamic belief. Most men prefer the traditional dishdasha or khandura (a long white shirt dress), with ghutra (a white headdress) and agal (a rope worn to keep the ghutra in place).

The Emirati women tend to wear an abaya (a long black cloak), which is worn over conservative clothes, with a shelya or hijab (a scarf used to wrap around the face and head).

IR-21

6.5 What makes Dubai Unique?

Dubai has shown Rapid Growth within 30-45 years. It has shown an effective use of resources. Initially it has only sources of income from oil exploration which is no more exists today but it has invested share of profit from oil income and created a developed city in the barren desert of Middle East and created an example in the world.

DUBAI IS BUOYANT
Dubai has always been an attractive destination & unique in the world, but what makes it so?

When world is exploring new planets for survival of human being. A Dubai which is a small city has created own land like palm island and world island, can be considered as blueprint for future instead of going to other planets.

Dubai has many sky scrapers in the city. They want to build a city like pyramid of Egypt through complex engineered superstructures in the middle of the earth. It shows growth of proud and confidence and a soft power in the world. It want to show how they are prominent

Sustainable city in the World.
Dubai has proved to survive against nature's fury. Green land in the desert

IR-22

IR-23

IR-24

Theme park like Antarctica continent in the hot desert makes a place where anyone can realize their dream like play in snow, or dive in sky. Dubai can create anything it shows. It shows the high aspiration of Dubaietes rather than small fishing colony or pearl town which happens to be in late 1960

Dubai's Classy police well equipped with fleet of super cars and Segway and amphibian vehicle which shows a safe and secure Dubai. It is not about luxury but it is about how speeder they are and can prevent crime and maintain a crime free city.

IR-25

IR-26

IR-27

IR-28

Dubai is always constantly on quest to impress the world with extravagance.

Biggest mall in the world.

Camel race by robots is the one example of which shows that Dubai always wants to do things differently which make an example.

It is also shows a futuristic approach towards autonomous world where everything will be in the control of machines.

Dubai wants biggest and best in the world

IR-29

6.6 Dubai Transportation System

Dubai is a city which has made its population moving fast by having integrated transportation system. Dubai is develop on the creek and two connect either side of creek it has developed water body transport by existing Abra (wooden boats) and water taxis. Dubai has Autonomous metro which plies for along 42 stations. The trams are connected by monorails. Dubai has city bus which plays role to reach commuters to the place which are not covered by metro, monorail, trams. These buses are acting as feeder bus which connects metro station, monorail stations as well as ferry station. Dubai personal has taxi service also.

Transport in Dubai is controlled by the Roads and Transport Authority (RTA), an agency of the government of Dubai, formed by royal decree in 2005.The public transport network has in the past faced congestion and reliability issues which a large investment programme has addressed, including over AED 70 billion of improvements planned for completion by 2020, when the population of the city is projected to exceed 3.5 million.

IR-30

Five main routes – E 11 (Sheikh Zayed Road), E 311 (Sheikh Mohammed Bin Zayed Road), E 44 (Dubai-Hatta Highway), E 77 (Dubai-Al Habab Road) and E 66 (Oud Metha Road) – run through Dubai, connecting the city to other towns and emirates. Additionally, several important intra-city routes, such as D 89 (Al Maktoum Road/Airport Road), D 85 (Baniyas Road), D 75 (Sheikh Rashid Road), D 73 (Al Dhiyafa Road now named as 2 December street), D 94 (Jumeirah

IR-31

Road) and D 92 (Al Khaleej/Al Wasl Road) connect the various localities in the city. The eastern and western sections of the city are connected by Al Maktoum Bridge, Al Garhoud Bridge, Al Shindagha Tunnel, Business Bay Crossing and Floating Bridge.

The Public Bus Transport system in Dubai is run by the RTA. The bus system services 140 routes and transported over 109 million people in 2008. By the end of 2010, there will be 2,100 buses in service across the city.[152] In 2006, the Transport authority announced the construction of 500 air-conditioned (A/C) Passenger Bus Shelters, and planned for 1,000 more across the emirates in a move to encourage the use of public buses. All taxi services are licensed by the RTA. Dubai licensed taxis are easily identifiable by their cream bodywork color and varied roof colors identifying the operator. Dubai Taxi Corporation, a division of the RTA, is the largest operator and has taxis with red roofs. There are five private operators: Metro Taxis (orange roofs); Network Taxis (yellow roofs); Cars Taxis (blue roofs); Arabia Taxis (green roofs); and City Taxis (purple roof). In addition, Dubai Taxi Corporation has a Ladies Taxi service, with pink roofs, which caters exclusively for female passengers, using female drivers. The Dubai International Airport taxi concession is operated by Dubai Taxi Corporation. There are more than 3000 taxis operating within the emirate making an average of 192,000 trips every day, carrying about 385,000 persons. In 2009 taxi trips exceeded 70 million trips serving around 140.45 million passengers

IR-32

Metro

A $3.89 billion Dubai Metro project is operational. It consists of two lines (Red line and Green line) which run through the financial and residential areas of the city. The Metro system was partially opened on September 2009. UK-based international service company Serco is responsible for operating the metro. The metro comprises the Green Line, which has 20 stations (8 underground, 12 elevated) and runs from the Etisalat Station to the Creek Station and the Red Line, the major back bone line, which has 29 stations (4 underground, 24 elevated and 1 at ground level) and runs from Rashidiya Station to UAE Xchange Station Jebel Ali. A Blue and a Purple Line have also been planned. The Dubai Metro (Green and Blue Lines) will have 70 km (43.5 mi) of track and 43 stations, 37 above ground and ten underground. The Dubai Metro is the first urban train network in the Arabian Peninsula. All the trains run without a driver and are based on automatic navigation.

Monorail

The Palm Jumeirah Monorail is a monorail line on the Palm Jumeirah. It connects the Palm Jumeirah to the mainland, with a planned further extension to the Red Line of the Dubai Metro. The line opened on 30 April 2009. Two tram systems are expected to be built in Dubai by 2011. The first is the Downtown Burj Khalifa Tram System and the second is the Al Sufouh Tram. The Downtown Burj Khalifa Tram System is a 4.6 km (2.9 mi) tram service that is planned to service the area around the Burj Khalifa, and the second tram will run 14.5 km (9.0 mi) along Al Sufouh Road from Dubai Marina to the Burj Al Arab and the Mall of the Emirates.

IR-33

Tram

A tramway located in Al Sufouh, Dubai, will run for 14.5 kilometers (9.0 miles) along Al Sufouh Road from Dubai Marina to the Burj Al Arab and the Mall of the Emirates with two interchanges with Dubai Metro's Red Line. The first section, a 10.6-kilometer (6.6 mi) long tram line which serves 11 stations, was opened on 11 November 2014, by H.H. Sheikh Mohammed bin Rashid Al Maktoum, The Vice-President and Prime Minister of UAE and Ruler of Dubai, with the line opening to the public at 6 am on 12 November 2014.

Waterways

There are two major commercial ports in Dubai, Port Rashid and Port Jebel Ali. Port Jebel Ali is the world's largest man-made harbor, the biggest port in the Middle East, and the 7th-busiest port in the world. One of the more traditional methods of getting across Bur Dubai to Deira is by *abras*, small boats that ferry passengers across the Dubai Creek, between Abra stations in Bastakiya and Baniyas Road. The Marine Transport Agency has also implemented the Dubai Water Bus System. Water bus is a fully air conditioned boat service across selected destinations across the creek. One can also avail oneself of the tourist water bus facility in Dubai. Latest addition to the water transport system is the Water Taxi.

6.7 Dubai Architecture

IR-34

Dubai has a rich collection of buildings and structures of various architectural styles. Many modern interpretations of Islamic architecture can be found here, due to a boom in construction and architectural innovation in the Arab World in general, and in Dubai in particular.

