MODULAR MOBILITY FOR FUTURE

MACRO TRENDS 2030

SUSTAINABILITY

URBANIZATION

WORKPLACE FLEXIBILTY

HEALTH-CARE

OFF-ROAD ADVENTURES

PERSONIFICATION

HMI

MULTI TASKING

TECHNOLOGY TRENDS 2030

LEV 4 AUTONOMY

VOICE HMI

HYPERLOOP

WIRELESS POWER

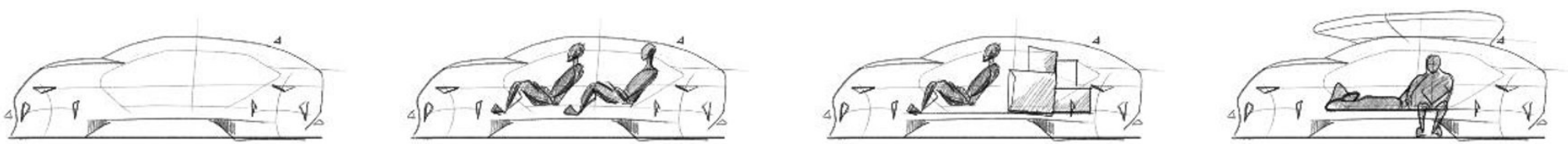
HOLOGRAPHIC INFOTAINMENT

3D PRINTING

INTERNET OF THINGS

NANO TECH

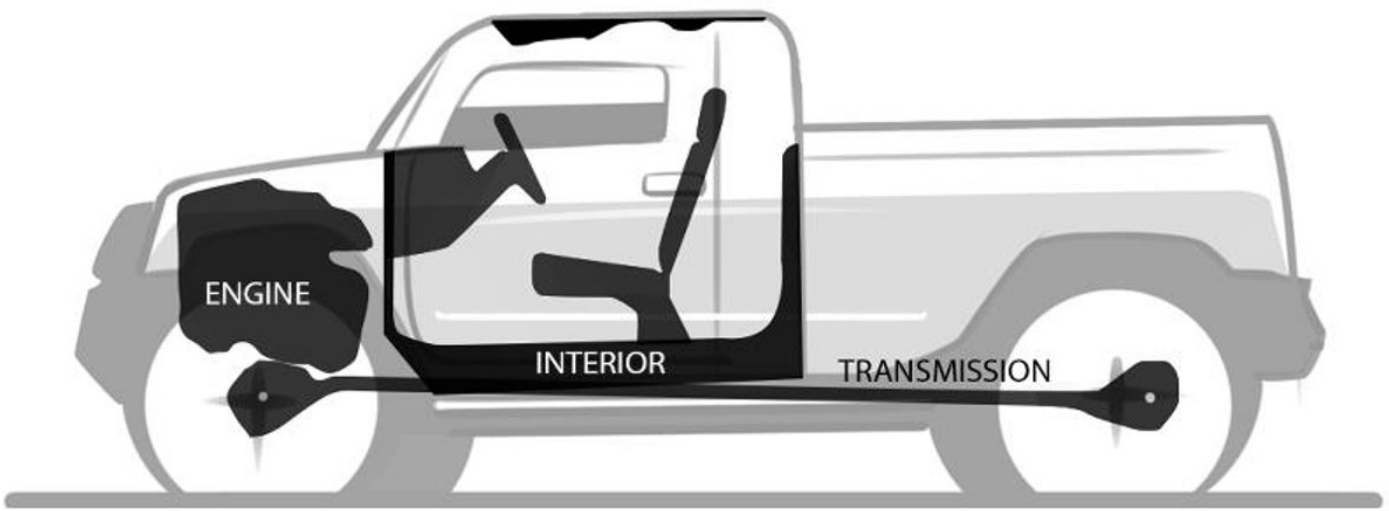
OUTDOOR ⇨ CITY
SPORT ⇨ WORK
EXTREME ⇨ CALM
MANUAL ⇨ AUTONOMOUS



Flexible interior space will be crucial point of the year 2030

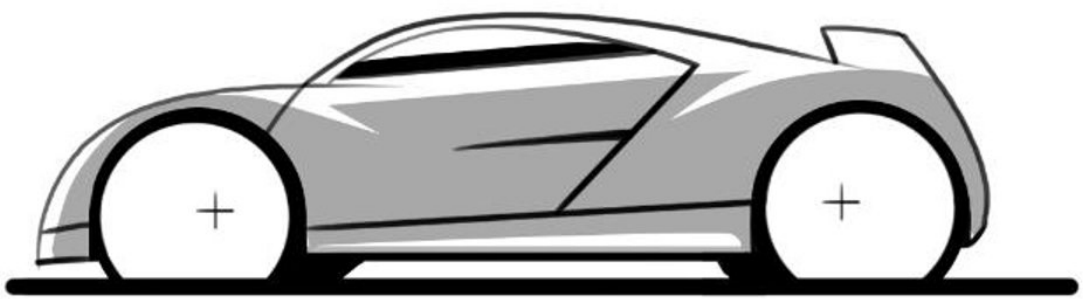

Homogeneous
Vehicle Attributes

(1) Seamless interaction within sub-systems



Effortless interaction between Powertrain and controls

(2) Great experience

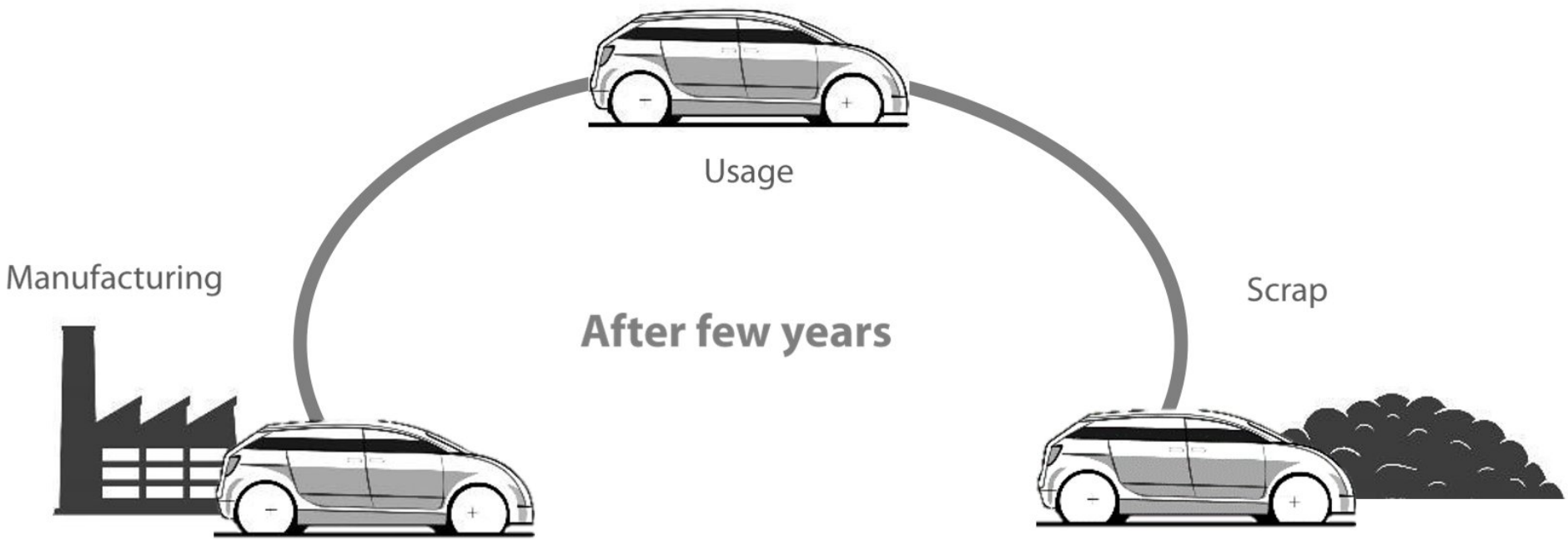


Great experience because all components are tailor made for specific vehicle

(3) Limited customization options

- Graphics and decals are the economical option to customize or personalize one's vehicle.
- Heavy customization is not at all economical.

(4) Limited life-span

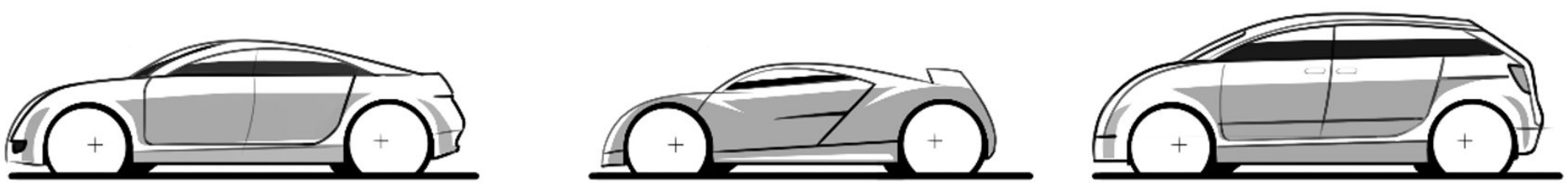


- Vehicles have limited life span after that it's efficiency get reduced
- Entire vehicle need to be scrapped just because of homogeneous system

(5) Costly to repair

- Repairing a damaged vehicle is costlier than buying new one

(6) Compromised choice



- Repairing a damaged vehicle is costlier than buying new one

Homogeneous Vehicle Attributes

(1) Seamless interaction within sub-systems

(2) Great experience

(3) Limited customization options

(4) Limited life-span

(5) Costly to repair

(6) Compromised choice

Modular system Attributes

(1) Can be customized easily
(2) Possibility of module update & reuse
(3) Easy maintenance
(4) Gives opportunity to choose
(5) User experience is depends on module

Modular system has more positive than negative

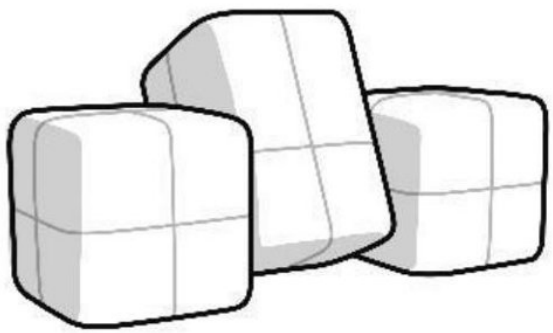
Case Example: **piaggio ape**

Modularity is not new concept to automobiles

Toyota introduced shared platform vehicle in 1997.

UNDERSTANDING
MODULARITY

- What is modularity?
- Levels of modularity
- Implementation in automobile

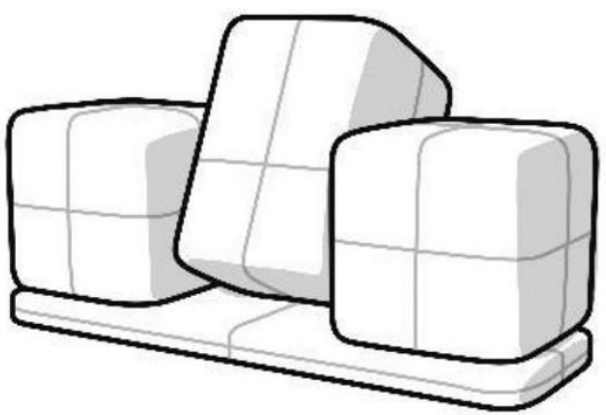


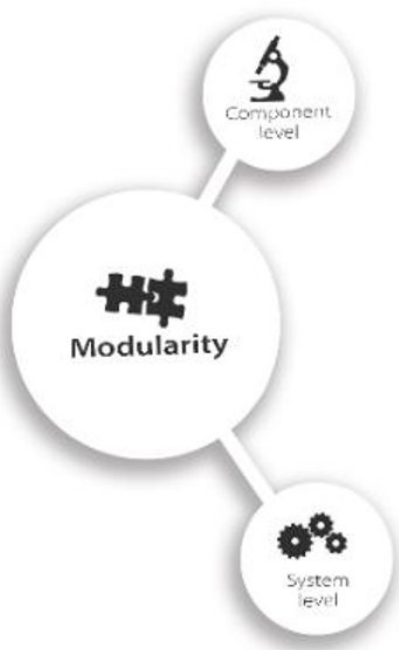
MODULE

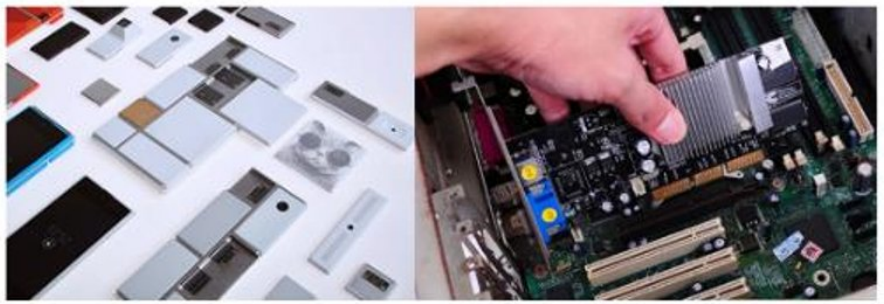
A separable component, frequently one that is interchangeable with others, for assembly into units of differing size, complexity, or function.

