China Automotive Value Pools 2030

Ways to play and investment opportunities
Several disruptive forces will shape the Chinese automotive industry in the years up to 2030

The most extensive disruption over the coming years will be seen in **software-based services** and **battery electric vehicles**

As the **Chinese market becomes increasingly mature**, demand for **financial services products** will grow

**Well-funded start-ups** have emerged rapidly, focusing on new value pools and **challenging the status quo**

**Strategic partnerships** are vital to survival of the fittest automotive players and **success** in this **dynamic environment**

The **geo-political climate demands that** global automotive players strike a strategic balance between **portfolio risks and regional risks**

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**Chinese market snapshot by 2030**

- **Expected annual BEV unit sales:**
  - ~ 10 Mio
- **Additional annual spending on financial services:**
  - ~ 863 bn USD
- **Additional annual spending on mobility services:**
  - ~ 121 bn USD
- **Number of autonomous vehicles (L4) on the roads:**
  - ~ 1 Mio
- **Chinese market share of global vehicle sales:**
  - ~ 25%
New value pools are emerging and growing strongly in the Chinese automotive market as a result of evolving market trends

### Value pool segmentation

<table>
<thead>
<tr>
<th>Value pools</th>
<th>Description</th>
<th>Key developments</th>
<th>CAGR 21-30</th>
<th>Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>Supply of car components&lt;br&gt; e.g. Autonomous driving</td>
<td>• Increased demand for batteries and storage&lt;br&gt; • Increased connectivity and feature set</td>
<td>4.2%</td>
<td>Vehicle batteries&lt;br&gt; ADAS technology&lt;br&gt; SW platforms &amp; enablers</td>
</tr>
<tr>
<td></td>
<td>Manufacturing to vehicle sales&lt;br&gt; e.g. ICE&lt;sup&gt;1&lt;/sup&gt; &amp; NEV&lt;sup&gt;2&lt;/sup&gt; trends</td>
<td>• Shift from ICE to NEVs&lt;br&gt; • Decreasing number of parts in NEVs</td>
<td>7.8%</td>
<td>New vehicle sales ICE&lt;br&gt; Platform sales &amp; licensing&lt;br&gt; New vehicle sales NEV&lt;br&gt; Used vehicle sales ICE</td>
</tr>
<tr>
<td></td>
<td>Financial services</td>
<td>• Trend towards financing and leasing&lt;br&gt; • Emergence of alternative business models</td>
<td>10.4%</td>
<td>Financing&lt;br&gt; Insurance&lt;br&gt; Leasing</td>
</tr>
<tr>
<td></td>
<td>Usage / operation functions&lt;br&gt; e.g. Function on demand</td>
<td>• Renewable energy creation for NEVs&lt;br&gt; • On-demand in-car services</td>
<td>13.1%</td>
<td>In-car/on-demand services&lt;br&gt; Data / Information&lt;br&gt; Electricity (grid, storage)</td>
</tr>
<tr>
<td></td>
<td>Mobility services</td>
<td>• Development of fully autonomous vehicles&lt;br&gt; • Increasing usage of real-time data</td>
<td>9.3%</td>
<td>Subscription&lt;br&gt; Robo Taxi&lt;br&gt; Micro Mobility&lt;br&gt; Ride Hailing&lt;br&gt; Sharing&lt;br&gt; Public Transport&lt;br&gt; Rental (long/ short term)</td>
</tr>
<tr>
<td></td>
<td>Aftermarket sales/services&lt;br&gt; e.g. NEV accessories</td>
<td>• Different maintenance requirements of NEVs&lt;br&gt; • Growing accessory business</td>
<td>8.4%</td>
<td>Parts (repair/maintenance)&lt;br&gt; Merchandising&lt;br&gt; Labor (repair/ maintenance)&lt;br&gt; Accessories</td>
</tr>
<tr>
<td></td>
<td>Battery recycling/reuse/resell&lt;br&gt; e.g. Second-life battery use</td>
<td>• Recycling or repurposing of old batteries&lt;br&gt; • Sustainable raw material procurement</td>
<td>34.1%</td>
<td>Battery reuse/ resale&lt;br&gt; Battery recycling/upcycling</td>
</tr>
</tbody>
</table>