Burj Khalifa

The design of Burj Khalifa is derived from patterning systems embodied in Islamic architecture. According to the structural engineer, Bill Baker of SOM, the building's design incorporates cultural and historical elements particular to the region such as the spiral minaret. The spiral minaret spirals and grows slender as it rises. The Y-shaped plan is ideal for residential and hotel usage, with the wings allowing maximum outward views and inward natural light. As the tower rises from the flat desert base, there are 27 setbacks in a spiraling pattern, decreasing the cross section of the tower as it reaches toward the sky and creating convenient outdoor terraces. At the top, the central core emerges and is sculpted to form a finishing spire. At its tallest point, the tower sways a total of 1.5 m (4.9 ft.)

IR-35

Burj Al Arab

Burj Al Arab was designed by multidisciplinary consultancy Atkins led by architect Tom Wright, who has since become co-founder of WKK Architects. Construction of the Island began in 1994 and involved up to 2,000 construction workers during peak construction. It was built to resemble the billowing spinnaker sail of a J-class yacht.[1] Two "wings" spread in a V to form a vast "mast", while the space between them is enclosed in a massive atrium. The architect Tom Wright said "The client wanted a building that would become an iconic or symbolic statement for Dubai; this is very similar to Sydney with its Opera House, London with Big Ben, or Paris with the Eiffel Tower. It needed to be a building that would become synonymous with the name of the country.

Dubai in Nutshell

Dubai, it is not the money which drives the aspirations of people. It is a natural resolution of the people to have a better life in the middle of the desert. For example, Dubai has proved that they have tried and succeed to sustain against the Nature's fury.

They don't have the resources like other countries but they can be said as proven that they are deploying sustainable sources by using alternative modes and had made their life easy which proves it as a sustainable city.

Dubai has proved the effective use of money, resources like Dubai has very less land but they created a land in the water and palm island and world island be considered as the blueprint for future. Instead of going to the other planet Dubai is a place where the dreams are accomplished- A theme park like Antarctica and also they came up with money generating income because it is all used by world? It has challenged the nature in the middle of desert and become tourist hub. These are all aspirations of Dubai rather than a small fishing or pearl town.

What is the inspiration of Dubai-Israel? Israel has done a massive research in Agriculture and they had proven it and this Dubai came up with a question that if they can do that then why can't we? Which is a question in the mind of every Dubaietes.

It is also the showcase of soft power where it can be clubbed with city like Tokyo, Newyork and all amenities, luxury where the people wants to come to showcase their idea.

Dubai wanted to act as a link between East and West. They also wants to build a city like pyramid of Egypt. Pyramids are built through complex engineering which no one can rebuilt in the middle of desert.

Dubai has many sky scrapers but none of has reach the height of Empire tower in Newyork. So they wanted to create a superstructure on the middle of earth/ middle of desert and which makes feel proud by every Dubaietes and feels jealous by other people.

Dubai wants everything in the western country and fuse into local, Middle Eastern culture. Nobody can say that once it was a fishermen colony and to delink itself from its past image.

They wear Khandura but still drive around Rolls Royce, Jaguar etc.

Dubaietes have learnt the art of balancing traditions with modernity. It also called rich man conclave. Dubai what you see today is actually what a glimpse of what to be in future- clean, green, sustainable.

This all the once upon a time was like fairy tale dreams and a root dream of every country which is an example.

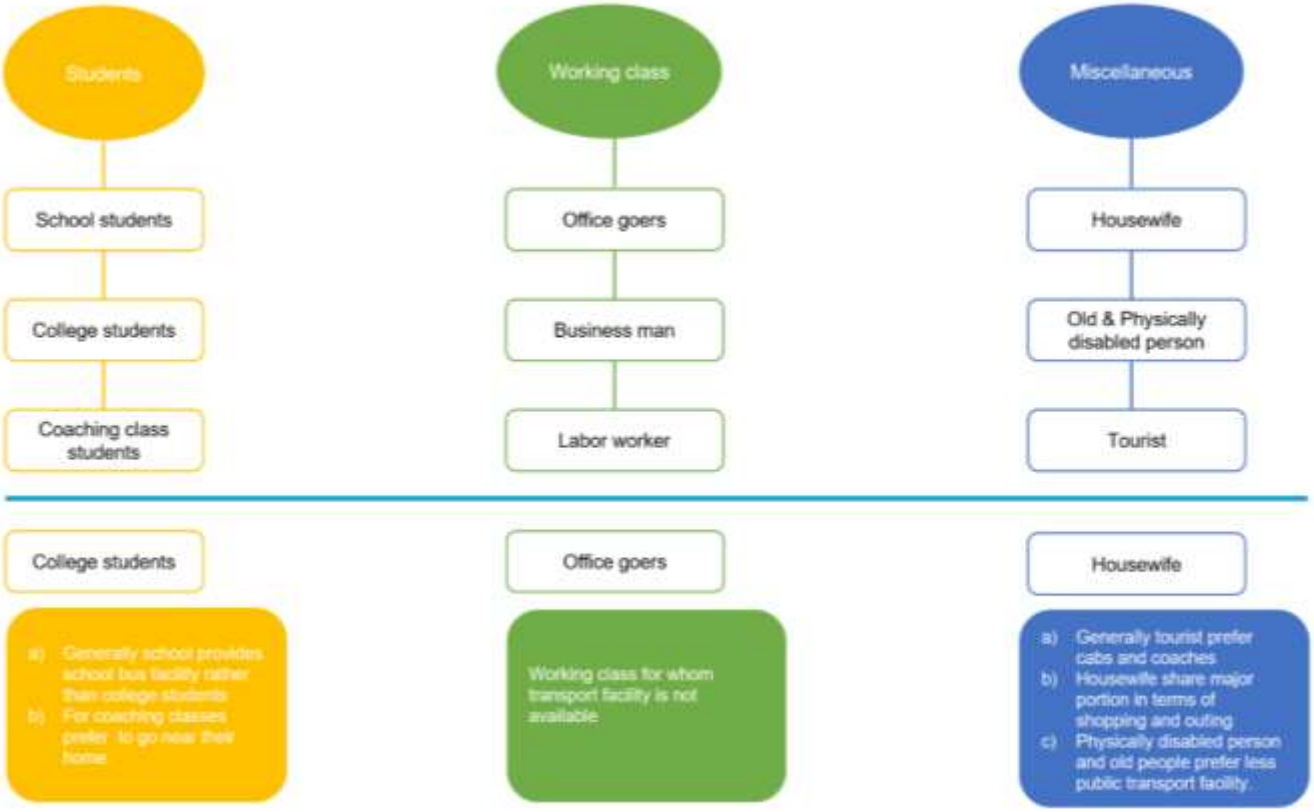
Dubai is a tax free nation and which has proven that high amount of disposable income and high amount of liquidity and they can afford to build megastructures which is seldom done anywhere.

Need for green technology in transportation to plug the loopholes of rising pollution, traffic congestion & problem and fossil fuel consumptions.

