



Perspectives on Chinese Development Speed & Product Cost

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Roland Berger perspective on Chinese development speed and product cost

Executive Summary

- **Chinese companies** – particularly in the automotive and capital goods sectors – **are rapidly expanding into global and especially Western markets**
- Their market entry is driven by **significantly faster product development processes (25–30% quicker) and substantially lower product costs (20–30% less) compared to Western incumbents**
- We provide an **impulse** into the **sources of these advantages** and outline **what Western companies must do** to stay competitive and **close the gap**

Since last year, both MNCs and local firms have struggled in China's domestic market, pushing Chinese companies to pivot toward exports in key industries...



...leading western players to continue to struggle against Chinese competition, both in China & now also in their home markets



...too slow in terms of time to market



...too expensive



...too little attuned to changing customer needs



Struggling to be competitive in China & in the respective home markets!

... it is time to act now!

The key question, particularly for engineered products & automotive companies is: How to achieve Chinese "speed" at competitive material costs levels?

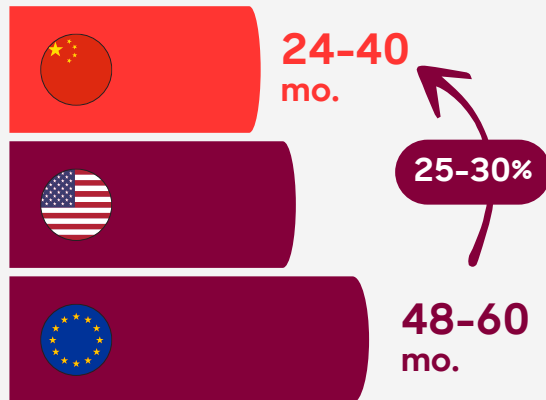
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Time to market

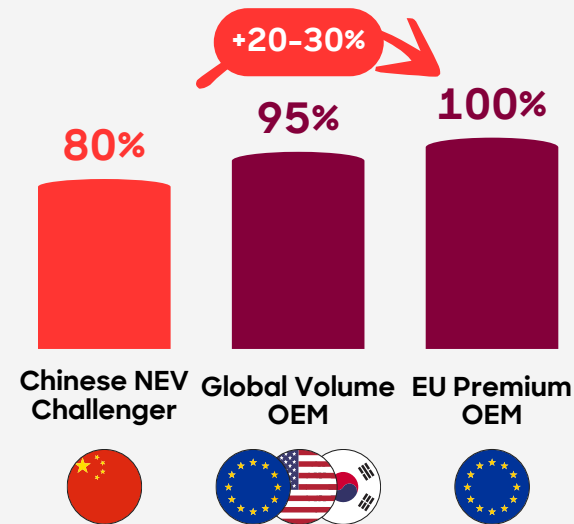
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Material cost competition

PDP development time [months]



BEV COGS comparison [%]



So the challenge for western OEMs is...

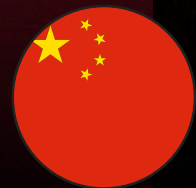
How to achieve Chinese "speed" in time-to-market...

... at competitive material costs levels?



Chinese companies, especially in the automotive sector, have drastically decreased time and resource efforts in product engineering processes

How are OEMs achieving China speed?



1 Accelerated product development process

Shortened strategy phase, Consequent use of (supplier)platforms, high vertical integration for selected systems, etc.