MODULARITY

Employing or involving a module or modules as the basis of design or construction.







LEVELS OF **MODULARITY**


COMPUTER
CASE STUDY

COMPUTER CASE STUDY

Aim- To understand modularity through personal computer cabinet
- To understand how variations achieved in personal computer.

Method- Study of personal computer cabinet
- Study of various accessories used in personal computer

Mother-board

Full size PC cabinet

Basic Structure

Monitor

Processor

SMPS

Basic components

RAM

HDD

Liquid cooler

SSD

Keyboard mouse

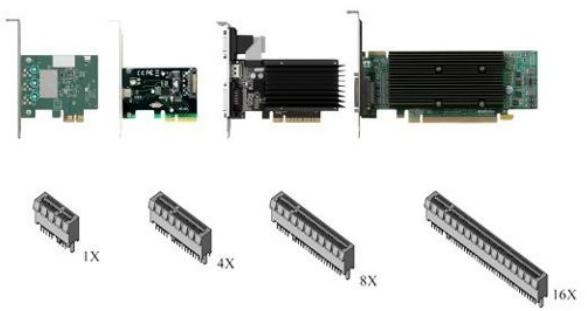
Speakers

Graphic Card

Web Camera

Add-ons

Open Platform



PCI Express
16X slot can accommodate all other cards.
performance will depend based on card not by the motherboard slots

Component Level

Product Level

System Level


LEGO BLOCK
STUDY

LEGO BLOCK STUDY

Aim- To understand modularity through lego block game
- To understand possibilities challenges and opportunities if Lego model implemented in vehicle

Method- Visit the lego shop to understand lego block structure and interlocking by having some hands-on experience with legos.
- Exploration of possibilities and opportunities

OBSERVATION

Standard Block

Special purpose Blocks

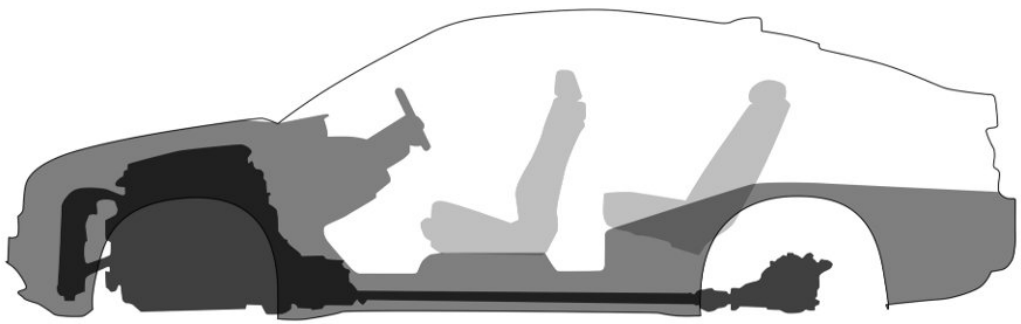
Implementation in automobile

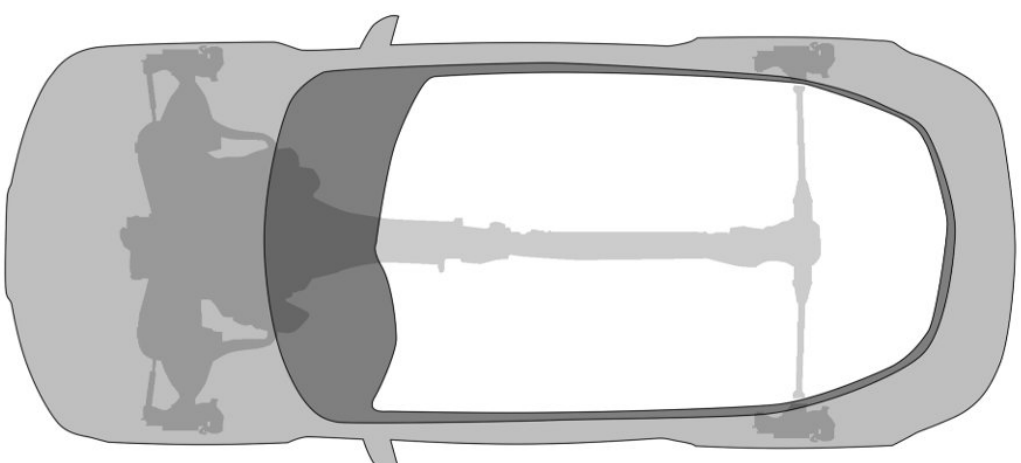
Modular platform- provides platform to accommodate various modules
E.g.. Vehicle platform

Essential module- Prime mover components to provide basic mobility to vehicle
E.g. Powertrain, controls, Interior

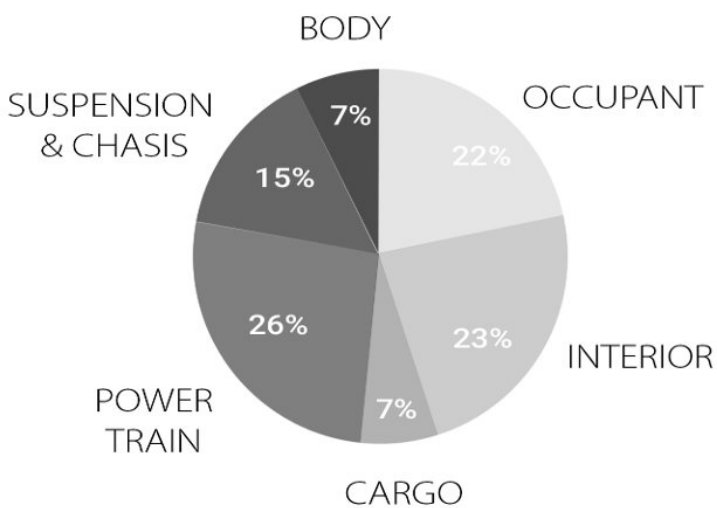
Accessory module- Enhance usability of vehicle
E.g. Music system, sensors etc.