Key developments:
- Increased demand for batteries and storage
- Increased connectivity and feature set
- Shift from ICE to NEVs
- Decreasing number of parts in NEVs
- Trend towards financing and leasing
- Emergence of alternative business models
- Renewable energy creation for NEVs
- On-demand in-car services
- Development of fully autonomous vehicles
- Increasing usage of real-time data
- Different maintenance requirements of NEVs
- Growing accessory business
- Recycling or repurposing of old batteries
- Sustainable raw material procurement

CAGR: 10.4% for Financing, 9.3% for Subscription, 8.4% for Parts (repair/maintenance), and 4.2% for Vehicle batteries.

Source: Strategy& analysis

September 2022

<sup>1</sup> Internal Combustion Engine<br> <sup>2</sup> New Electric Vehicles
The traditional automotive industry faces disruptive trends such as digitalization & electromobility, leading to new and growing value pools

Key developments in Chinese automotive value pools

<table>
<thead>
<tr>
<th>Traditional value pools</th>
<th>Growing value pools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>Financial services</td>
</tr>
<tr>
<td>• Vehicles are turning increasingly into ever more connected devices, accelerating ADAS and software uptake</td>
<td>• Growing customer trend towards sharing leads to higher uptake of financing and leasing products</td>
</tr>
<tr>
<td>• The main driver is the accelerated adoption of NEV, mainly battery electric vehicles by Chinese customers</td>
<td>• Consumers crave flexibility &amp; uninterrupted access to their functioning vehicle – promoting conventional financing models</td>
</tr>
<tr>
<td>Production and Sales</td>
<td>Usage/ operation</td>
</tr>
<tr>
<td>• The trend from ICE towards NEV remains the most critical driver of automotive transformation</td>
<td>• Customers demand in-car services, navigation and charging infrastructure among vehicle operations</td>
</tr>
<tr>
<td>• In addition, sales and licensing of software and platforms become more relevant as connectivity increases</td>
<td>• On-demand car use offers new revenue opportunities</td>
</tr>
<tr>
<td>• New sales strategies &amp; customer access play a decisive role</td>
<td>Mobility services</td>
</tr>
<tr>
<td>Aftermarket sales &amp; services</td>
<td>• Growing trend towards subscription and sharing models</td>
</tr>
<tr>
<td>• Trend towards electric vehicles is reflected in aftermarket components and services through declining demand per NEV</td>
<td>• Consumers seek more convenient pay-as-you-go services as well as reduced fixed costs</td>
</tr>
<tr>
<td>• NEVs require fewer components and maintenance, while the overall installed base is increasing in size</td>
<td>Refurbishing/ recycling</td>
</tr>
<tr>
<td>• Customer satisfaction threshold has risen as expectations increase</td>
<td>• Growing trend towards battery recycling and upcycling</td>
</tr>
<tr>
<td></td>
<td>• Access to rare-earth minerals is becoming a critical factor</td>
</tr>
<tr>
<td></td>
<td>• Increased regulatory pressure driven by ESG</td>
</tr>
</tbody>
</table>

China Automotive Value Pools 2030

Source: Strategy& analysis

NEV = New energy vehicle

*additional revenue by 2030

September 2022
Progression of value pools reveals dominant position of production & sales and financial services as well as healthy overall growth rates

Market size & profit by category in 2021, 2025, 2030

<table>
<thead>
<tr>
<th>Category</th>
<th>2021</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Size</td>
<td>2.18 trillion USD</td>
<td>3.59 trillion USD</td>
<td>4.58 trillion USD</td>
</tr>
<tr>
<td>Profit</td>
<td>0.39 trillion USD</td>
<td>0.77 trillion USD</td>
<td>1.17 trillion USD</td>
</tr>
</tbody>
</table>

Market Size: 8.6% CAGR

Profit: 12.6% CAGR

Source: PwC Strategy& analysis
There is a broad spectrum of value pools to tap into – traditional value pools remain big while emerging value pools are growing rapidly.