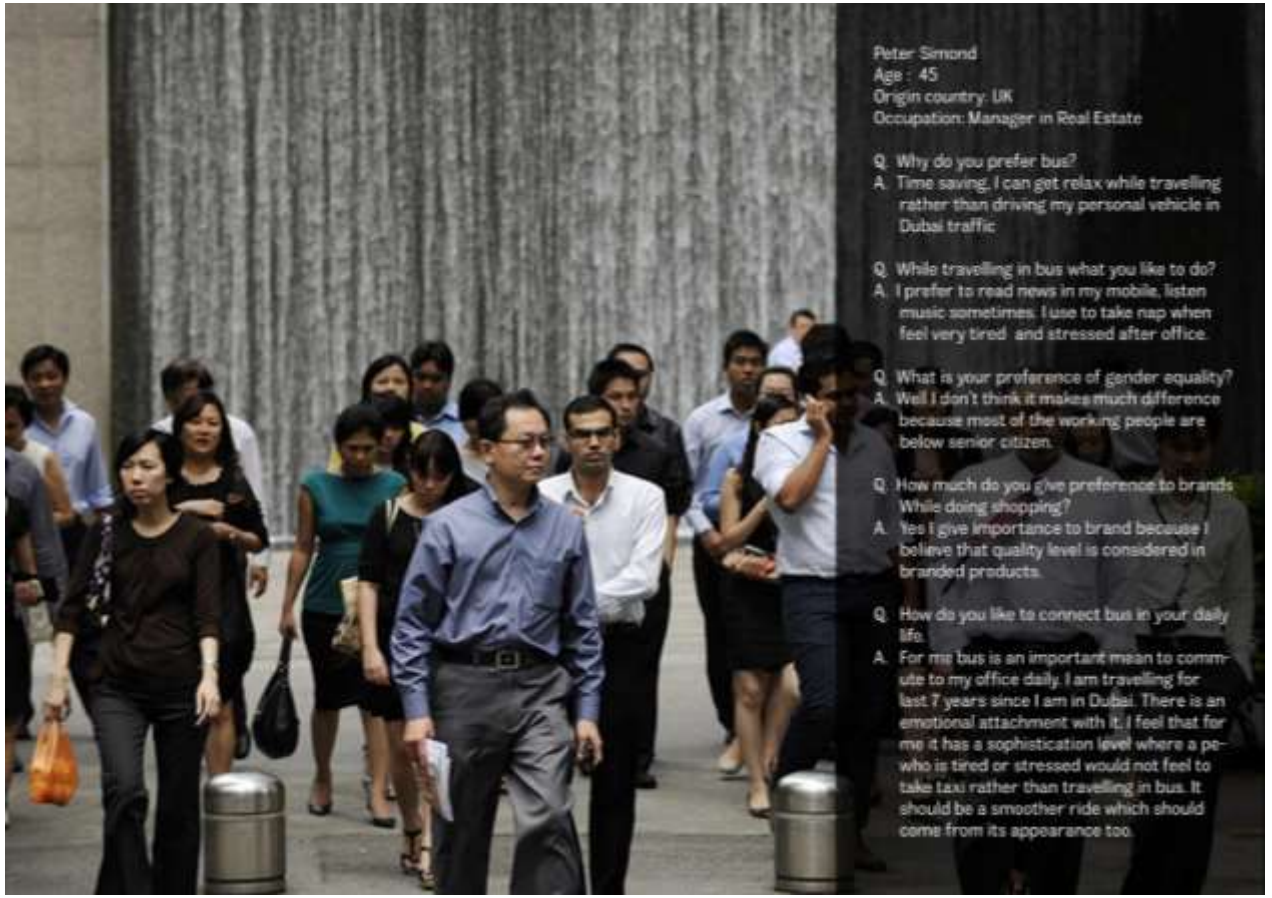

DUBAI Talks about
PROMINANCE
SUSTAINABLE
VERTICAL
SUPERLATIVE
CHALLENGE
OPULENCE
BUOYANT
SMART
LAVISH
GROWTH
SHOWCASE
AMALGAMATION
POST CONTEMPORARY
SOFT POWER
EXOTIC

7. Persona

To define user of the product it is essential to understand persona, their behavior with the product functionally and emotionally



On the basis of previous analysis three major persona are chosen from each category such as college student, Office worker, and a housewife. And accordingly questionnaire prepared.



Ashya Hamir Sheikh
Age : 21
Origin country: Abu Dhabi
Occupation: Student at University of Dubai

Q. Why do you prefer bus?
A. I prefer bus because most of my college mates preferred to commute together. So for me bus is a mode to connect with them rather than travel in personal vehicle. It is a safer and time saving mode of travel. No worry about parking for my personal vehicle.

Q. While travelling in bus what you like to do?
A. Usually I daily commutes about 10 km to & fro during which I like to chit chat with my friends and if I am alone I use to listen music in my mobile, but I will prefer to travel in wi-fi enabled bus.

Q. What is your preference of gender equality?
A. Well I am Emiratis, but for me there is no much difference between male and female in terms of commuting together in our age group.

Q. How much do you give preference to brands while doing shopping?
A. I do shopping much but for me rather than brand quality matters.

Q. How do you like to connect bus in your daily life?
A. Bus is not just a mode of transport. But a space where I spend my 40 minutes daily. To choose anything for me first its outer appearance matters which should not be much noisy.

Rubeena Makhdum
Age : 30
Origin country: (Dubai) UAE
Occupation: Housewife

Q. Why do you prefer bus?
A. Bus is a cheap mode rather than hiring a taxi for single commuter. A safer mode of transport for ladies.

Q. While travelling in bus what you like to do?
A. I prefer to go with my neighbour so that I can have gossips while travelling, and if alone then I prefer to use my phone like listening music.

Q. What is your preference of gender equality?
A. For me it is necessary to have consideration between male and female requirements.

Q. What type of shopping you do while commuting bus?
A. I like to shop for grocery, general utility items sometimes in shopping malls.

Q. How much do you give preference to brands while doing shopping?
A. I am concerned more about qualities of products rather than brands.

Q. How do you like to connect bus in your daily life.
A. For me it should be a comfortable ride. If I feel it should give a roomy feel.

8. Trend Insight

Trend evolution insight is gives a picture how the products are evolving and which has also changed the user approach to the product.

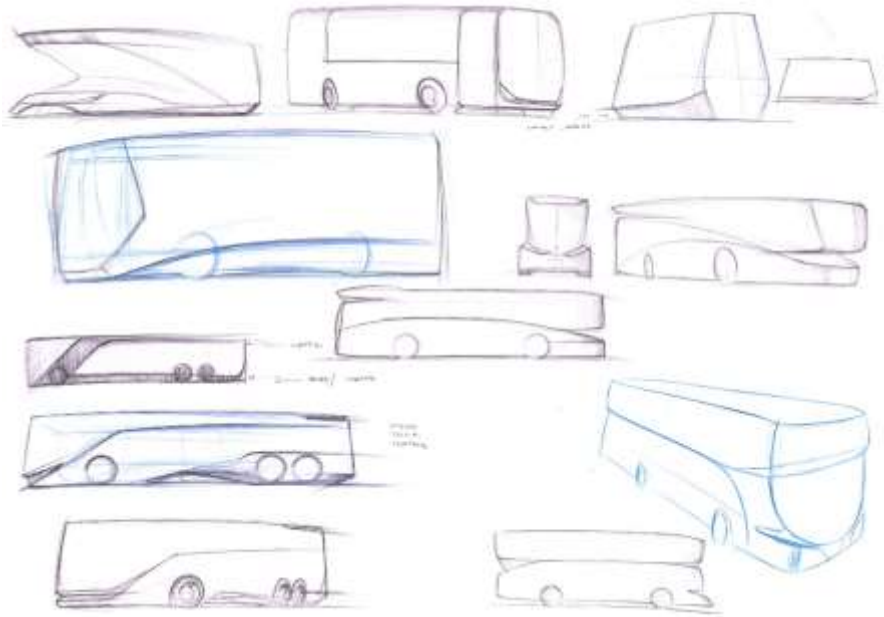
Clockwise:
PLM Mountain 241-A-25, 1930.
Golden arrow "Merchant Navy" Pacific class, no. 21C1 after WWII
Etoile du Nord, 1924
Thalys, 1970
Existing Thalys