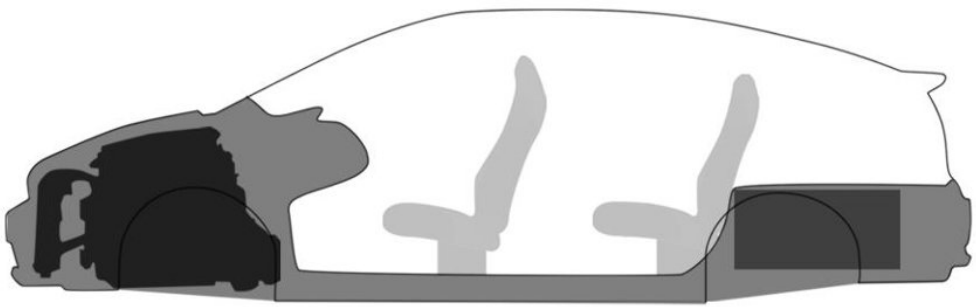
VEHICLE VOLUME
STUDY

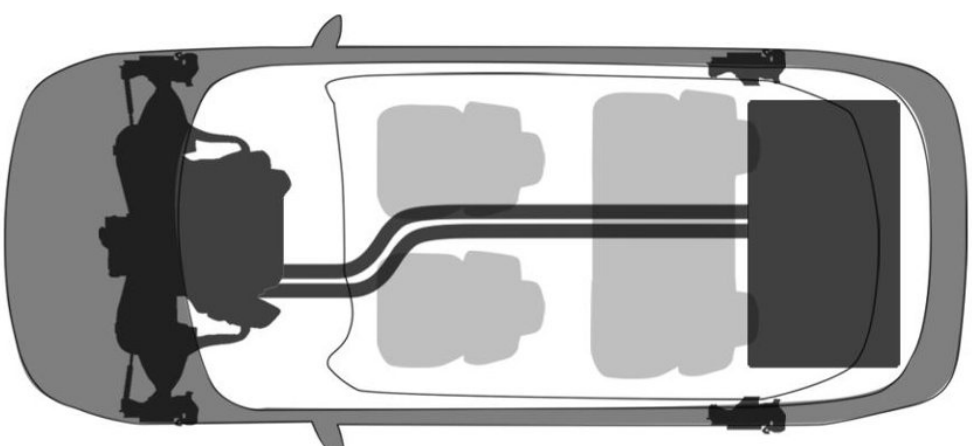




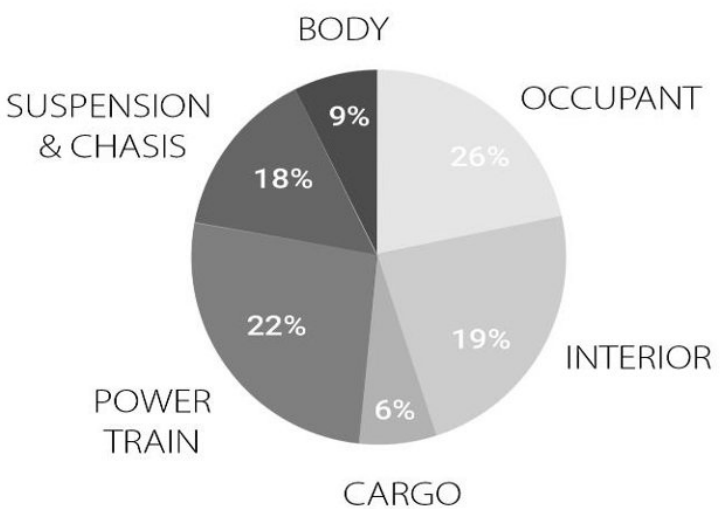
BMW X6

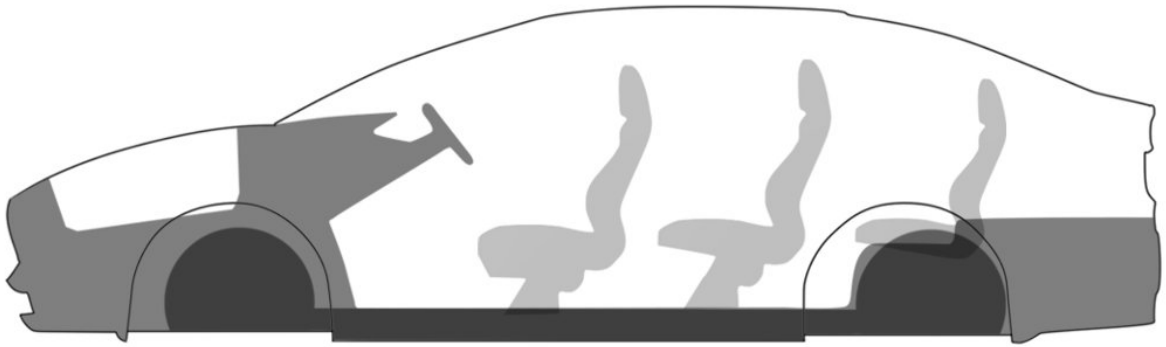

BODY
OCCUPANT
22%
INTERIOR
23%
CARGO
7%
POWER TRAIN
26%
SUSPENSION & CHASIS
15%
7%

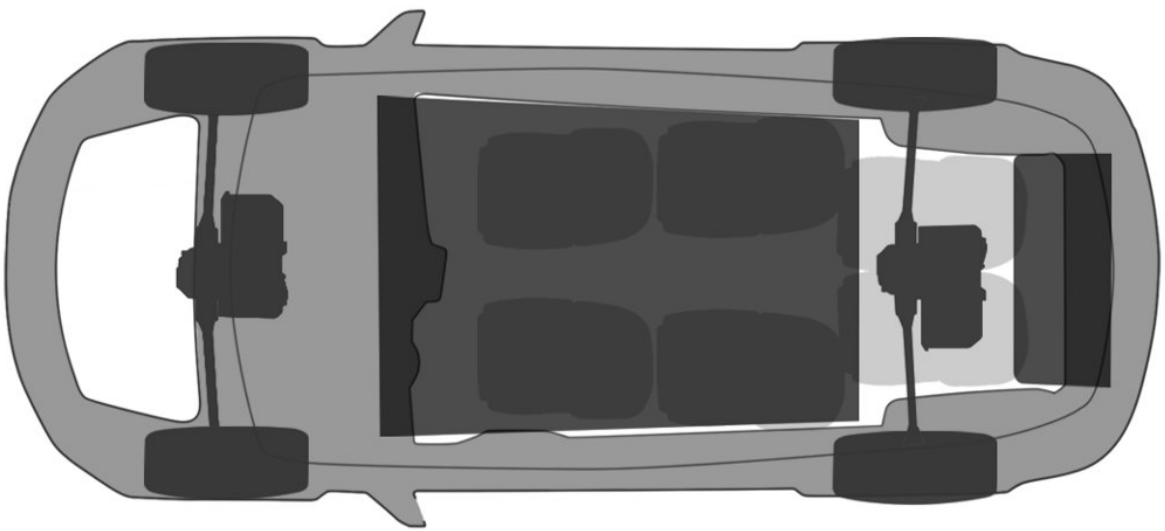




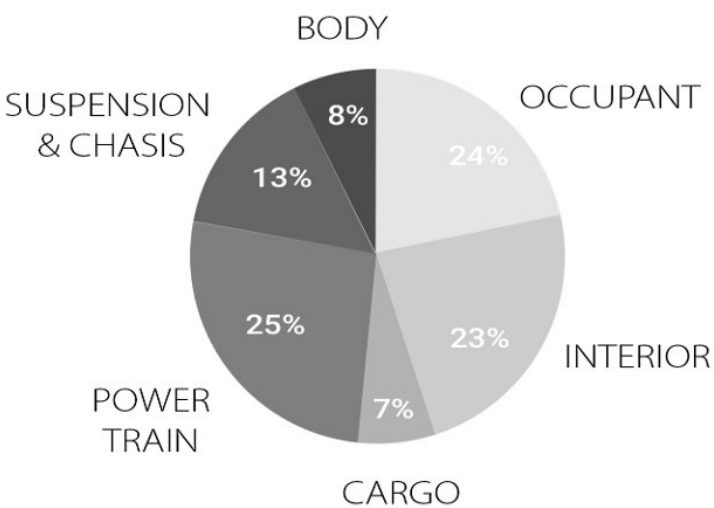
TOYOTA PRIUS







TESLA MODEL X



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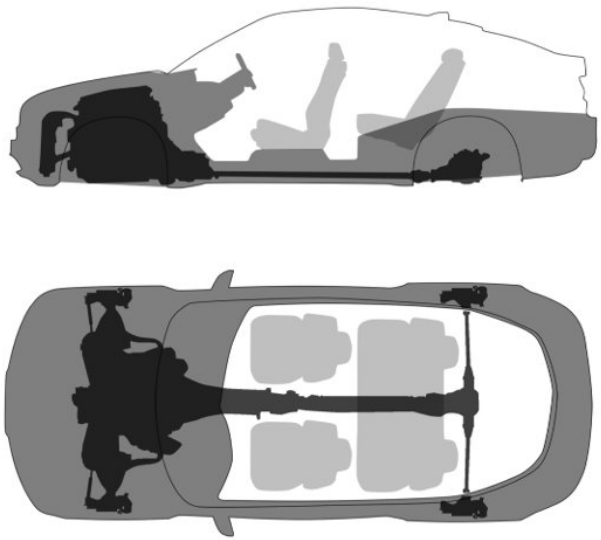

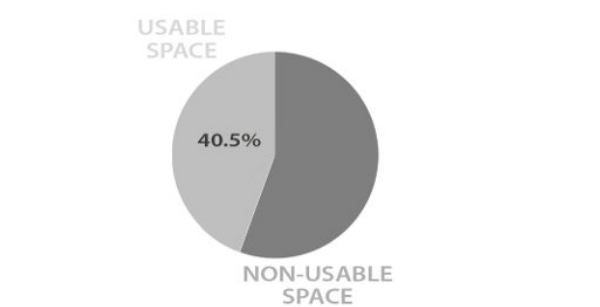

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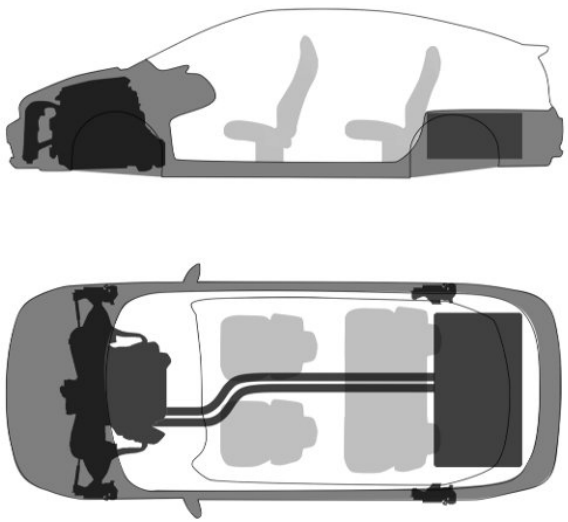

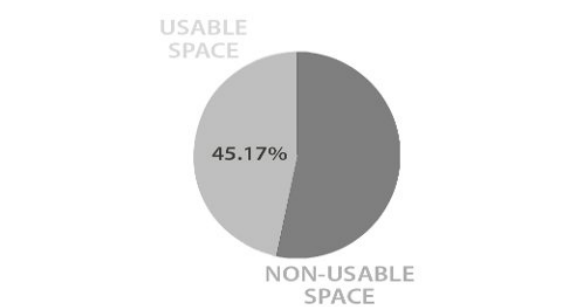

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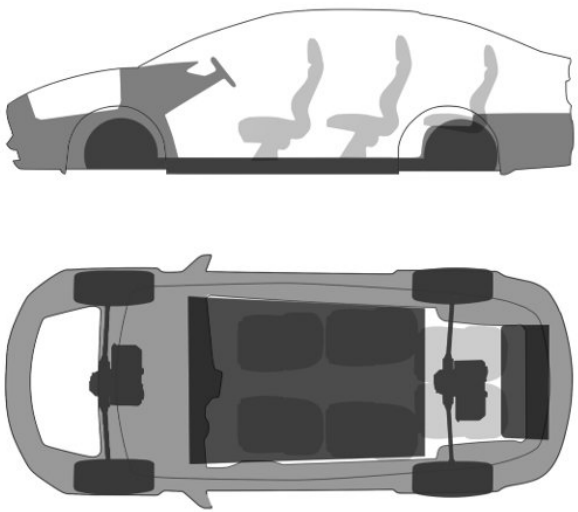
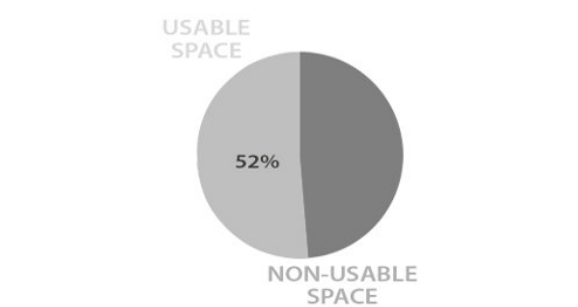
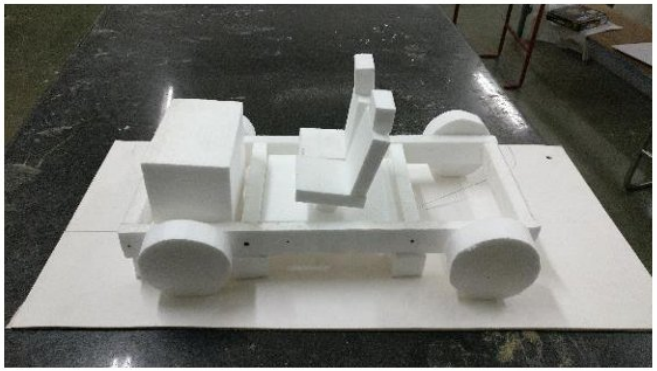
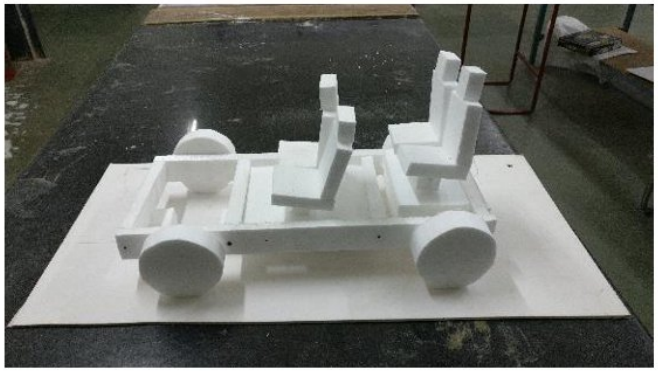
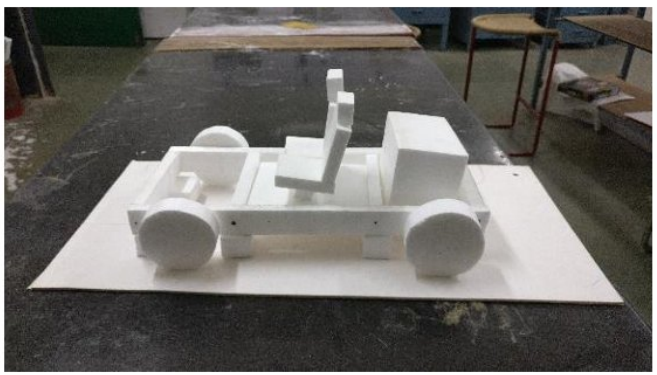
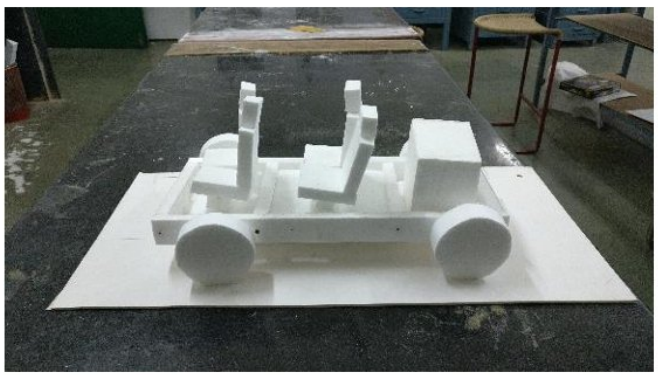
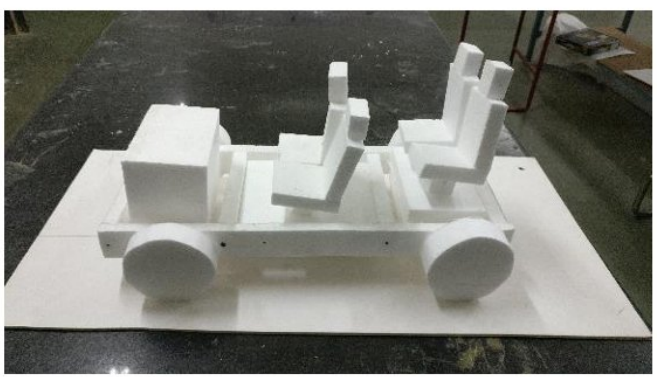
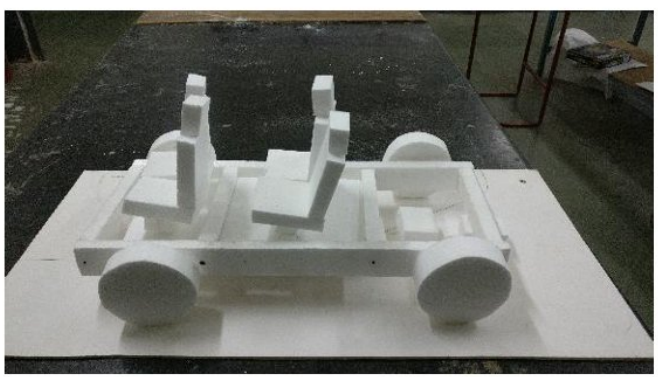
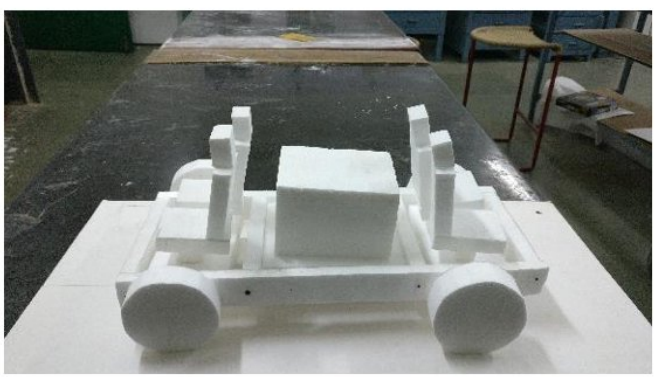