2 Parallelization of processes and minimum viable product approach

Agility & speed in basic development with Minimal Proof of Concept Approach



3 Lean and hierarchical organization

Lean R&D organization, quickly adapting to market conditions - Enabling further accelerated global expansion



Further Deep Dives for selected Chinese passenger car, commercial vehicle OEMs and capital goods companies available





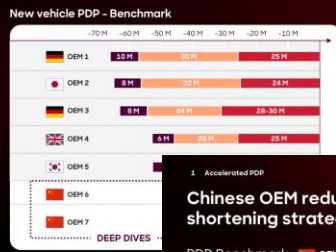
Combining significantly reduced product development processes with a consequently organized R&D function enables efficient time to market

China Speed – Unparalleled product development and engineering speed

1 Accelerated product development process

Compared to traditional OEMs, Chinese companies achieve significant time savings in all stages of the product development process

China Speed – PDP Benchmark (# months)



Best Practices – Acceleration of:

Strategy/Feasibility phase:

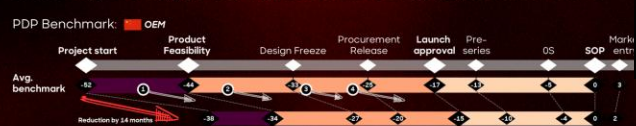
- Strengthening early stage/maturity with cross-functional competence and concept design freeze
- Customer data analysis to effectively assess market behavior and optimize offer structure with additional local design hubs
- Global division of labor - "Work around the clock"

Concept phase

- Parallelization of development processes
- Consequent use of modular (supplier) platforms with strong focus on shared (IP) architectures
- Vertical integration for key systems (e.g., EV components)

Up to 75% acceleration

Chinese OEM reduced their PEP by 14 months compared to the benchmark shortening strategy phase, digitization and early supplier involvement

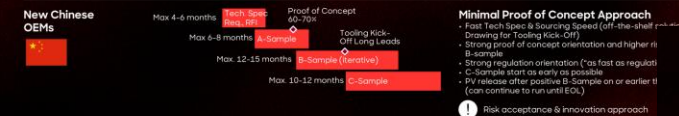
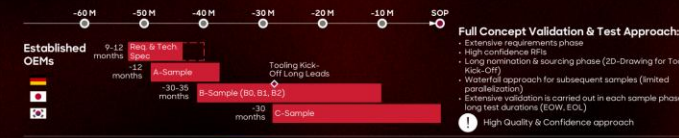


- Early phase and product requirements**
 - Reduction to "1 clay" model already at Product definition - no changes in the clay afterwards
 - Early commitment to one design (avoid PM milestones)
 - Consistent use of customer data in early phase - de-personalization of options with reduced demand
- Digitalization in development**
 - Changes after "1 Clay" exclusively virtually
 - Full use of VR for interior design
 - Virtual testing for 80% of parts - Low number of physical tests required
 - 2 summer and winter tests take place in one year (extended summer in China and utilization of southern hemisphere)
- SW competence**
 - Parallel development of HW and SW
 - Parallel kick-off at design freeze, synchronization point at pre-series release
- Early supplier involvement**
 - Early involvement of suppliers - as early as 14 months after project start
 - Active risk management: components are commissioned in early stage (e.g. design elements, connectivity, ADAS functionality)
 - Tooling starts directly after design freeze
 - Use of soft tooling for start of pre-series to reduce impact of potential inavailability of hard tooling
 - Early homologation and beta prototypes based on soft tooling

2 Parallelization of processes and MVP¹⁾ approach

Using a MVP approach in development and testing combined with a higher risk tolerance in the early phase, overall development times are decreased

Basic development Benchmark (Deep Dive HV-battery)



3 Lean and hierarchical organization

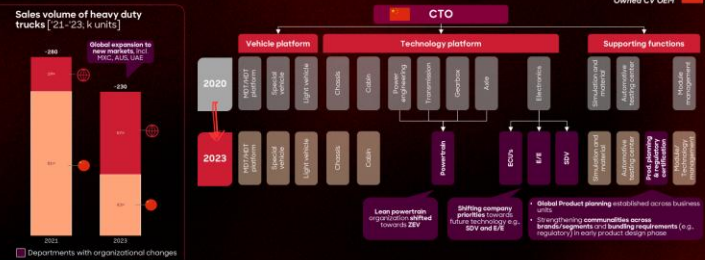
Centralized and highly integrated R&D function is geared towards fast development of technologies which are rapidly diffused to the market

Chinese OEM organization split between headquarter and site responsibilities



Even traditional Chinese companies have begun to drastically change their R&D organizations and gear them towards global market expansion

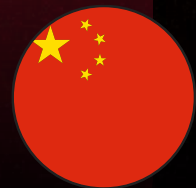
R&D organization adaptation: Example chin. commercial vehicle company



1) Minimum Viable Product

Chinese OEMs, especially in the automotive sector, deliver significant cost gaps in their BOMs, mainly due to...