**Growth trends and market sizes** from 2021 to 2030

**Traditional Value Pools**

- Used vehicle sales NEV
- New vehicle sales NEV
- Used vehicle sales ICE
- Software (Car OS)
- Labor (repair & maintenance)
- Merchandising
- Accessories
- Parts (repair & maintenance)
- Battery
- Techn./platform sales & licensing
- Infotainment**
- New vehicle sales ICE

**Growing Value Pools**

- Subscription
- Battery recycling
- NEV energy supply (private)
- Financing
- Data / Information
- Connected services
- Insurance
- Leasing
- Rental
- Ride-hailing

* Bubble size corresponds to approx. market size in 2030  ** Hardware only

Source: Strategy&

September 2022
The financial services sector is growing rapidly as more Chinese consumers buy vehicles and make use of financing products.

**Snapshot on financial services**

**Value pool size and profit**

<table>
<thead>
<tr>
<th>Revenue by segment in bn USD</th>
<th>Profit by segment in bn USD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing</td>
<td>Financing</td>
</tr>
<tr>
<td>597</td>
<td>340</td>
</tr>
<tr>
<td>1,091</td>
<td>1,461</td>
</tr>
<tr>
<td>489</td>
<td>628</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>CAGR ‘21-’30</td>
<td>CAGR ‘21-’30</td>
</tr>
<tr>
<td>13.1%</td>
<td>11.5%</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>CAGR ‘21-’30</td>
<td>CAGR ‘21-’30</td>
</tr>
<tr>
<td>5.6%</td>
<td></td>
</tr>
</tbody>
</table>

**Top players by segment**

- **Financing**
  - Bank of China
  - FAW-VOLKSWAGEN
  - SAIC GMAC

- **Leasing**
  - HERALD LEASING
  - VOLKSWAGEN FINANCE
  - YIXIN GROUP

- **Insurance**
  - Pingan
  - CPIC
  - PICC

**Value pool description**

Financial services comprise three segments: financing, leasing and insurance.

**Main drivers**

The usage of financial products is still underdeveloped in China compared to Western markets. Increasing sensitivity and demands to secure the vehicles' residual value through these services as well as mounting "Westernization" will drive the financing and leasing market in the long-term.

Savings as a percentage of household income has historically been high in China, peaking at more than 38% in 2010, compared to 6% in the US. This savings ratio has declined in recent years.
ICE incumbents are under huge pressure – New EV players focussing on overall user experience have registered a strong sales uptake

Incumbent challengers from Far East

<table>
<thead>
<tr>
<th>Product</th>
<th>Nio</th>
<th>Weltmeister</th>
<th>Human Horizons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales 2021</td>
<td>91,429 units</td>
<td>44,157 units</td>
<td>3,742 units</td>
</tr>
<tr>
<td>Business model</td>
<td>• New vehicle sales</td>
<td>• New vehicle sales</td>
<td>• New vehicle sales</td>
</tr>
<tr>
<td></td>
<td>• Battery as a Service</td>
<td>• Function on demand</td>
<td>• Commercializing smart cities</td>
</tr>
<tr>
<td>Design focus</td>
<td>• User experience, lifestyle brand</td>
<td>• User experience</td>
<td>• Customer centricity</td>
</tr>
<tr>
<td></td>
<td>• Human-machine interaction</td>
<td>• User customization</td>
<td>• User experience, lifestyle brand</td>
</tr>
<tr>
<td></td>
<td>• Battery swapping</td>
<td>• China chic</td>
<td>• Select differentiating features</td>
</tr>
<tr>
<td>Expansion</td>
<td>Europe, starting in Norway 2021</td>
<td>Focus on China</td>
<td>Europe &amp; North America¹</td>
</tr>
<tr>
<td>Attack on:</td>
<td>Tesla, Xpeng, VW, Audi, BMW, Daimler</td>
<td>Nio, Tesla, Xpeng, VW</td>
<td>Daimler, BMW, Audi, Porsche</td>
</tr>
</tbody>
</table>