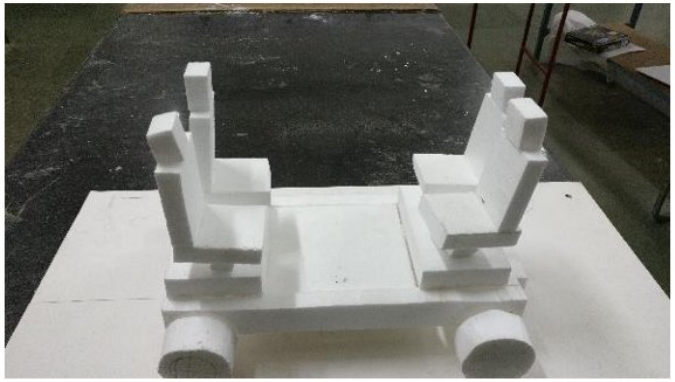


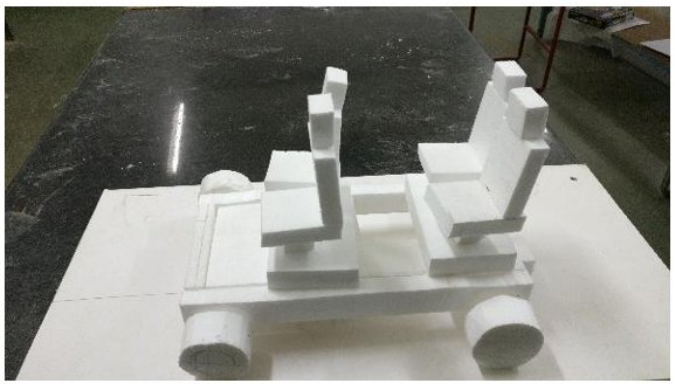



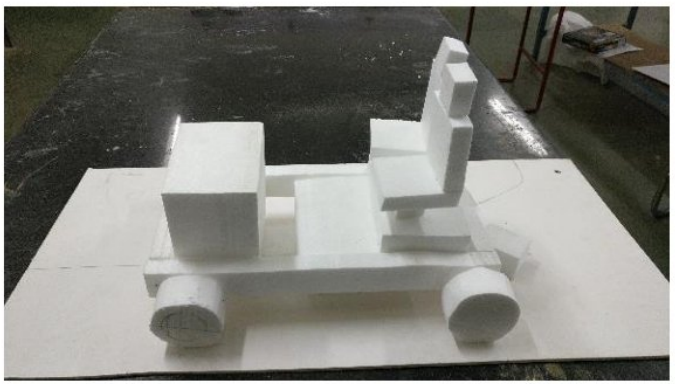



VEHICLE CONFIGURATION

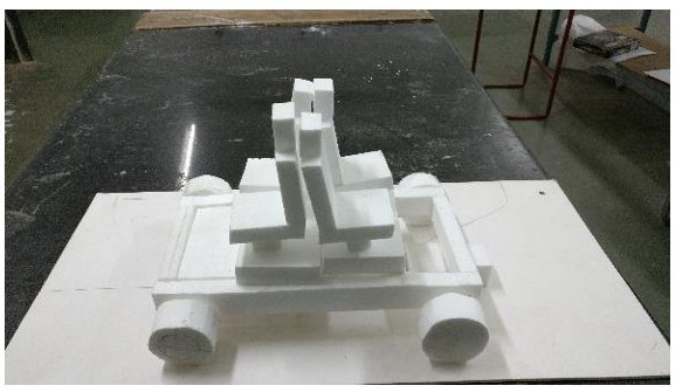




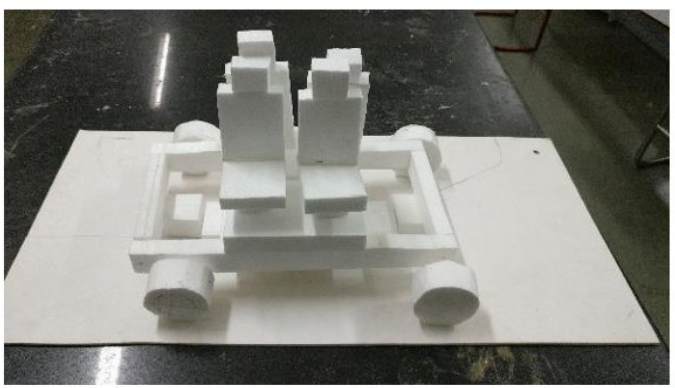


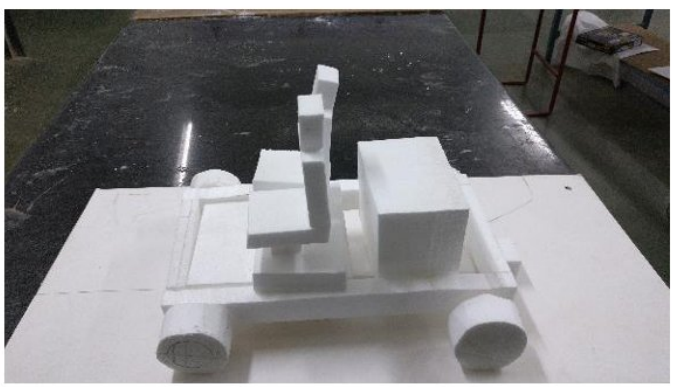




VEHICLE CONFIGURATION







DESIGN BRIEF

To conceptualize Modular mobility for year 2030

Vehicle should able to evolve or adapt with user need

- Any user should able to upgrade own vehicle with utmost ease

Vehicle should function as an Urban commutor

- Minimum seating capacity of 2 people.
- Having all basic features required in year 2030.

CONSUMER PROFILE

GEN Y 1981-1995
Gen Y will be significant market force in 2030
Conventional - make decisions based on value for money