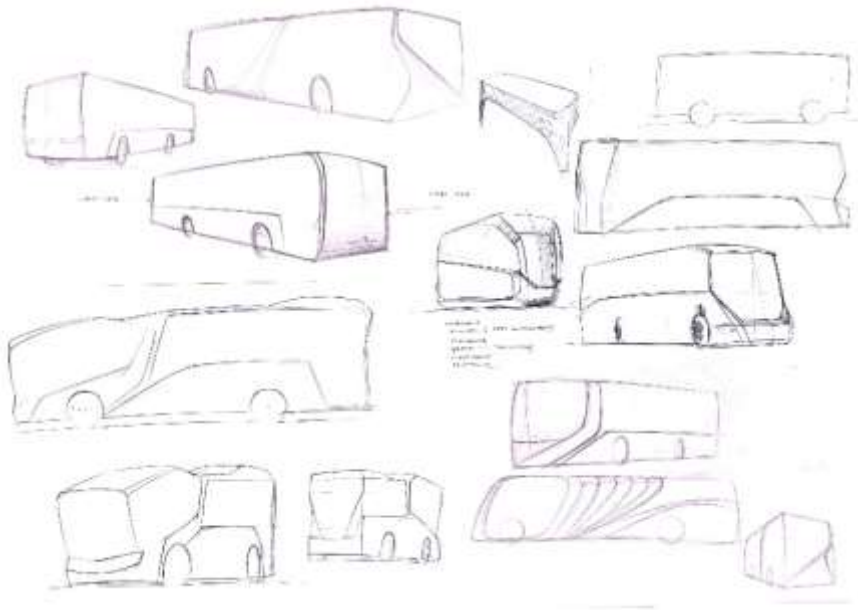
Insight: from more uncovered and protruded mountings and with the advancement in the pressed metal technology the shapes are more heading towards square and flat to smoother and organic

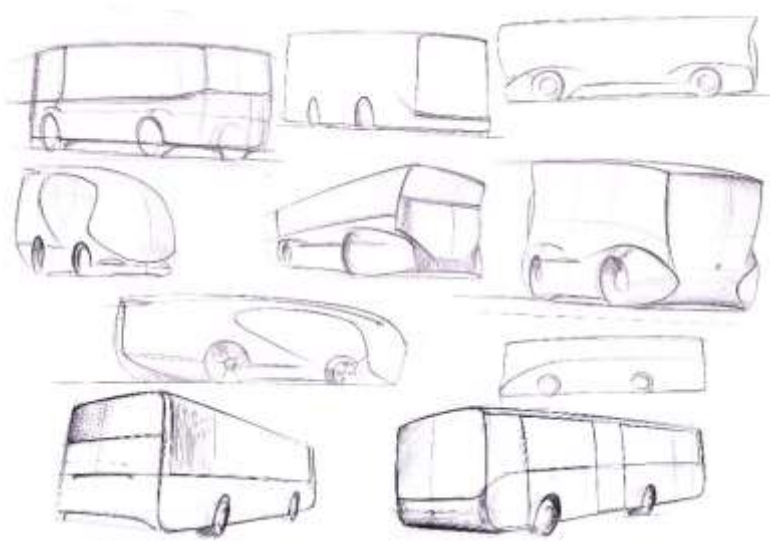
From left to right: Transition from wooden seat to cushion seats, to minimal use of material and ergonomics consideration Individual light to ambient LED, more informative