How are OEMs achieving China cost levels?



1

Conscious product trade-off decisions

They make conscious product trade-off / design decisions with strong customer attunement in focus



2

A stringent cost-out operating model

They work within a stringent cost-out operating model leveraging both technical and commercial levers



3

Procurement set-up with end-to-end perspective and accountability

They foster direct accountability for cost-out management end-to-end wherever possible



Further Deep Dives for selected Chinese passenger car, commercial vehicle OEMs and capital goods companies available





Through early product feature decisions and a clear cost-out operating model, Chinese companies achieve drastically lower product cost

China Cost – Stringent material and product cost savings across categories

1 Conscious product trade-off decisions

For heavy duty trucks for example we see a -20-30% gap in material costs - Mainly driven by design choices, high local supplier share and lower ops. costs

Material cost gap CN-OEM and EU-OEM – Heavy duty trucks (HDT)

Primary drivers of the COGS gap (non-exhaustive)

- Cost-efficient product design**
 - Less durability/reliability requirements
 - Cost competitiveness & standardization of non-critical parts
 - Selective customer preference adherence
- Higher share of Chinese**
 - Low-cost sourcing benefit

Examples

- Lower material grades for non-critical parts, e.g. single-sided galvanized steel vs. double-sided
- Increased usage of cost-competitive materials and lower focus on environmental materials, e.g. interior plastics
- High share of standardized components with reduced variance
- Comparable spend on "intelligent" E/E components vs. EU-OEMs
- Reduced spend on non-core customer preferences, e.g. down-specification within cabin interior
- High share esp. for BEV/mechanical components, e.g. SAIC with 70% local Chinese supplier share

2 A stringent cost-out operating model

Overall, Chinese players excel in portfolio control, cost-out management and creating and leveraging sourcing advantages...

- Active portfolio control**
 - Stricter product portfolio complexity control**
Less variants, versions and off-shoots avoid to creep into portfolio, enforcing clear business cases and ensuring constant clean-up
 - Making clearer trade-off decisions**
Focus demanded customer benefits and consciously cost-efficient product design
 - Lowering specs & increasing standardization**
Lower technical specifications (e.g. durability) and standardized products (more off-the-shelf and carry-over parts)
- Focused cost-out management**
 - Driving stricter cost-out management**
Stricter cost-out operating model design and enforcement (weekly/monthly VAR/VE sessions, aggressive YTD MatCo targets)
 - Ensuring "high intensity" in supply base handling**
Partnerships with high-stake suppliers (e.g. HV battery) and high negotiation frequency/pressure (e.g. quarterly negotiations)
- Created & leveraged sourcing advantages**
 - Leveraging volume effects**
A high BEV/ICE volume domestic market enables economies of scale, further enhanced by a "greenfield" starting point
 - Utilizing local supply base & manufacturing**
Low-cost domestic manufacturing (~70% local supplier, ~40% blue collar labor cost vs. EU)
 - Keeping captive suppliers**
High share of captive suppliers to support no-to-low margin pricing strategies
 - Strategic reliance on state interference & taxes**
Selected state subsidies and support in strategic areas (e.g. steel, HV battery mat., energy)

3 Procurement set-up with E2E perspective and accountability

WM Motor leveraged the opportunity presented by its "greenfield" start and strategically decided to set up an integrated EV development and procurement

Integrated development and procurement center

Facts

- Chinese electric vehicle maker founded by Freeman Shen, former Volvo and Geely chairman in China
- Raised funds from Chinese tech companies Baidu and