Age 35-49 years old
Life-stages - Family formation, Family maturation

Characteristics

Tech-savvy
Innovative
Creative
Confident
Sociable
Flexible

CONCEPT 1


MODULAR MOBILITY
FOR YEAR 2030

CONCEPT 2

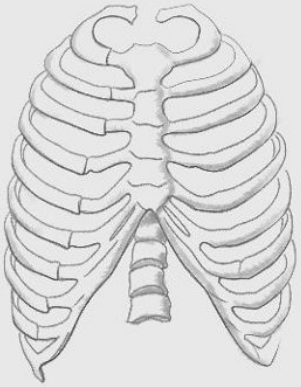

MODULAR MOBILITY
FOR YEAR 2030

CONCEPT 3


MODULAR MOBILITY
FOR YEAR 2030

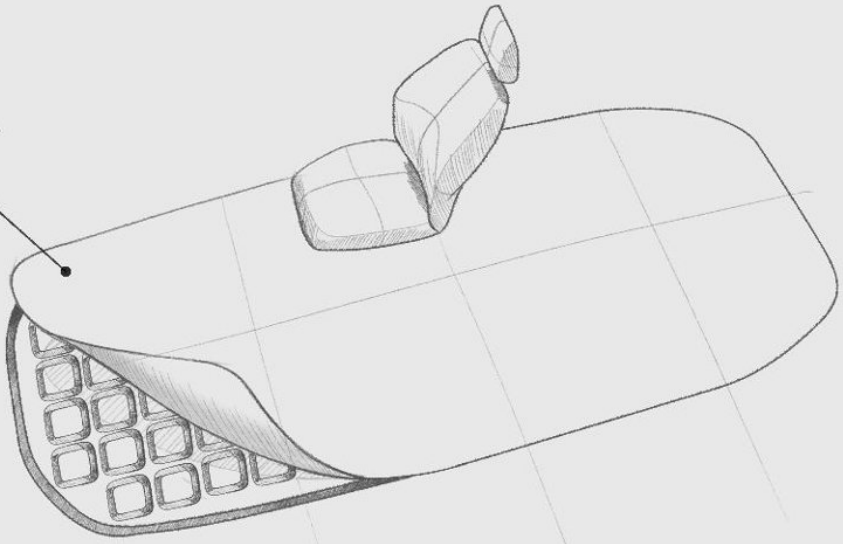
CONCEPT 4

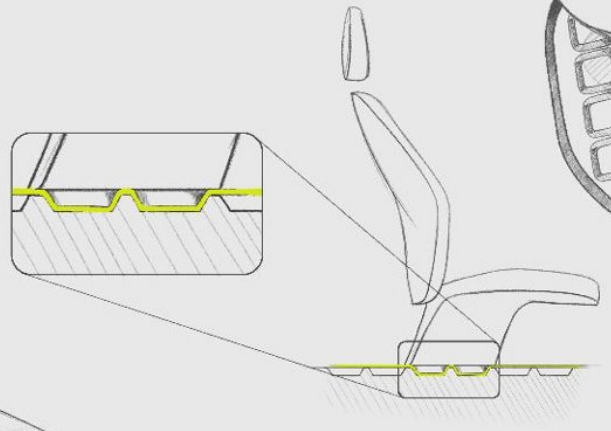
NATURE + TECHNOLOGY

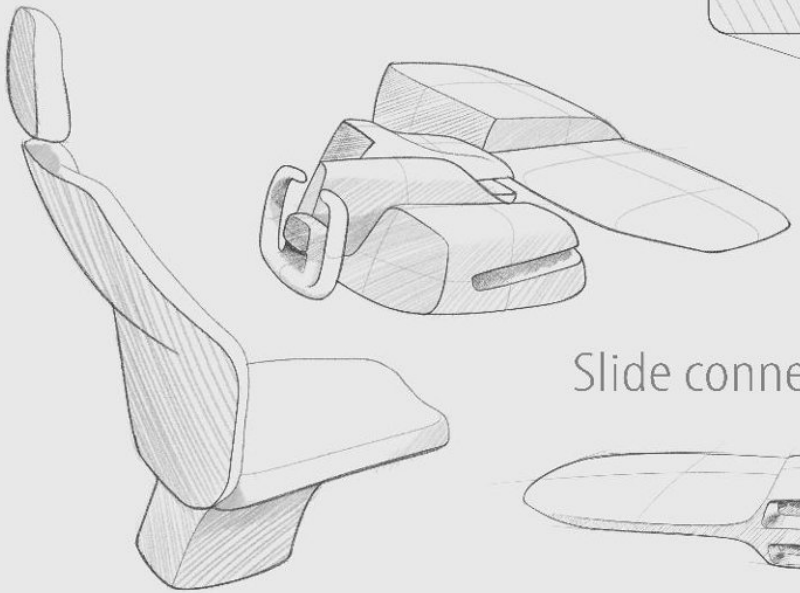


Aluminum foam
With graphene coating

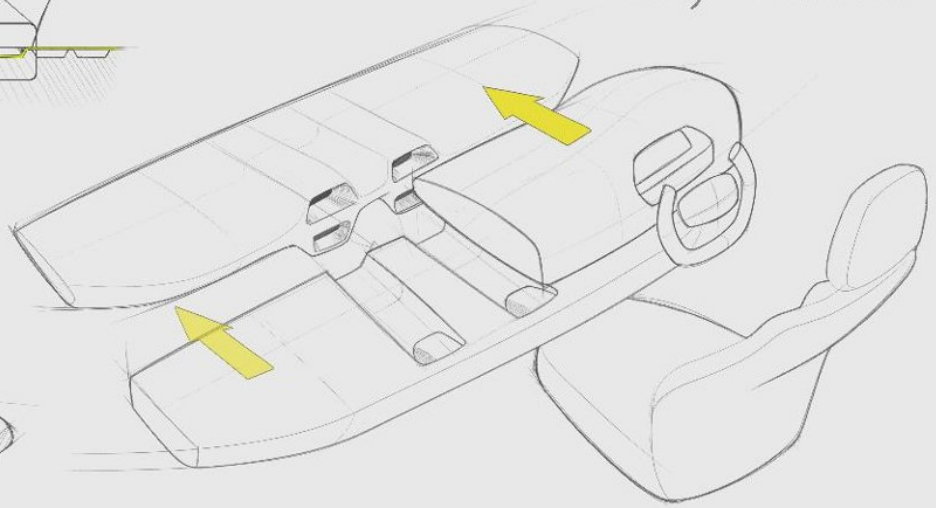
Shape memory polymer



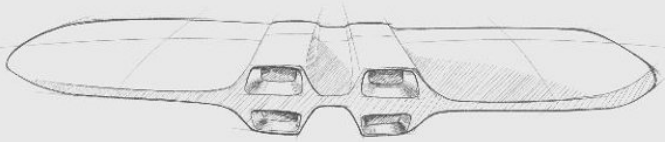




Easy installation



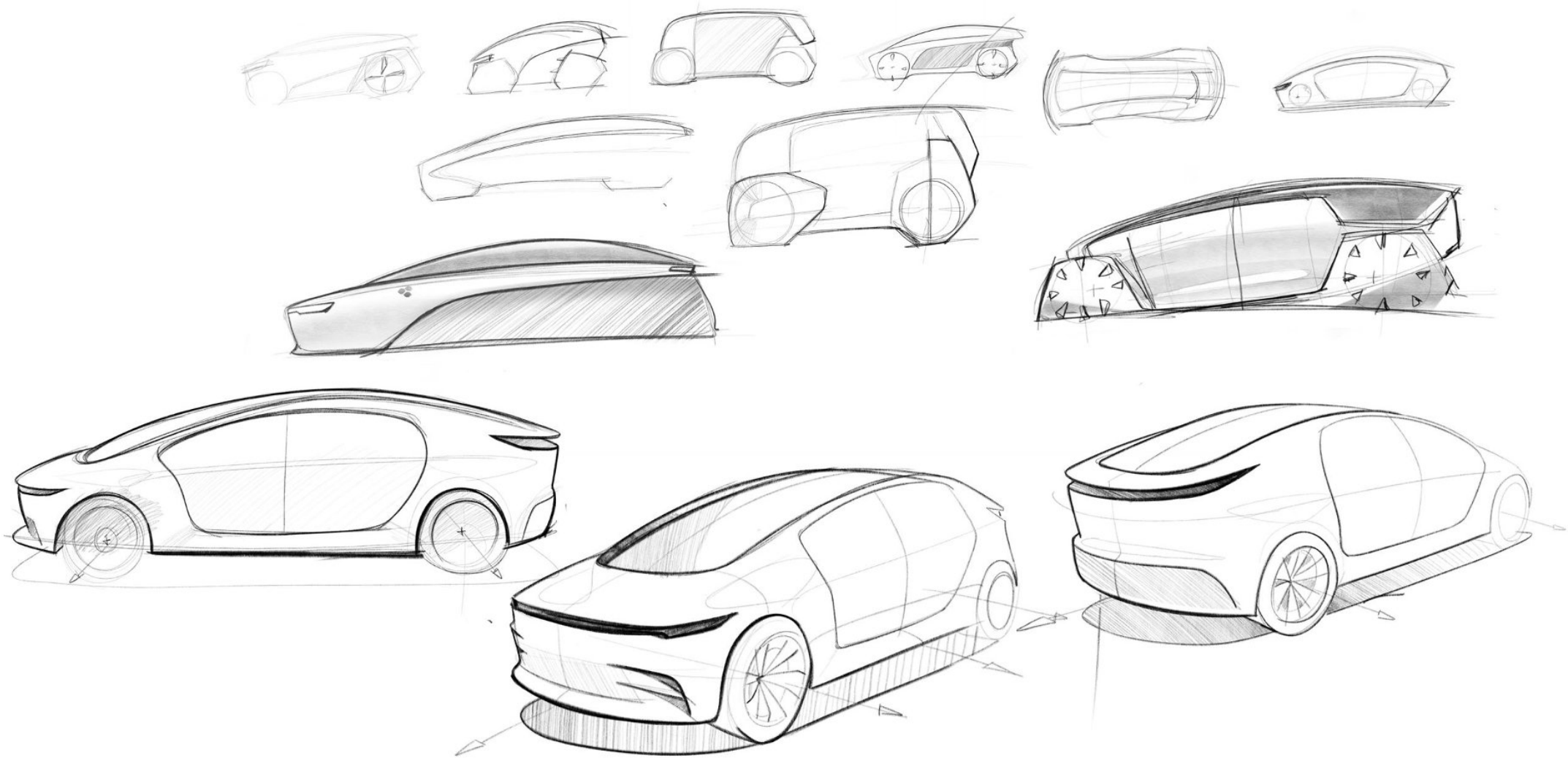