¹) Subject to market development in China and company funding

Source: Company information of Nio, WM Motors and Human Horizons, PwC Strategy& research
In addition, there has been a major increase in deal activity in the past 2 years across all value pools

**Deals perspective**

**Deals across value pools**

<table>
<thead>
<tr>
<th>Value Pools</th>
<th>Deals across value pools</th>
<th>Selected top-Deals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production and sales</td>
<td>8/3</td>
<td>Morgan Stanley issues ADS on Nio of $2.5 bn</td>
</tr>
<tr>
<td>Components</td>
<td>10/3</td>
<td>GDDG places strategic funding of $1.7 bn on Baoneng</td>
</tr>
<tr>
<td>Refurbishing / Recycling</td>
<td>3/9</td>
<td>Alibaba raises Angel round of $1.4 bn for IM Motors</td>
</tr>
<tr>
<td>Financial Services</td>
<td>3/13</td>
<td>Hillhouse issues directional investment of $2.8 bn to CATL</td>
</tr>
<tr>
<td>Usage / Operation</td>
<td>2/12</td>
<td>FAW et al invest $2.2 bn in JV with Zhongqi Chuanzhi Tech.</td>
</tr>
<tr>
<td>Aftermarket</td>
<td>1/10</td>
<td>BlackRock raises $1.2 bn in IPO for TuSimple</td>
</tr>
<tr>
<td>Mobility Services</td>
<td>1/9</td>
<td>SAIC increased capital on Global Carsharing by $292 mn</td>
</tr>
</tbody>
</table>

1) Based on major deals within Chinese automotive market from 2020-2022
2) Sums do not all add up due to rounded presentation of numbers

Source: PwC Strategy& research
Numerous Chinese start-ups are world-leading pioneers in their field – some have already been acquired by Chinese technology firms

Profiles of top start-ups in selected core value pools

**Financing**

**Ant Finance Group**
- Founding year: 2014
- Valuation: ~ 120 USD bn
- Sales Volume: ~ 18.2 USD bn
- Segmentation: Digital payments
- Differentiator: Subsidiary of Alibaba, pioneer of digital payments in the Chinese market

**Data / Information**

**Autox Corp. Ltd.**
- Founding year: 2018
- Valuation: undisclosed
- Sales Volume: undisclosed
- Segmentation: Autonomous driving
- Differentiator: Leading in unmanned robotaxi, Largest robotaxi fleet in China - 1000+ vehicles*

**Leasing**

**Yixin Rental Group**
- Founding year: 2013 (as Bitauto)
- Valuation: undisclosed
- Sales Volume: undisclosed
- Segmentation: Online vehicle platform
- Differentiator: Subsidiary of Tencent, China’s largest online automobile financing/trading/leasing platform

**Battery reuse/ resell**

**Aulton Group**
- Founding year: 2016
- Valuation: undisclosed
- Sales Volume: undisclosed
- Segmentation: Battery swapping / reuse
- Differentiator: extensive charging network, reuse of older batteries, cooperation with 13 OEMs worldwide

**Electricity (grid, storage)**

**Meineng Energy**
- Founding year: 2011
- Valuation: undisclosed
- Sales Volume: undisclosed
- Segmentation: Grid energy storage
- Differentiator: First-of-a-kind flow battery, cooperation with utility companies and Anhui government

**Battery re-/upcycling**

**BRUNP Group**
- Founding year: 2005
- Valuation: undisclosed
- Sales Volume: undisclosed
- Segmentation: Battery recycling
- Differentiator: Subsidiary of CATL, pioneer in battery recycling technologies
Strategy& has identified three key success factors for global decision makers seeking to capitalize on Chinese automotive value pools

### Key success factors

1. **Understand your own position**
   - Who is in the market?
   - What do these companies do?
   - What is your differentiator?
   - Who could be a good fit as partner?
   - …

2. **Prioritize where to play**
   - What are the potential value pools?
   - Which value pool is the most attractive for your business?
   - How do you expand current value pools or tap into new ones?
   - …

3. **Define your ways to play**
   - What is your core business?
   - What is your optimal transformation plan?
   - Who could act as a transformative partner and how?
   - …

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>100 automotive brands on the Chinese market – i.e. international brands, small and large local brands

~70% of moves into new value pools have failed badly due to an underestimation of the resulting complexity

3 major ways to move forward on the Chinese market – i.e. stand-alone, partner or invest

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Source: PwC Strategy& research, Harvard Business Review
There will continue to be a growing, and competitive, playing field of companies seeking to exploit automotive value pools in China up to 2030.