Innovative approach

- Set up of an integrated EV development & procurement center within its organization designed from scratch
- Targets to optimize development efficiency, quality and price by:
 - Agile development process with rapid iterations
 - In-depth benchmarking
 - Platformization
 - Standardization
 - Aligned manufacturing & supply chain operating models and set-up

In terms of general drivers, volume effects, life-cycle design choices, local base and very stringent handling of suppliers and cost-out mgmt. stand

BEV COGS comparison HDT EU-OEM vs. CN-OEM BEV on domain level

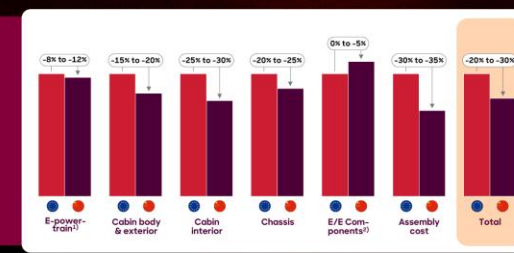
General drivers (non-exhaustive)	>15% BEV HDTs	Designed for 5-10 years	>70% local share	Nega. up to 4x per year	>30% captive share	Stricter cost-out OH	Government interfere./Tax
BEV COGS comparison EU-OEM vs. CN-OEM [x]							
E-power-train ¹⁾	-8% to -12%	○○○	○○○	○○○	○○○	○○○	○○○
Cabin body & exterior	-15% to -20%	○	○○○	○○	○○	○○	○○○
Cabin interior	-25% to -30%	○	○○○	○○	○○	○○	○
Chassis	-20% to -25%	○	○○○	○○	○○	○○	○○
E/E Components ²⁾	-1% to -5%	○○	○	○○○	○○	○	○○
Assembly cost	-30% to -35%	○○	○	n/a	n/a	n/a	○○
Total	-20% to -30%	○○○	○○○	○○	○○	○	○○○

1) Including HV battery, 2) including cost of E/E hardware (controller/ECU), wiring harness, display, HV hardware and sensors (e.g. camera, radar, etc.) 3) i.e., supplier partnerships, supplier negotiation frequency, 4) i.e., target costing/pre-3D/IEC consultations, etc.

Source: Interviews with market participants

Key cost differences on a BOM level can for example be seen within cabin interior and manufacturing costs

BEV COGS comparison HDT EU-OEM vs. CN-OEM [x]



Comparison assumptions

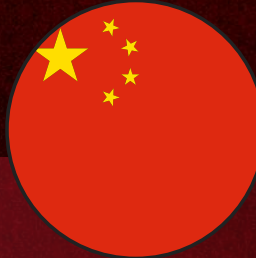
- Product: High runner HDT BEV from EU-OEM & CN-OEM (with product design destined for CN & EU-market)
- Production: CN-OEM production in China vs. EU-OEM production in EU
- Non-BEV: Findings for non-BEV specific domains also valid for ICE

1) Including HV battery, 2) including cost of E/E hardware (controller/ECU), wiring harness, display, HV hardware and sensors (e.g. camera, radar, etc.)

Source: Interviews with market participants

Regardless where or how you start, but start!

Learning from Chinese manufacturers...



China speed

A Time to market
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How are OEMs achieving China speed?

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Agility & speed in basic development with Minimal Proof of Concept Approach
- 3 Lean and hierarchical organization**
Lean R&D organization, quickly adapting to market conditions - Enabling further accelerated global expansion

Further Deep Dives for selected Chinese passenger car, commercial vehicle OEMs and capital goods companies available

sector, deliver significant cost gaps

OEMs achieving China cost levels?

- 1 Conscious product trade-off decisions**
They make conscious product trade-off / design decisions with strong customer attachment in focus
- 2 A stringent cost-out operating model**
They work within a stringent cost-out operating model leveraging both technical and commercial levers
- 3 Procurement set-up with end-to-end perspective and accountability**
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China cost

... western players can "walk the Chinese" way!





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