Slide connection dashboard

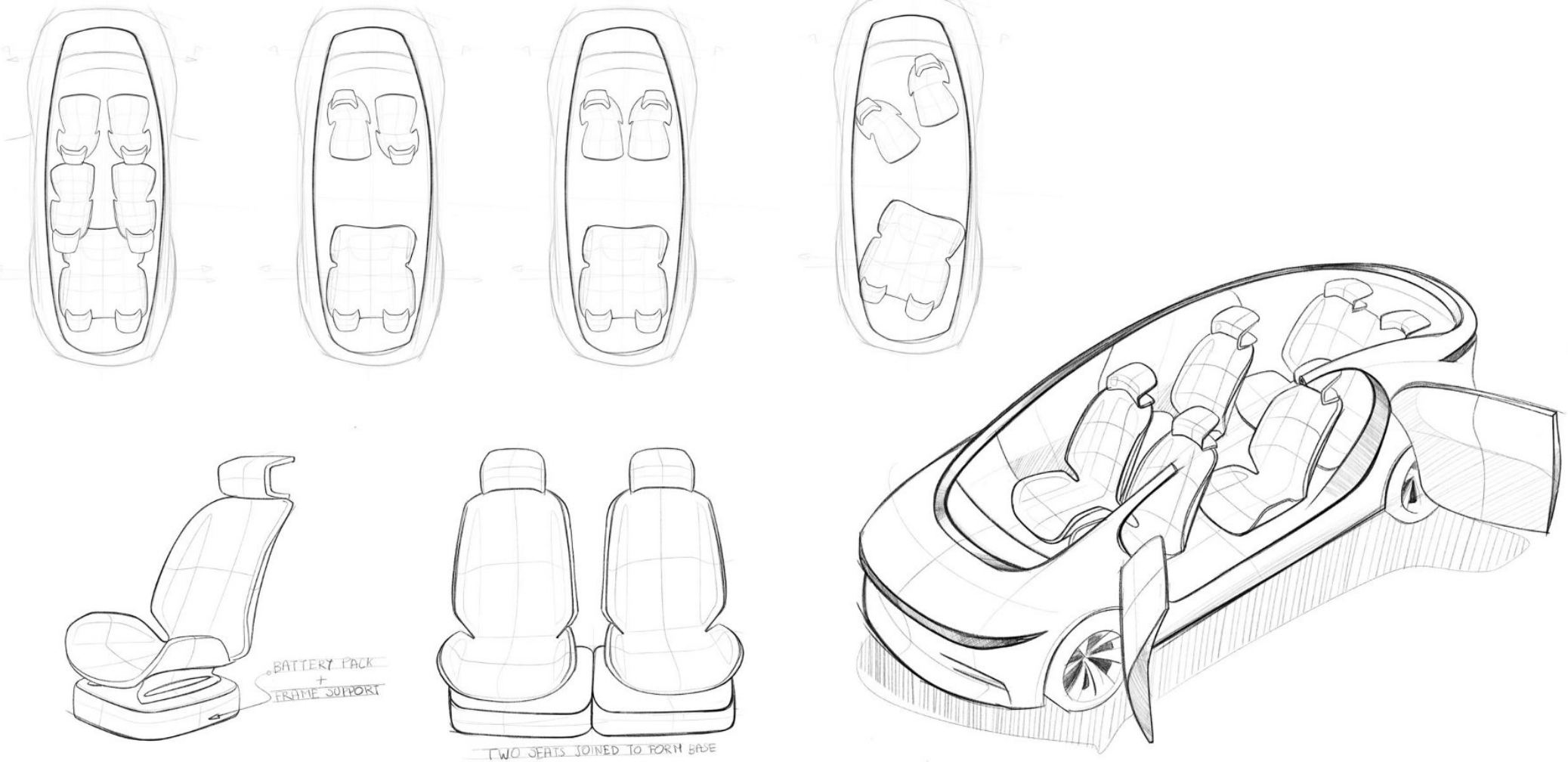


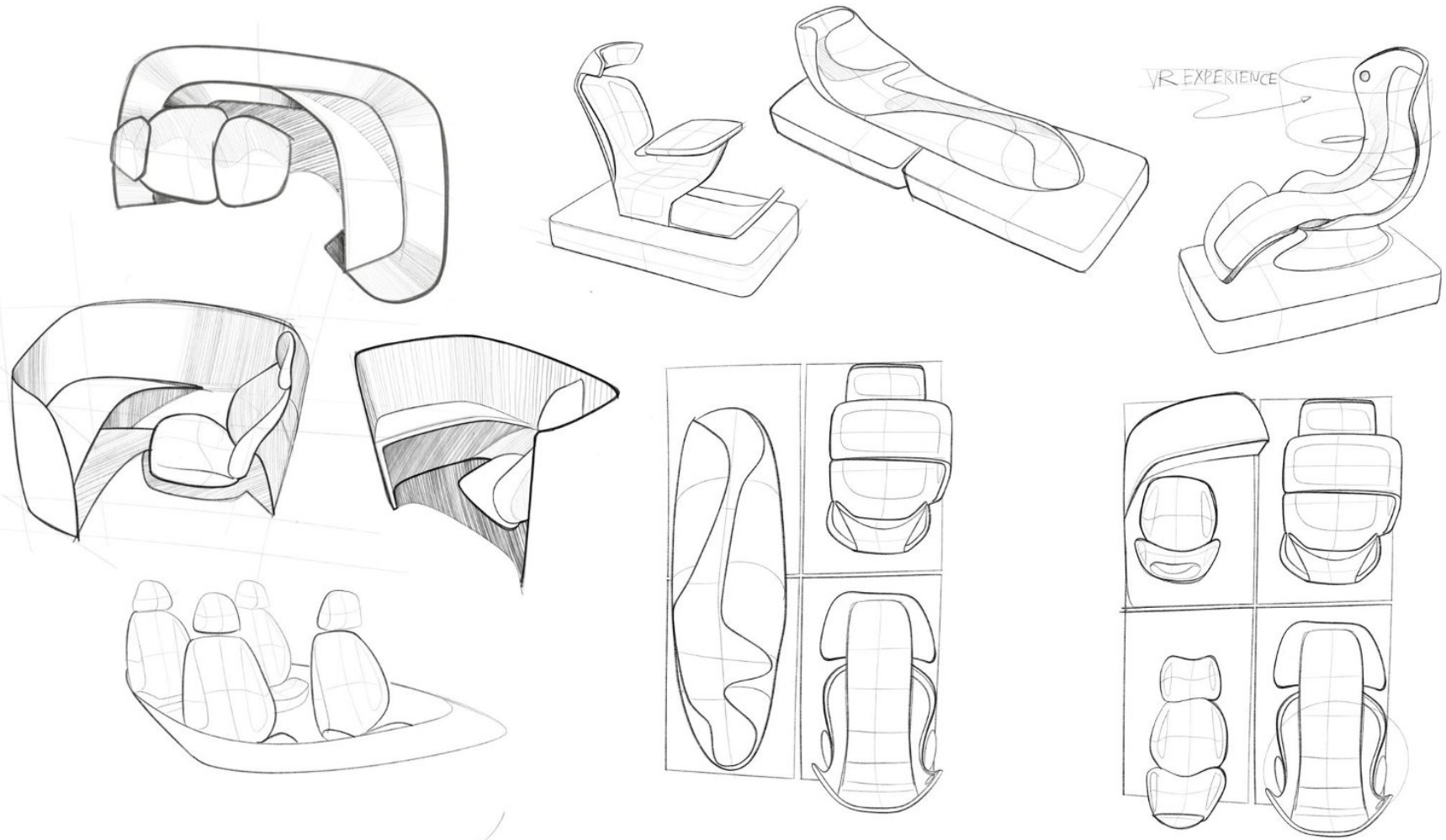
CONCEPT 5


NEW
MODIFY
SELL

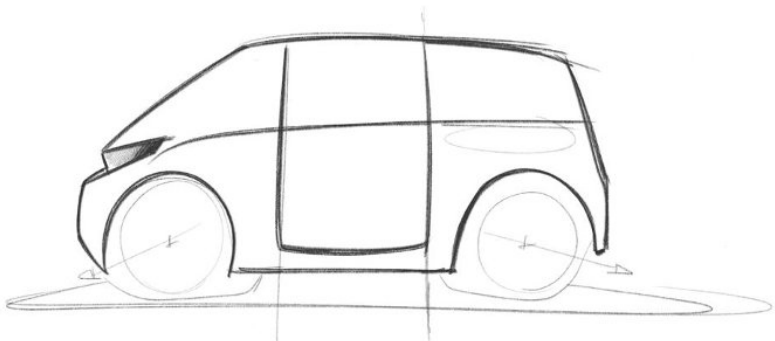
CONCEPT 6

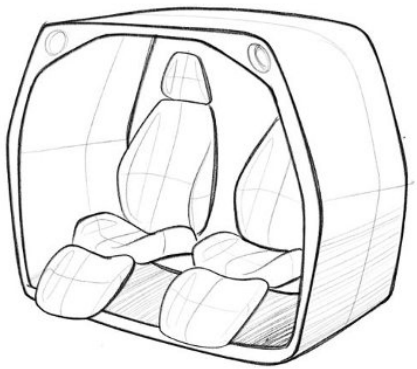


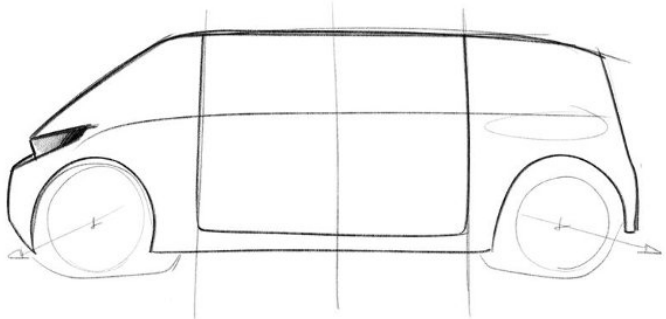

BATTERY PACK
+
FRAME SUPPORT
TWO SEATS JOINED TO FORM BASE

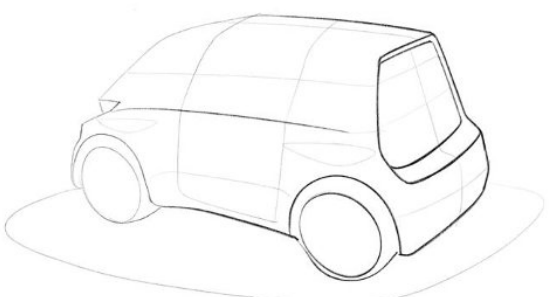

VR EXPERIENCE

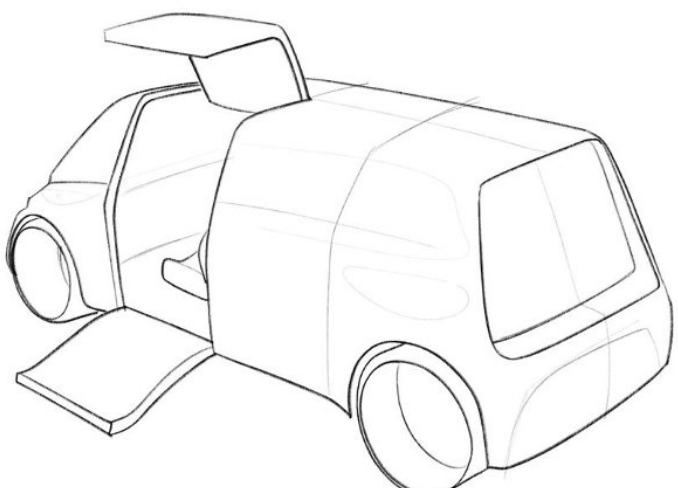
CONCEPT 7

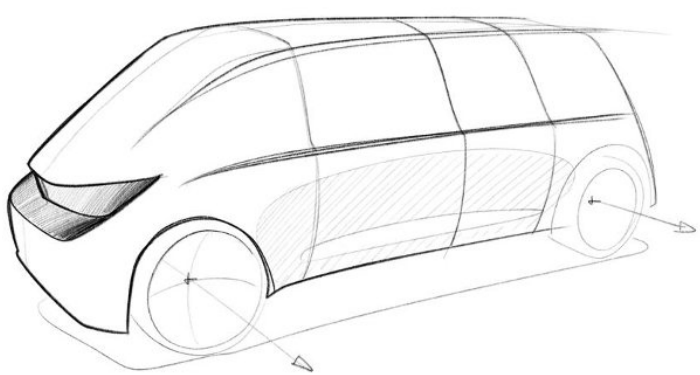




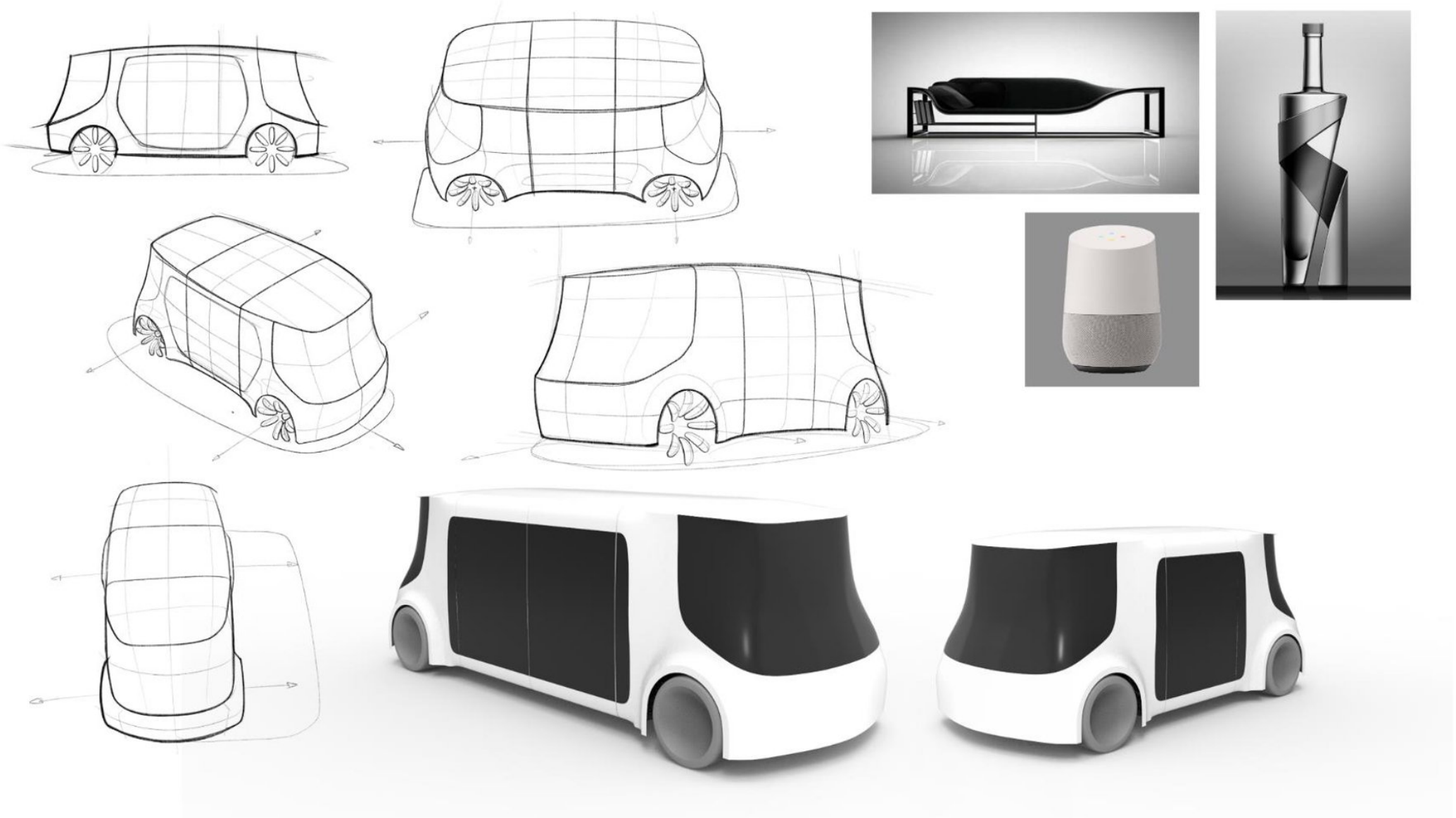


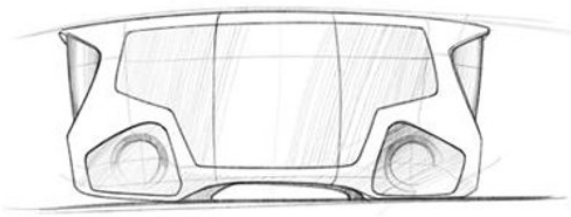


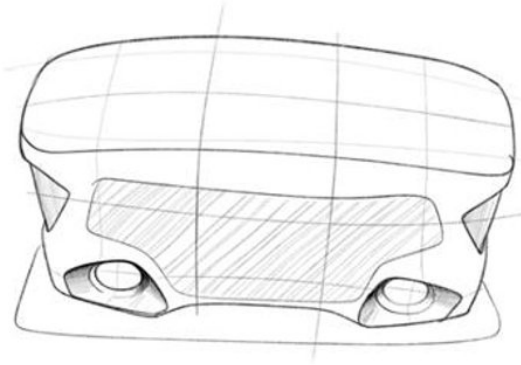


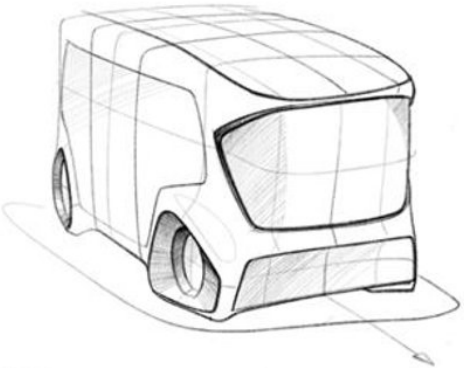


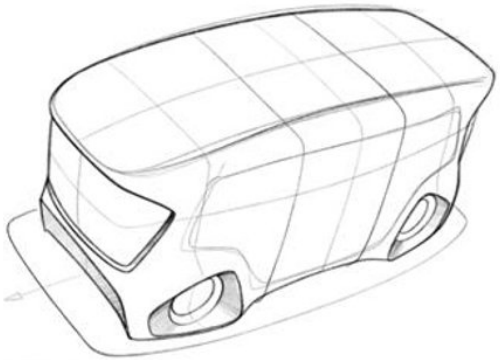
