Challenges & success factors for multinational automotive suppliers in China

April 2006
## Contents

<table>
<thead>
<tr>
<th></th>
<th>Objective and methodology of the study</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Chinese Automotive Market</td>
</tr>
<tr>
<td>3</td>
<td>Key findings from the survey</td>
</tr>
<tr>
<td>4</td>
<td>Conclusions and recommendations</td>
</tr>
<tr>
<td>5</td>
<td>Appendix- Detailed results of the survey</td>
</tr>
<tr>
<td>6</td>
<td>About Arthur D. Little</td>
</tr>
</tbody>
</table>
Objective and methodology of the study

Arthur D. Little’s study of the Chinese market presents the challenges and success factors for foreign automotive suppliers in China

Objective of the study
- This study illustrates the current situation of foreign, "multinational", suppliers in the Chinese automotive market
- It shows areas of improvement and levers to improve operations of foreign companies in the Chinese market within a mid-term timescale

Methodology
The study was pursued in four steps:
- Background research of industry data to describe and understand the overall market situation
- Structured questionnaire to interview suppliers producing in China. All interviews took place in China
- Additional expert interviews to enrich results of first interview round
- Final analysis and conclusions cross-checked with industry experts
Almost 50 companies participated in the study. All interviews took place in China.
Growth of Chinese automotive industry continues, but at a slower rate

- Growth of Chinese automotive market continues. China has overtaken Japan to become the second-largest vehicle market.
- Growth is mainly driven by passenger car sales to private sector.
- Declining growth rate after government has cracked down on easy credit in order to avoid an overheating of the Chinese economy.

Source: Global Insight
Chinese Automotive Market – Industry Overcapacity

Industry overcapacity remains in foreseeable future

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>4.7</td>
<td>3.1</td>
</tr>
<tr>
<td>2006E</td>
<td>5.5</td>
<td>3.5</td>
</tr>
<tr>
<td>2007E</td>
<td>6.2</td>
<td>3.9</td>
</tr>
<tr>
<td>2008E</td>
<td>7.2</td>
<td>4.3</td>
</tr>
<tr>
<td>2009E</td>
<td>8.0</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Source: Global Insight, ADL estimation

- Current capacity utilization at OEM plants around 60%, no significant improvement in forecasted period
- OEMs are still installing capacity for new models, adding further over capacity in near future
  - Utilization of JVs with Western OEMs is low
  - Japanese and local Chinese are expanding capacity aggressively, e.g. Honda plans to double its capacity in China to launch its premium Acura brand

Comments
Declining prices squeeze OEM margins and result in increasing price pressure which erodes supplier margins as well.

<table>
<thead>
<tr>
<th>Price Range</th>
<th>Model</th>
<th>Original Price (KRMB)</th>
<th>New Price (KRMB)</th>
<th>Price Cut (KRMB)</th>
<th>% Cut</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50KRMB</td>
<td>QQ (1.1L)</td>
<td>45.8</td>
<td>45.5</td>
<td>-2.3</td>
<td>-5.0%</td>
</tr>
<tr>
<td></td>
<td>Xiali (1.1L)</td>
<td>41.8</td>
<td>39.8</td>
<td>-2</td>
<td>-4.8%</td>
</tr>
<tr>
<td>50-100KRMB</td>
<td>Fit (1.3L)</td>
<td>96.8</td>
<td>89.8</td>
<td>-7</td>
<td>-7.2%</td>
</tr>
<tr>
<td></td>
<td>Geely (Youliou)</td>
<td>55.4</td>
<td>51.7</td>
<td>-3.7</td>
<td>-6.7%</td>
</tr>
<tr>
<td>100-150KRMB</td>
<td>Polo (1.4L)</td>
<td>108.5</td>
<td>99.9</td>
<td>-8.6</td>
<td>-7.9%</td>
</tr>
<tr>
<td></td>
<td>Execelle (1.8L)</td>
<td>130.8</td>
<td>125.3</td>
<td>-7.5</td>
<td>-5.7%</td>
</tr>
<tr>
<td>150-200KRMB</td>
<td>Mondeo (2.0L)</td>
<td>189.8</td>
<td>167</td>
<td>-22.8</td>
<td>-12.0%</td>
</tr>
<tr>
<td></td>
<td>Bora (1.8L)</td>
<td>169.9</td>
<td>151</td>
<td>-18.9</td>
<td>-11.1%</td>
</tr>
</tbody>
</table>

Source: Company data

- In the short to medium term, with new capacity and new models continuing to enter the market, price competition is expected to remain intense.
- Prices are expected to decline by 10-15% per year, even more in the higher price segments.
**Increasing market share**

**Chinese Automotive Market – Western OEMs are losing market share**

**European OEMs are losing market share while others are gaining: in particular Asian OEMs seems to be most competitive in China**