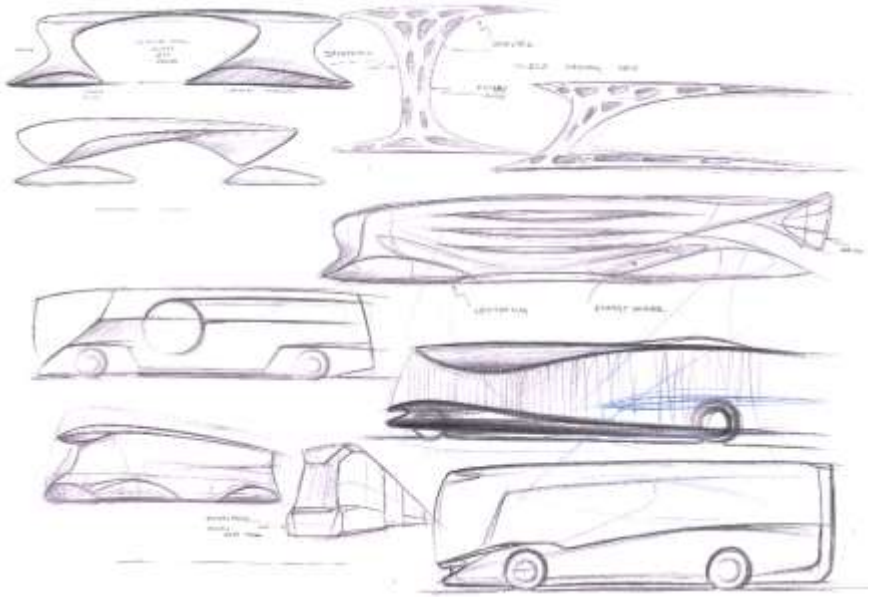
IR-36 IR-37 IR-38

9. Warmup Ideations







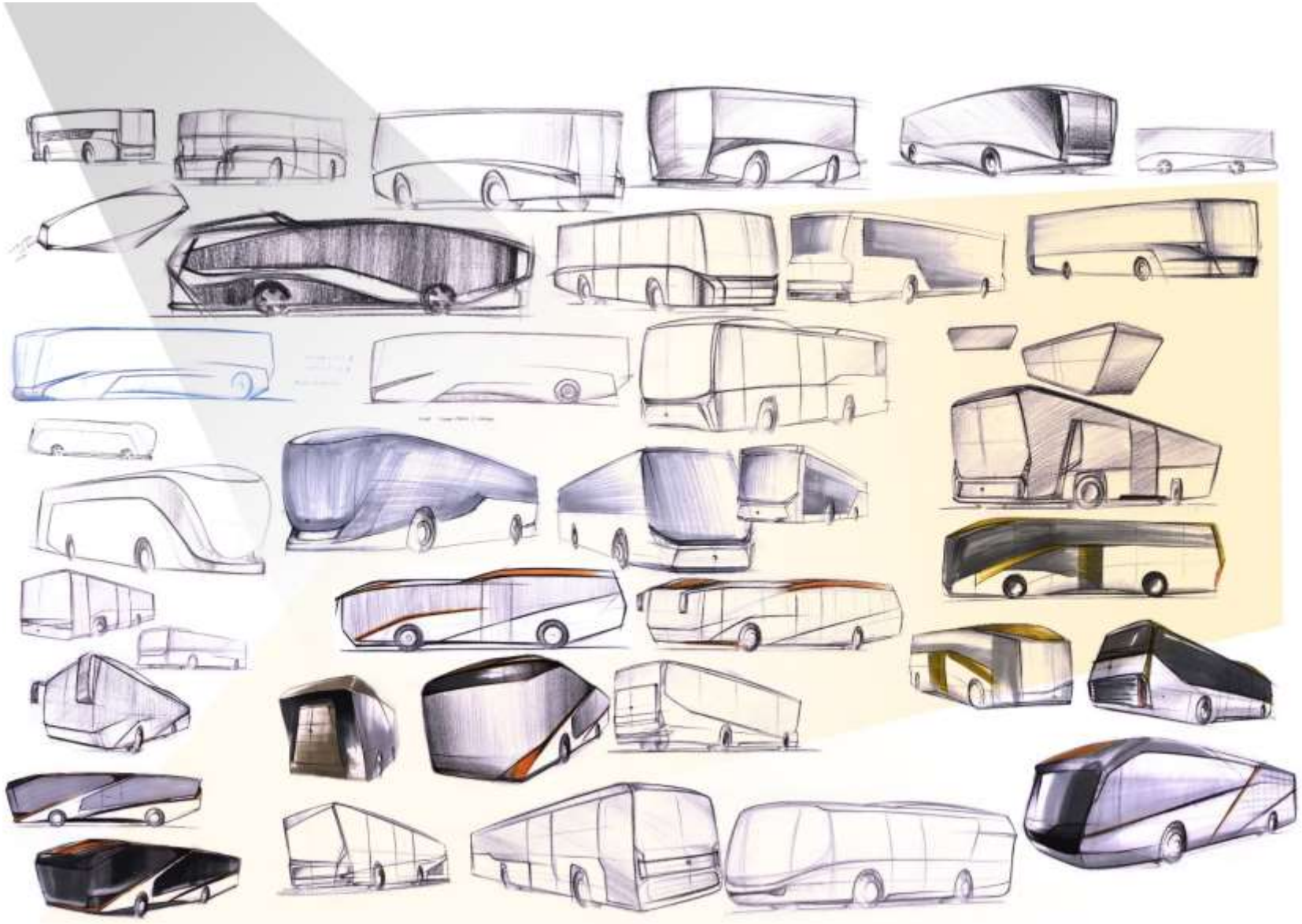


10. Mood Board

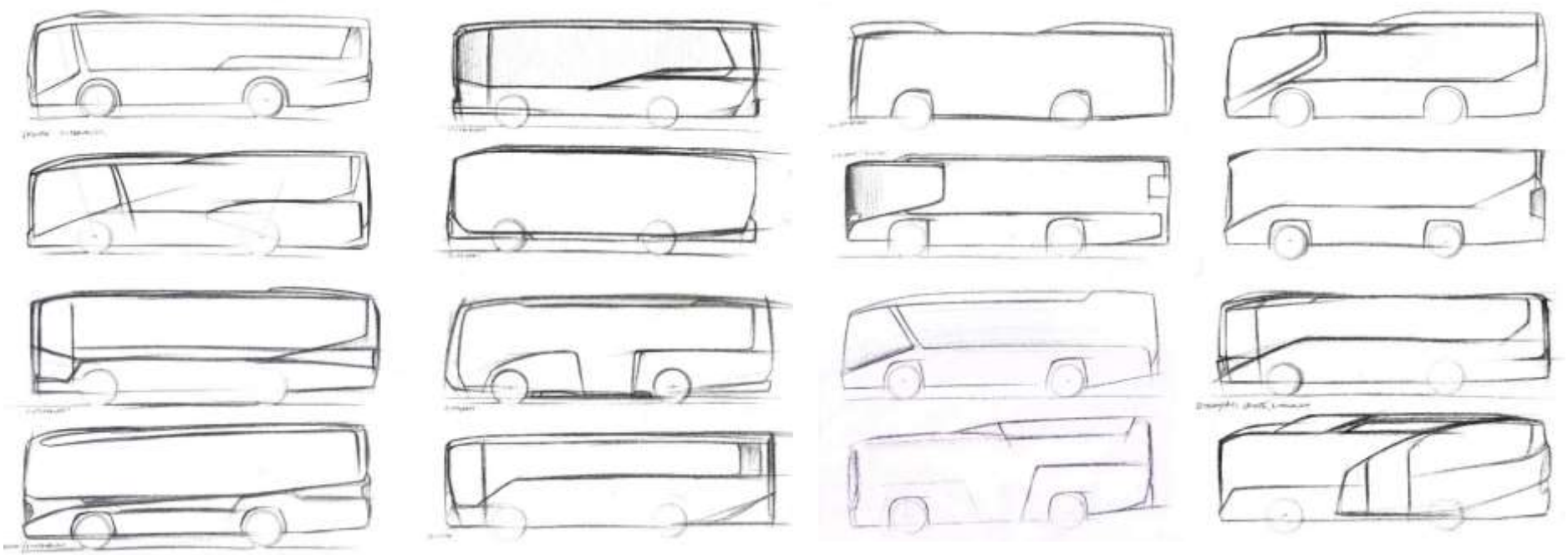
Mood board of Dubai explains about the impression of Dubai, its footprints. It shows the opulence, lavishness, a dimensional growth, aspirational growth of Dubaietes. It shows how the Dubai has shown buoyancy in terms of architecture, technology, economy, extravagantly.