CONCEPT REFINEMENT

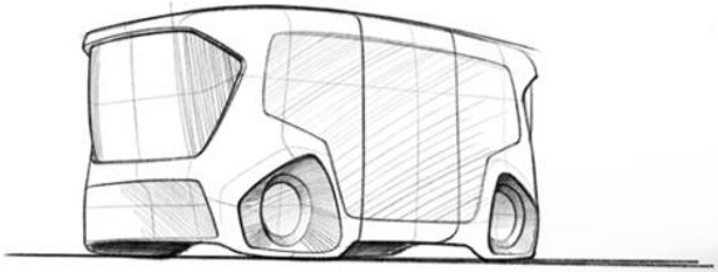


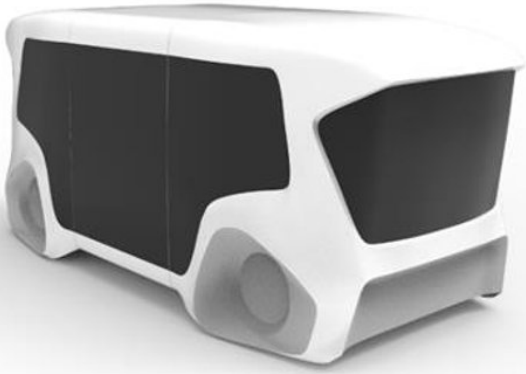


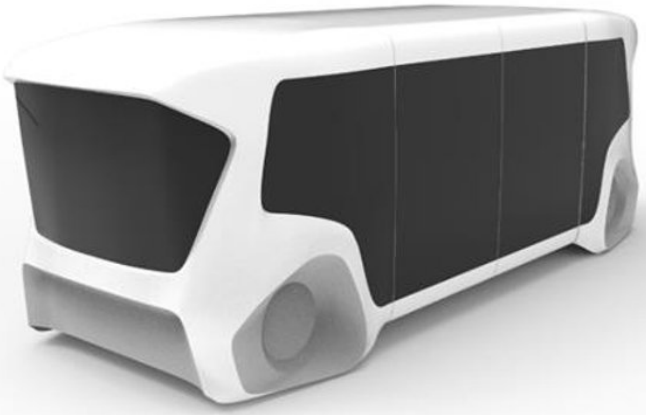


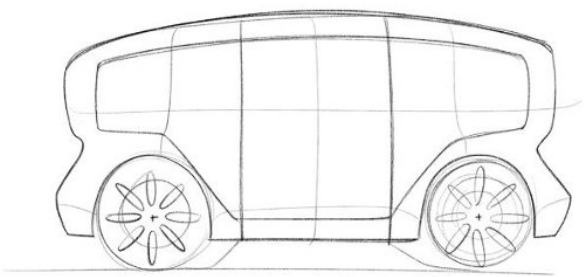


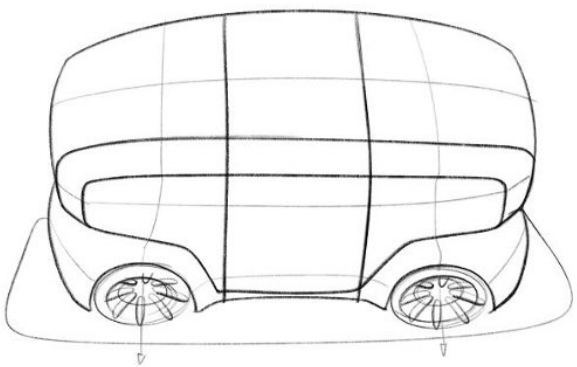


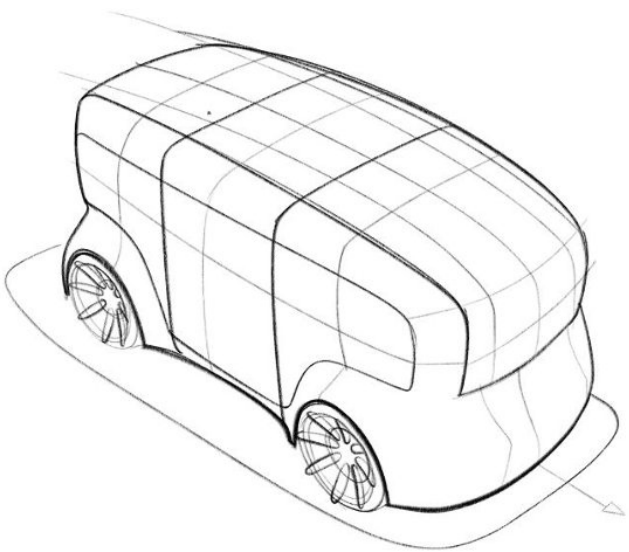


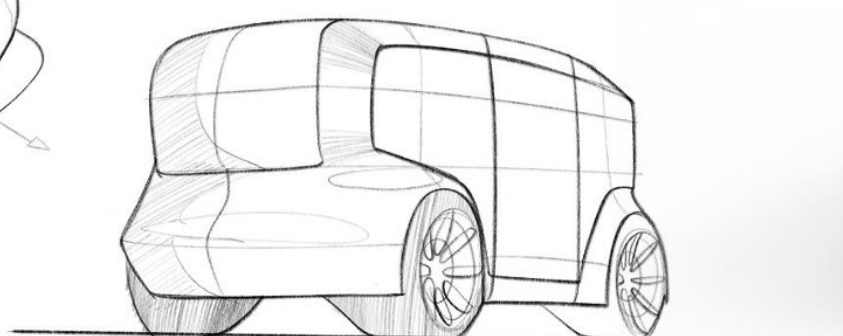


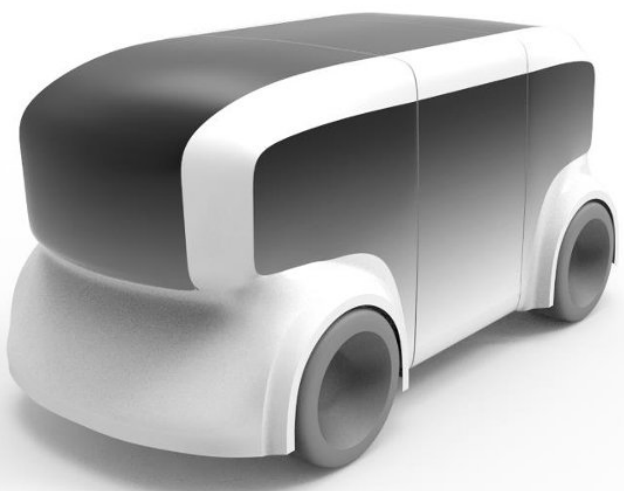


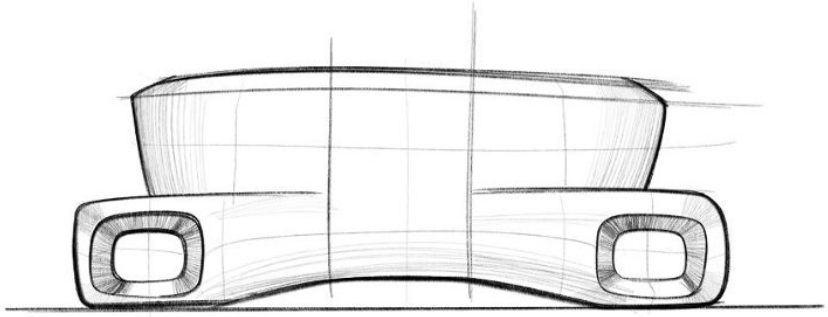


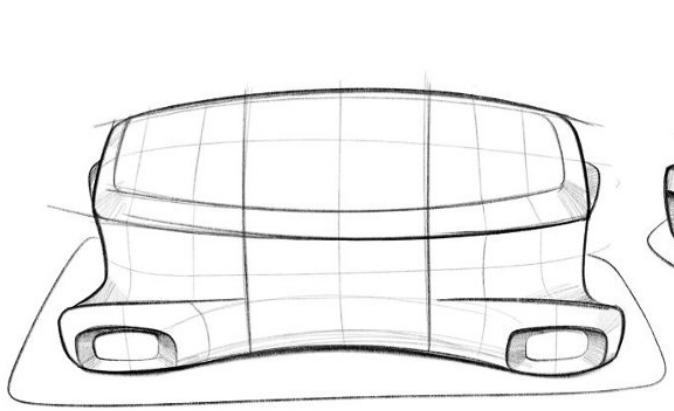


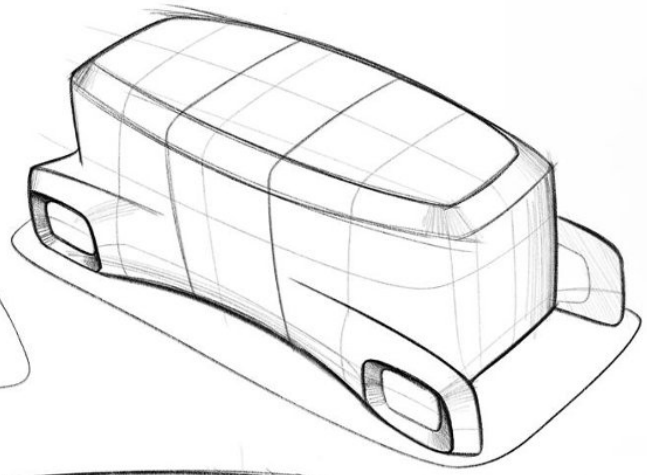


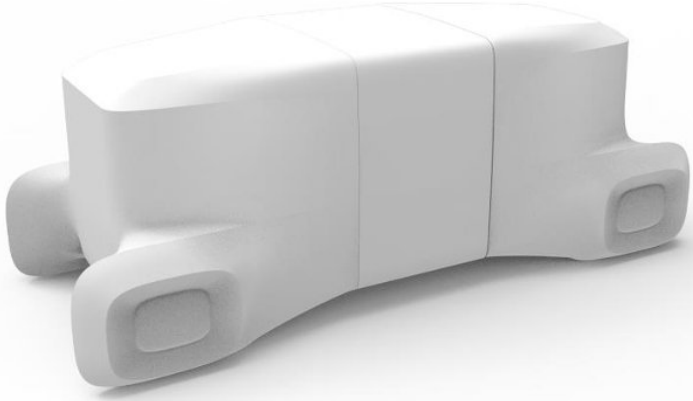


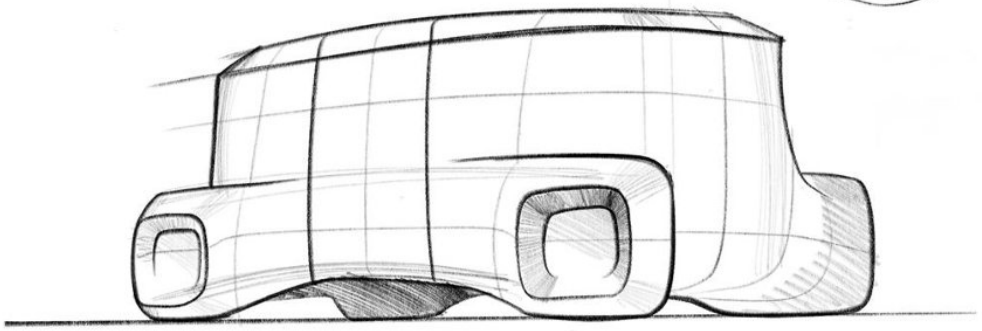


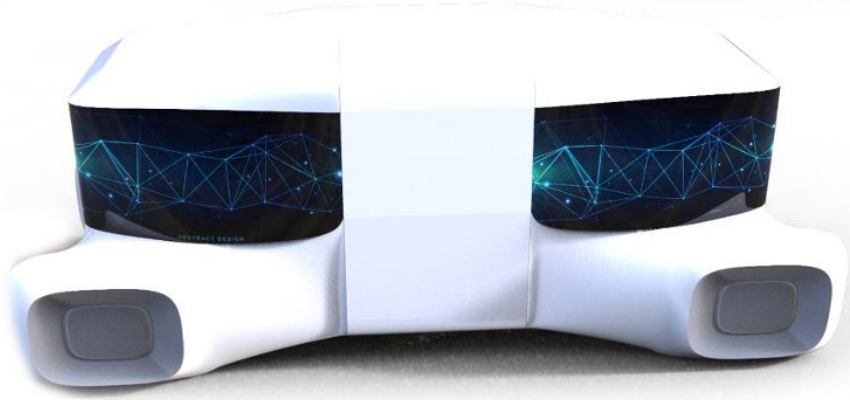


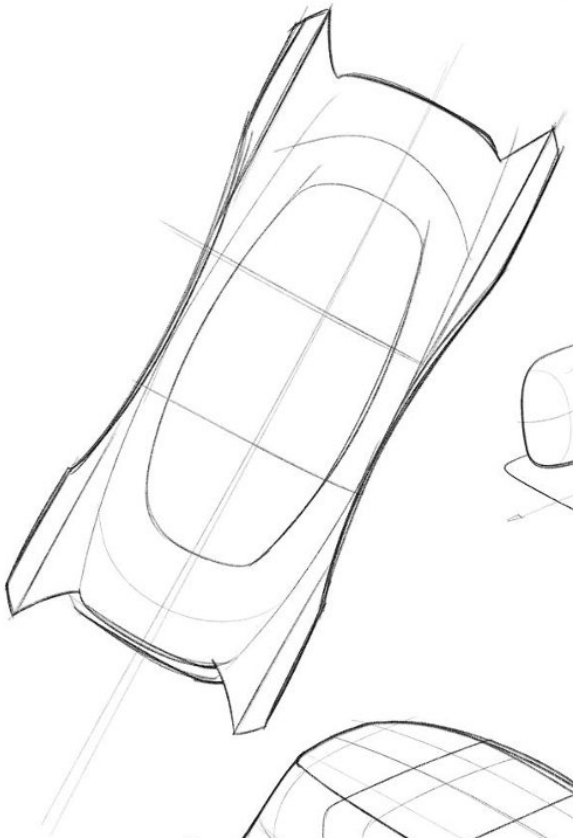


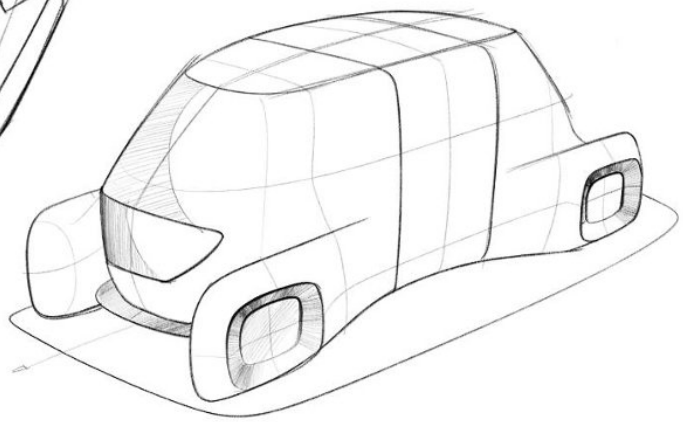