Within selected core value pools, some local players have already positioned themselves successfully. Multiple other players are still in the process of growth and upscaling in different value pool segments.
Players need to adapt by shifting their core competencies to new demands, evaluating the attractiveness of new value pools

**Business model assessment & potential ways to play**

<table>
<thead>
<tr>
<th>Ways to play</th>
<th>Core business proximity</th>
<th>Core competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Further enhance and scale core competencies, adapt them to market requirements in order to meet increasing market demand</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>• Identify main drivers and most relevant sub-segments to make full use of current capabilities</td>
<td>Med</td>
<td>Med</td>
</tr>
<tr>
<td>• Conduct in-depth analysis of value pool trends and relevant potential for own business</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>• Carry out risk assessment (e.g. due to regulations)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Evaluate different investment strategies (e.g. partnerships, stand-alone investments) to leverage resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Conduct in-depth analysis of value pool trends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Assess potential conflicts (e.g. due to cannibalization)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Evaluate suitability of different forms of cooperation (e.g. partnerships, joint ventures) for participation in promising value pool segments</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Players can capitalize through strategic partnerships or investments, although core value pools should be approached independently.

**Overview of strategic ways to play**

<table>
<thead>
<tr>
<th>Components</th>
<th>Production and sales</th>
<th>Aftermarket sales/services</th>
<th>Financial services</th>
<th>Usage/operation</th>
<th>Mobility services</th>
<th>Refurbishing/recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEMs</td>
<td>Suppliers</td>
<td>Investment firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stand-alone</td>
<td>Partnership</td>
<td>Investment</td>
<td>Early</td>
<td>Growth</td>
<td>Late</td>
<td></td>
</tr>
</tbody>
</table>

**China Automotive Value Pools 2030**

*Strategy& September 2022*
OEMs should consider both, partnerships and investments, for effective market positioning

Ways to play for OEMs (deep-dive)

<table>
<thead>
<tr>
<th>Components</th>
<th>Partnership</th>
<th>Investment</th>
<th>Early</th>
<th>Growth</th>
<th>Late</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>Partnership</td>
<td>Investment</td>
<td>Early</td>
<td>Growth</td>
<td>Late</td>
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<td>Aftermarket sales/services</td>
<td>Partnership</td>
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</tbody>
</table>

**Rationale**

- **Components** and the technology domain require increasing localization – therefore partnership with local start-ups are recommended.
- Adapt current sales channels to current market trends (e.g., D2C sales model) to gain more customer access and insights.
- Leverage existing capabilities in the aftermarket for the repair and maintenance of NEVs and stay abreast of customer demands.
- Local partnership or investment can exploit substantial leasing or rental value pool segments and break through local customer barriers.
- Partnership with provider of in-car services and charging infrastructure is recommended – preferably those with customer-centric software.
- Investment or partnership with a leading local player is recommended to gain market share rapidly and strengthen position.
- Due to volatile market size & growth conditions, an initial partnership in battery refurbishing/recycling is recommended to satisfy demand.
Depending on the automotive player, different ways to play should be applied for successful future positioning in China

**Outlook and next steps**

- **OEMs** should adapt – shifting their core competencies to new market demands and evaluating the attractiveness of new value pools

- **Suppliers** should take advantage of new value pools to achieve differentiation, increased customer exposure, market share and profit growth

- **Investors** should balance risks with the potential for growth and profit in order to arrive at the right investment decision and portfolio strategy

- **All automotive players** must evaluate their geo-political exposure to any global region when making strategic investment decisions

Source: PwC Strategy&
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