DUBAI
LAVISH
GROWTH
SUPERLATIVE
OPULENCE
EXTRAVAGANT
PROMINENCE
AMALGAMATION
BU
YANT
EXOTIC

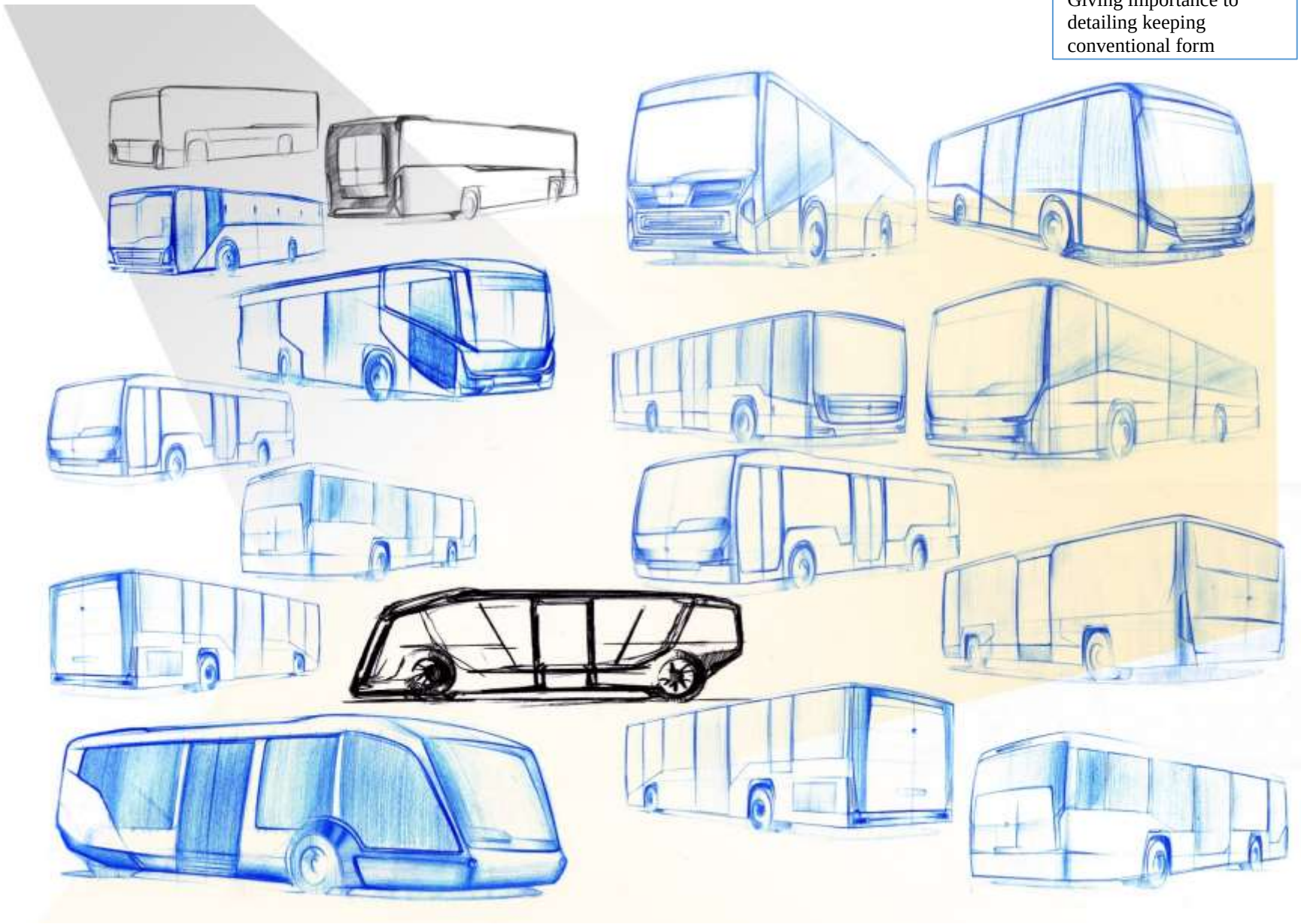
11. Explorations



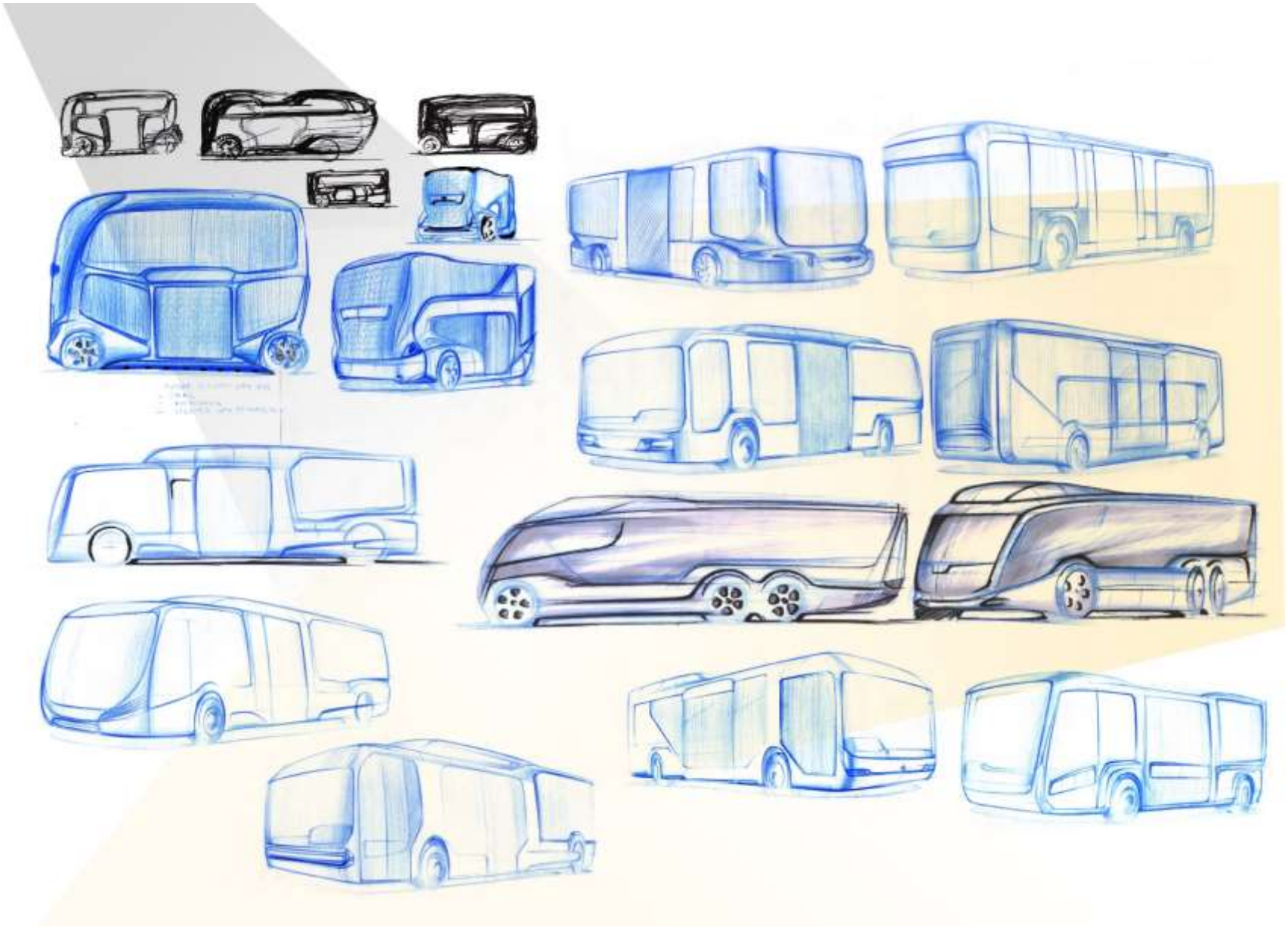
11.1 Silhouette Explorations

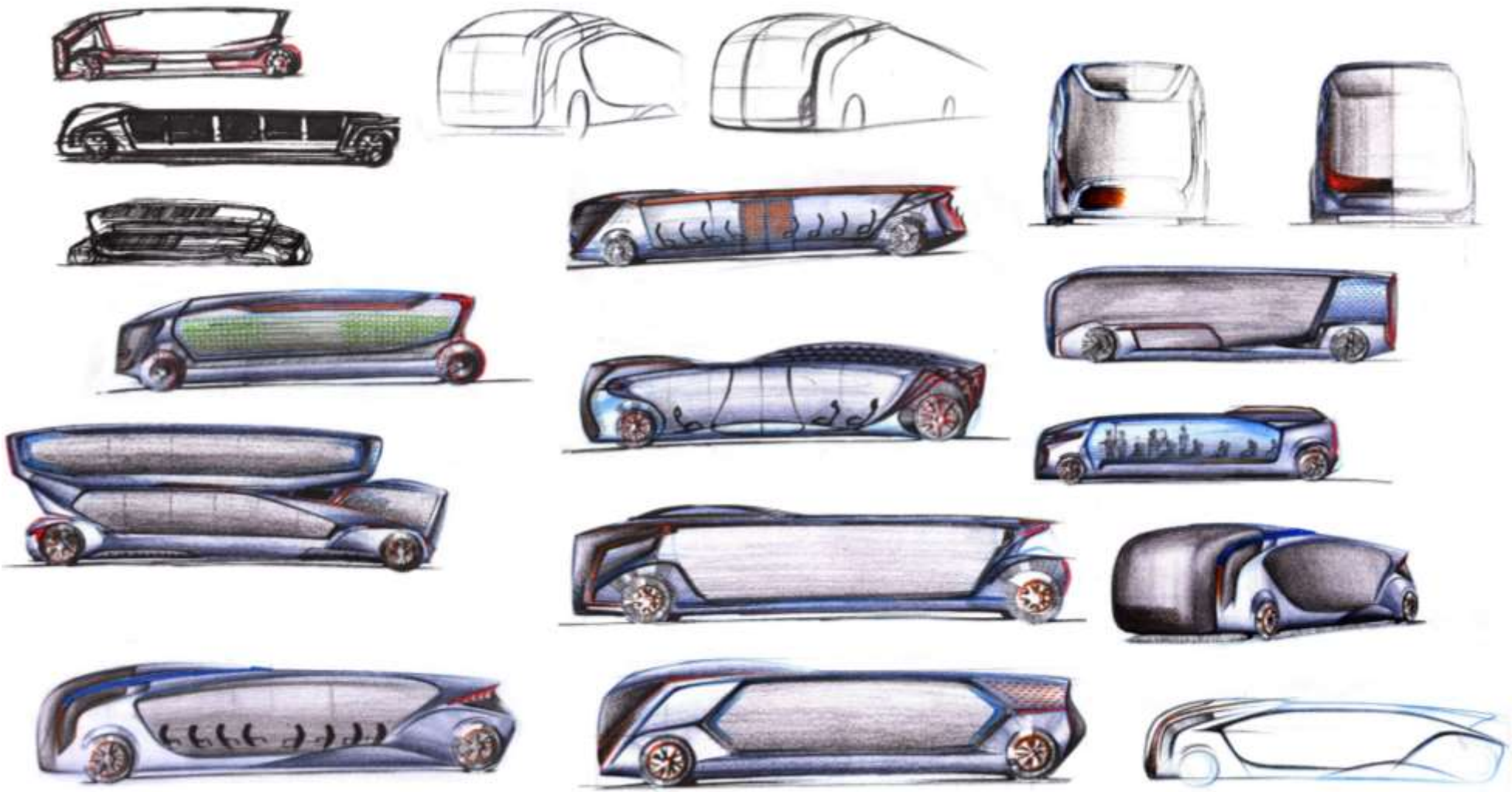


Explorations were done
Giving importance to
detailing keeping
conventional form



Ideation based on inspiration from oyster , dressing of Dubaietes, Muslim architecture, Growth in technology