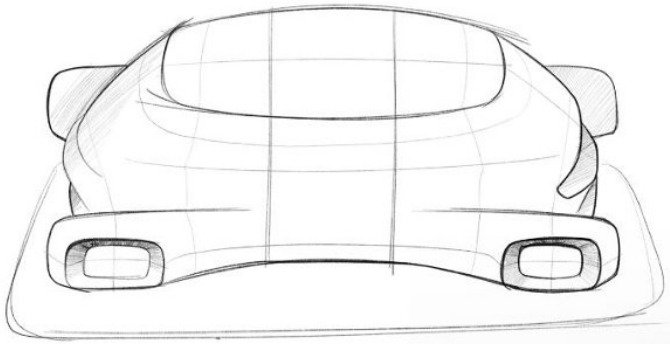


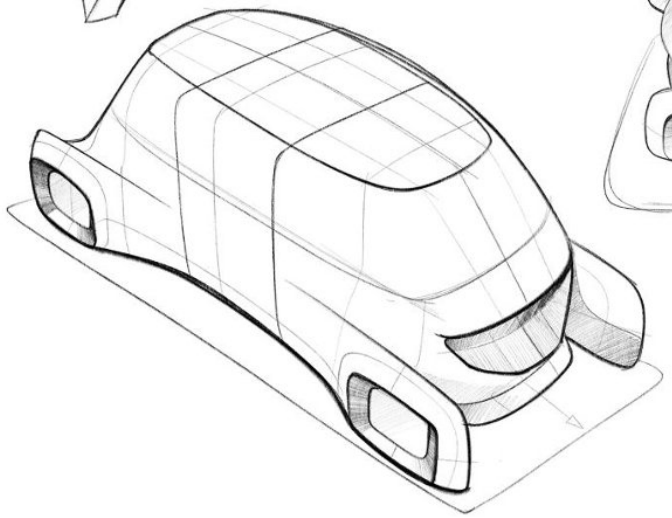


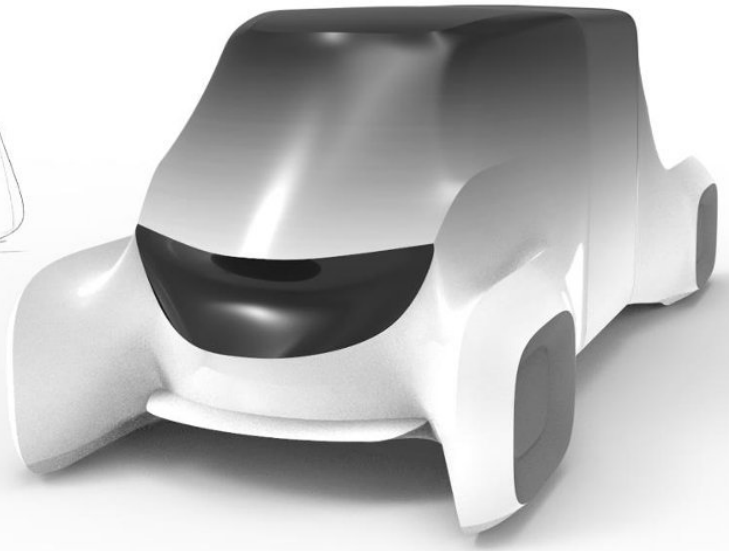


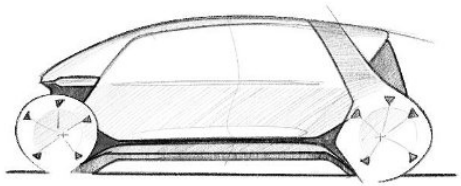
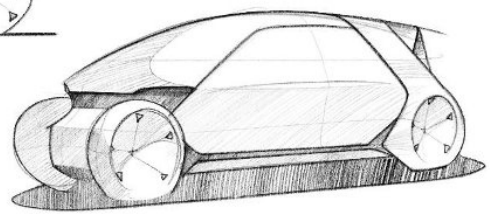
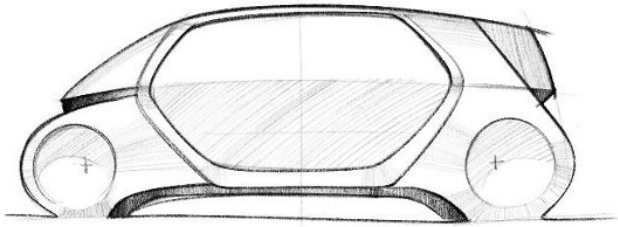
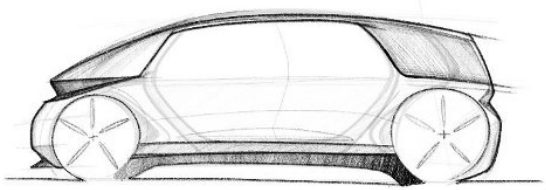
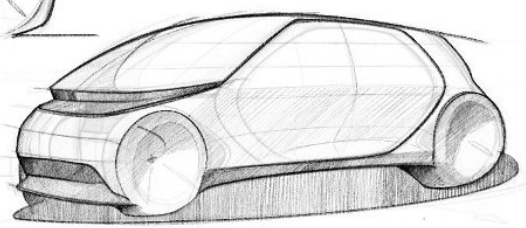
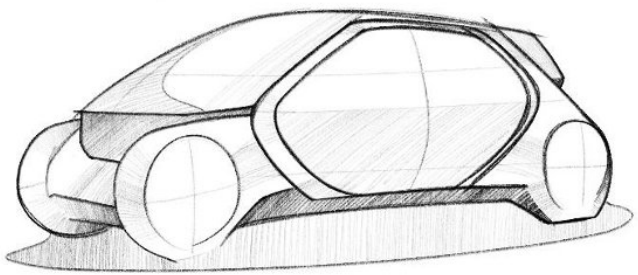
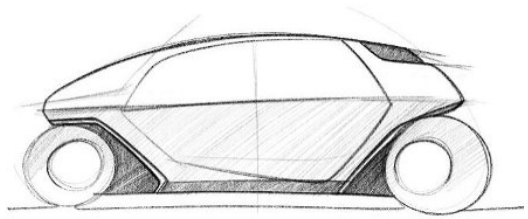
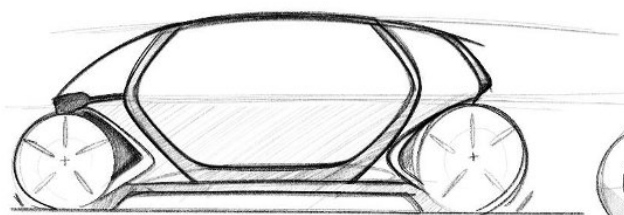
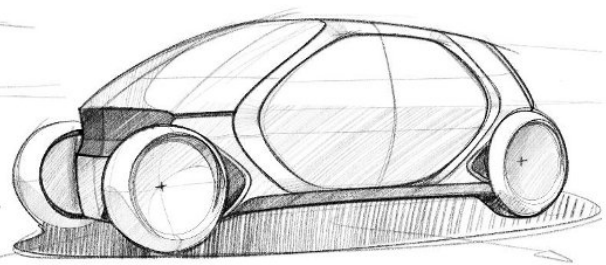
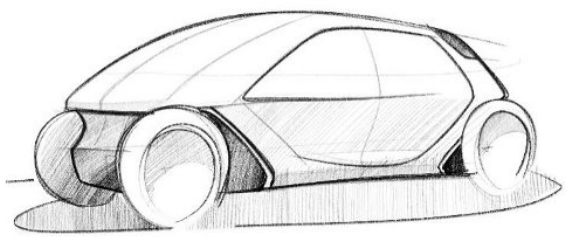


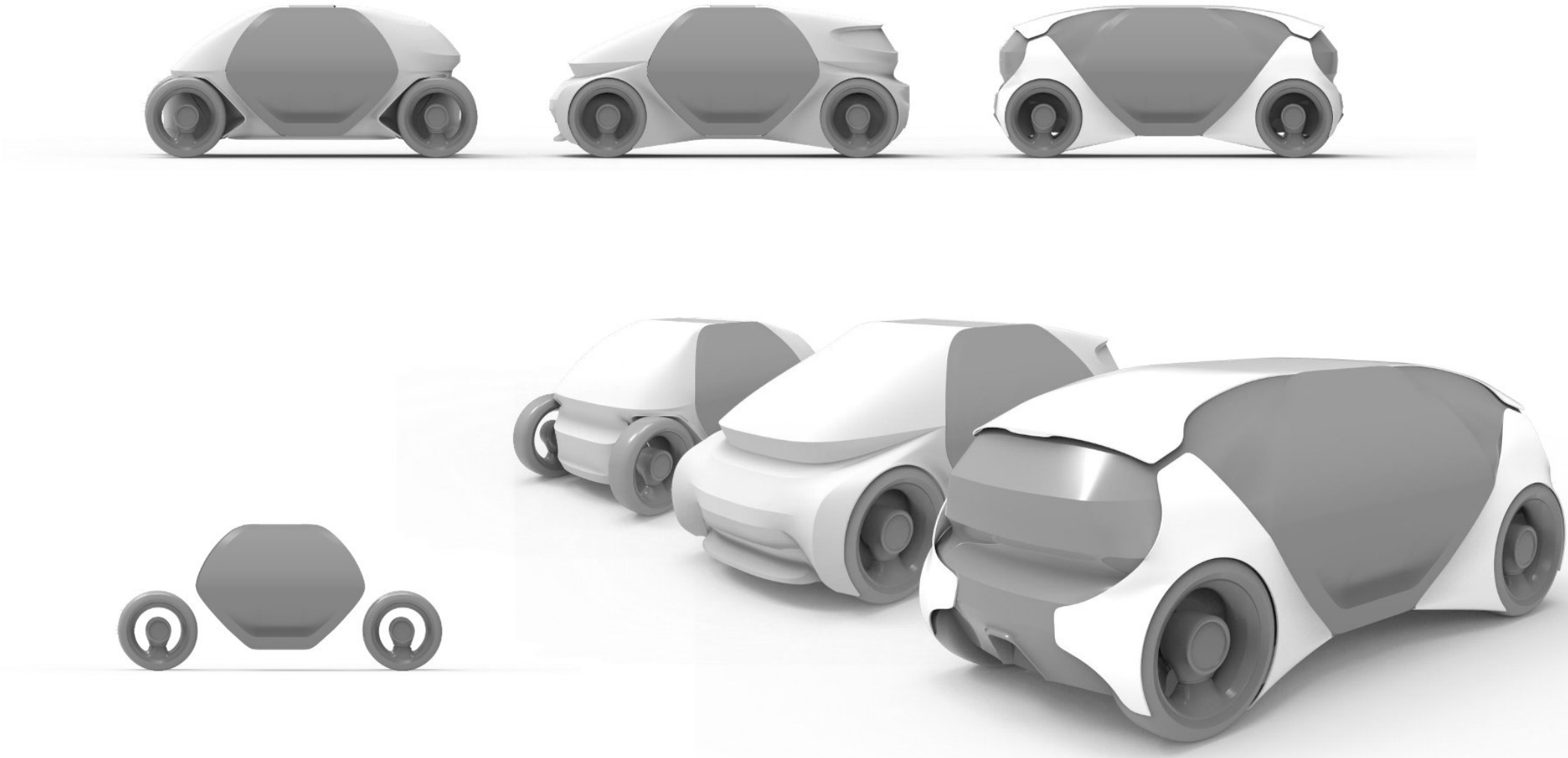


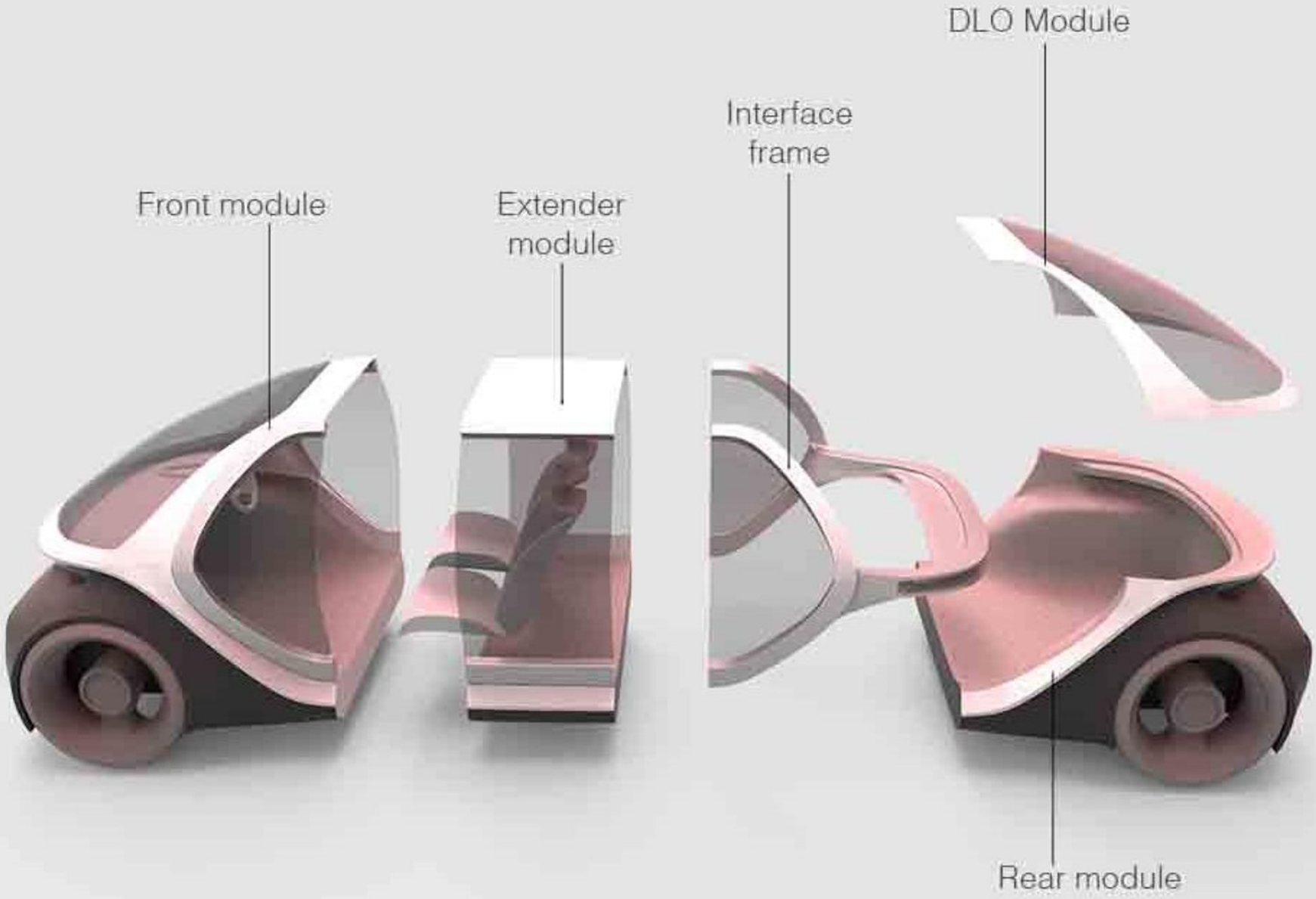









DLO Module
Interface frame
Front module
Extender module
Rear module