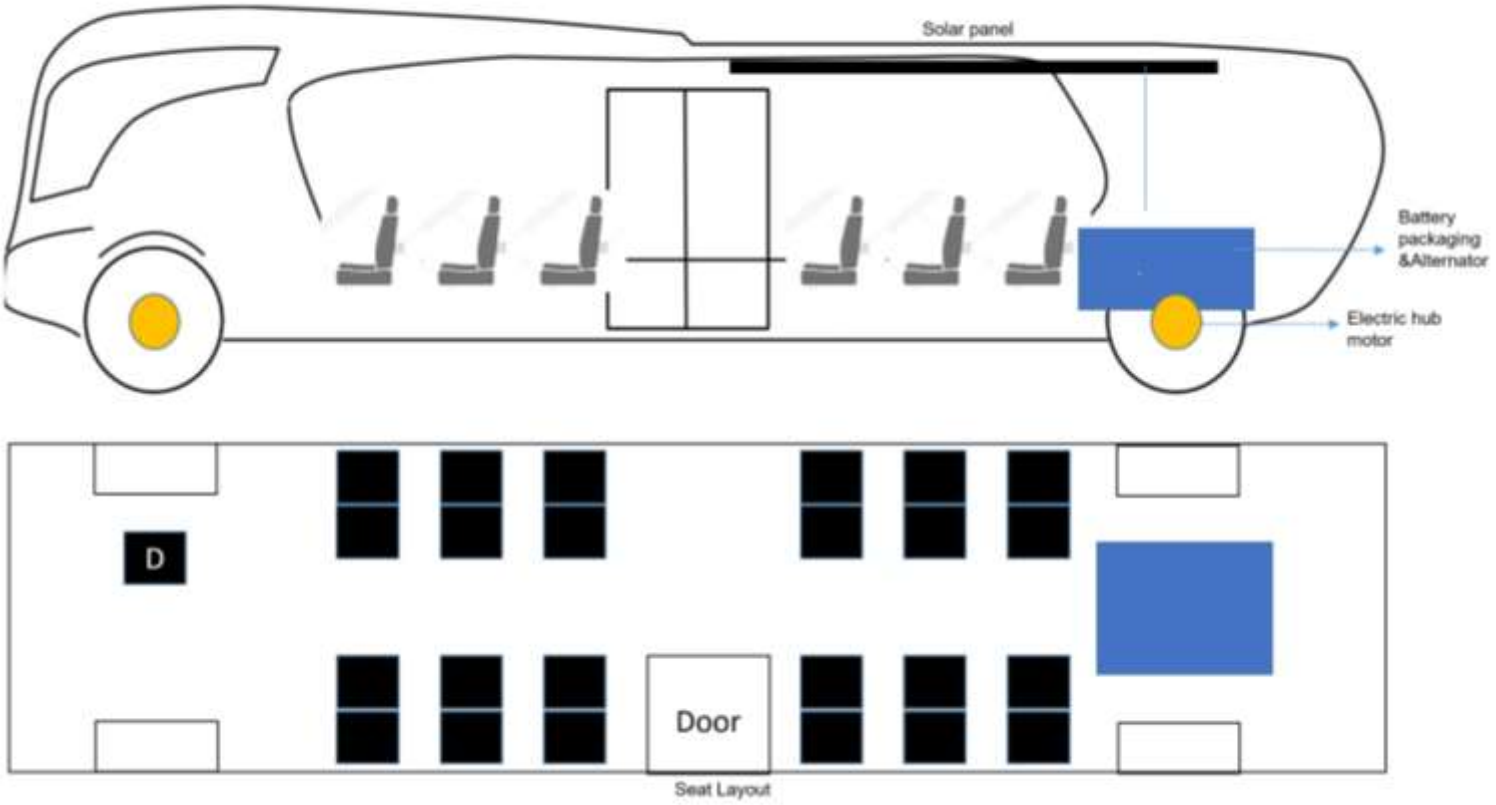




12. Final direction exploration

12.2 Final concept renderings

Concept packaging & proportion calculation



For Standard Deluxe Bus the legroom space length= 750mm

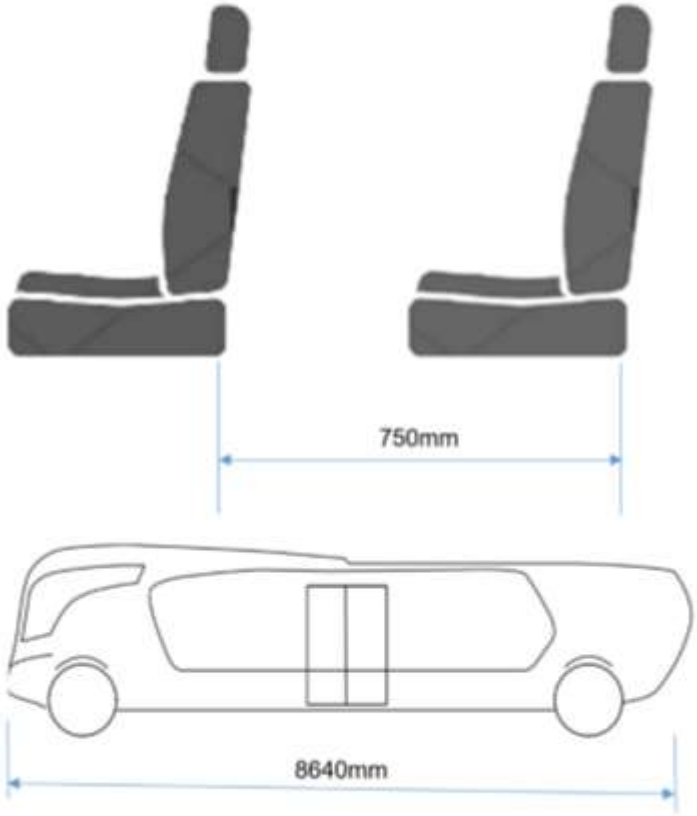
For more exclusive and wide room space
Length for legroom space = 900mm

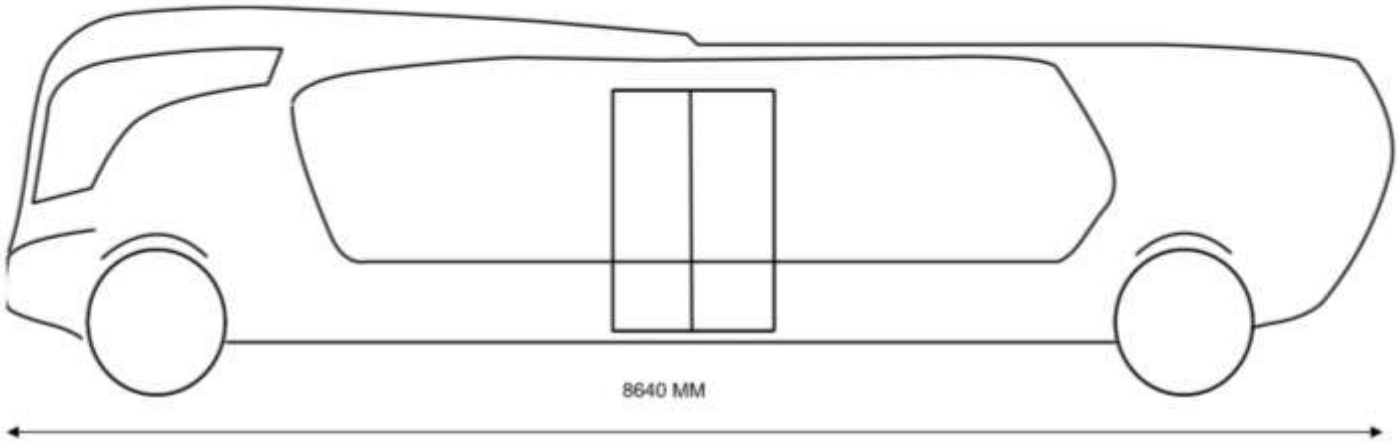
But as the vehicle is more elongated so shortened to 800 mm

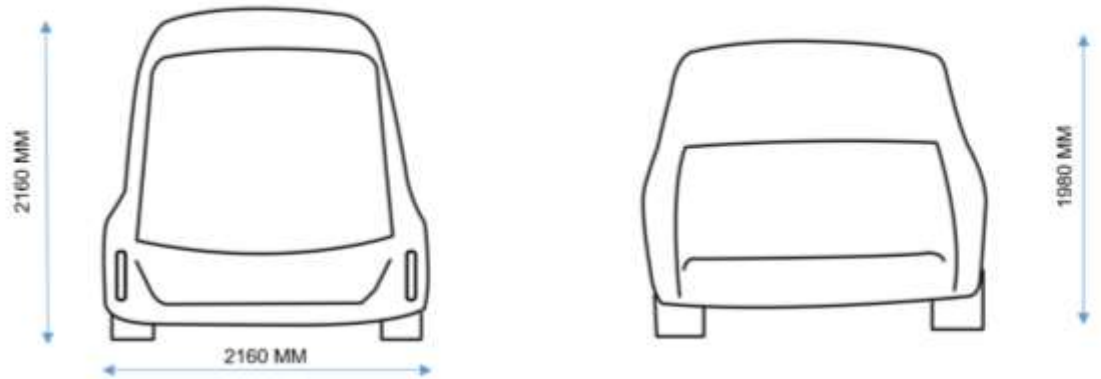
Row of seats = 6 + 1 for door

Total passenger space length= 6* 800+1000
= 5800mm

Total length considering driver cab space length
And rear engine area= 5800+ 2000+ 840
= 8640 mm

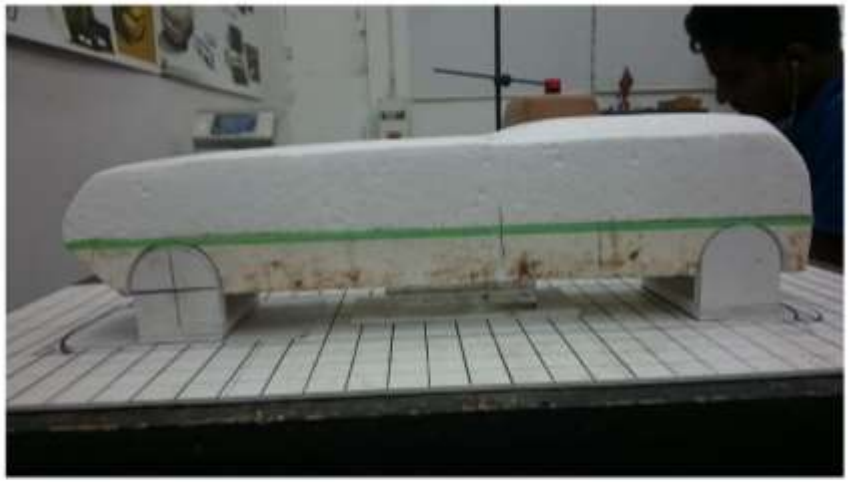



8640 MM


2160 MM
2160 MM
1980 MM

Clay modelling

Scale of model- 1:18




D-94 | JUMEIRAH DUBAI
ASHOK LEYLAND
DUBAI CITY BUS
D-94 | JUMEIRAH
ASHOK LEYLAND

13. Image Reference

1 https://upload.wikimedia.org/wikipedia/commons/0/05/Raghunandan_Saran,_Founder_Ashok_Leyland.png
2 http://www.ashokleyland.com/history
3 http://www.ashokleyland.com/history
4 http://www.ashokleyland.com/history
5 http://www.ashokleyland.com/history
6 http://www.ashokleyland.com/history
7 http://www.ashokleyland.com/history
8 http://www.ashokleyland.com/history
9 http://www.ashokleyland.com/history
10 https://upload.wikimedia.org/wikipedia/en/thumb/7/7b/Hinduja_Group_Logo.svg/1036px-Hinduja_Group_Logo.svg.png
11 http://eskipaper.com/images/buddha-7.jpg
12 http://www.ashokleyland.com/sites/default/files/field/image/LCV_0.png
13 http://www.westsidecities.org/westside-public-transportation/
14 http://indiatransportportal.com/wp-content/uploads/2015/03/11448-001.jpg
15 https://in.pinterest.com/pin/507851295458606367/
16 http://www.seddiqi.com/en/image-gallery/page/2
17 http://www.itp.net/564023-dubai-ruler-among-regions-most-popular-on-facebook
18 http://www.epluses.com/content/10reasons
19 &NCS_modified=20130820105908&MaxW=640&imageVersion=default&AR-306149938.jpg
20 ee97c0791c121eeca34763526c5bb9ec.jpg
21 http://peartreediaries.com/dubai-breakfast-90s-style-2/
22 https://in.pinterest.com/search/pins/?q=dubai&rs=remove&0=dubai%7Ctyped&remove_refine=golf%7Ctyped
23 https://in.pinterest.com/pin/114841859218965021/
24 https://in.pinterest.com/pin/322007442089283485/
25 Zippi-at-Dubai-police-headquarter-3.jpg
26 ski_Cheick_Dubai.jpg
27 dubai_1477885b.jpg
28 The-Latest-Robot-Jockeys3.jpg
29 fe2aebeeed2cc5c3e101ca45a79f351d.jpg
30 1307.jpg
31 https://en.wikipedia.org/wiki/Transportation_in_Dubai
32 https://en.wikipedia.org/wiki/Transportation_in_Dubai
33 https://en.wikipedia.org/wiki/Transportation_in_Dubai
34 15882309761_61d9c2c532.jpg

35 https://in.pinterest.com/pin/93309023500318442/

14. Bibliography

https://en.wikipedia.org/wiki/Hinduja_Group
http://dtc.nic.in/Annexure26CGMSBU8802010.pdf
https://en.wikipedia.org/wiki/Dubai
http://www.emirates.com/english/destinations_offers/dscoverdubai/aboutdubai/
https://www.virtualtourist.com/travel/Middle_East/United_Arab_Emirates/Dubai/Dubai
1857296/Transportation-Dubai-TG-C-1.html
https://www.tripadvisor.in/Travel-g295424-s303/Dubai:United-Arab-Emirates:Public.Transportation.html
http://www.therichest.com/rich-list/the-biggest/top-10-unbelievable-facts-about-dubai/?view=all

http://www.emiratesgroupcareers.com/english/discover/history.aspx
https://en.wikipedia.org/wiki/History_of_Dubai
https://www.dubai.com/v/history/
http://www.dubai.ae/en/aboutdubai/Pages/DubaiEconomy.aspx