<table>
<thead>
<tr>
<th>Western OEM Market Share 2002-2005</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market Share (%)</strong></td>
<td><strong>Mainly European OEMs are losing market share while others are gaining</strong></td>
</tr>
<tr>
<td></td>
<td>– In total, Japanese OEMs have surpassed European OEMs to take the largest market share</td>
</tr>
<tr>
<td></td>
<td>– Korean OEM is gaining market share aggressively</td>
</tr>
<tr>
<td></td>
<td>– Increase of market share of US OEMs are mainly driven by Shanghai GM</td>
</tr>
<tr>
<td></td>
<td>– Chinese local OEMs, such as Chery and Geely, are also increase market share</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>European OEM</th>
<th>US OEM</th>
<th>Korean</th>
<th>Local Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>19.90%</td>
<td>5.20%</td>
<td>9.10%</td>
<td>22.80%</td>
</tr>
<tr>
<td>2003</td>
<td>18.50%</td>
<td>24.8%</td>
<td>12.00%</td>
<td>12.00%</td>
</tr>
<tr>
<td>2004</td>
<td>17.70%</td>
<td>27.2%</td>
<td>28.3%</td>
<td>27.7%</td>
</tr>
<tr>
<td>2005</td>
<td>21.80%</td>
<td>13.5%</td>
<td>14.6%</td>
<td>23.3%</td>
</tr>
<tr>
<td>2006</td>
<td>22.00%</td>
<td>40.1%</td>
<td>15.5%</td>
<td>22.0%</td>
</tr>
</tbody>
</table>

Source: Global Insight
Chinese Automotive Market – Emerging market of low cost product

The “emerging market” of low cost models is experiencing the highest growth rate – that trend will affect the suppliers too.

<table>
<thead>
<tr>
<th>Volume Growth (%)</th>
<th>Top growth of major models* 2004-2005</th>
<th>selectively</th>
<th>Comments</th>
</tr>
</thead>
</table>
|                   | QQ                                   | 130%        | Low cost models experienced highest growth in 2005
|                   | Elantra                               | 72%         | – Chery’s QQ, as low cost sub-compact model, shows highest growth rate in 2005
|                   | Excelle                              | 61%         | The segment of low cost models could be regarded as an “emerging market” with promising growth rates in future, due to further promotion by government policy
|                   | Xiali                                 | 58%         |                     |
|                   | Elysee                                | 48%         |                     |

Source: Global Insight, ADL analysis  
* Sales volume >25K in 2004
Arthur D. Little's survey questionnaire covered six major sections along companies' value chains

<table>
<thead>
<tr>
<th>Structure of the survey</th>
<th>Major sections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. General Conditions</strong></td>
<td>A. General Conditions</td>
</tr>
<tr>
<td><strong>B. Research &amp; Development</strong></td>
<td>– Intention of set-up in China</td>
</tr>
<tr>
<td><strong>C. Purchasing</strong></td>
<td>– Choice of location and legal form</td>
</tr>
<tr>
<td><strong>D. Production</strong></td>
<td>– Requirements and criteria for Chinese staff</td>
</tr>
<tr>
<td><strong>E. Logistics</strong></td>
<td>B. Research and Development</td>
</tr>
<tr>
<td><strong>F. Quality</strong></td>
<td>– Planned phases of product development</td>
</tr>
<tr>
<td></td>
<td>– Measures to protect intellectual property</td>
</tr>
</tbody>
</table>

- C. Purchasing
  - Transparency, quality level and flexibility of Chinese suppliers
- D. Production
  - Material, machine and labor utilization
- E. Logistics
  - On-time delivery, information flow and JIT requirements
- F. Quality
  - Observed quality and challenges to quality level

Challenges for multinational automotive suppliers in China
Key findings from the survey – Situation of Multinational Suppliers in China

1st tier manufacturers are primarily interested in proximity to the customer sites (OEMs)

Results of the Study – General Conditions (1)

Most important criteria for your choice of location in China

- Proximity to customer sites is most important criterion for site selection by suppliers
  - Majority of suppliers is forced by key accounts (OEMs) to follow, even though they sometimes have to build a new factory in China despite capacity available elsewhere
  - These suppliers have to rethink their China strategy now to open new markets, both in China and globally; often their major MNC* customers are losing market share in China
  - Integration of China operations into global production network and leverage of low cost manufacturing in China becomes crucial

- The identification of a beneficial infrastructure, qualified employees and partners is seen as a big challenge in China, and requires profound analysis and expertise of the market

- Mainly bigger suppliers see the need to avoid currency risks

Source: Supplier survey, ADL analysis, *Multi National Corporations
The appropriate legal form depends on the type of company, government regulations and legal requirements

<table>
<thead>
<tr>
<th>Recommended legal form for entrepreneurship in China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Venture (JV)</td>
</tr>
<tr>
<td>Wholly foreign owned enterprise (WFOE)</td>
</tr>
<tr>
<td>Dealership</td>
</tr>
<tr>
<td>Not specified</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

- The Wholly Foreign Owned Enterprise (WFOE) is usually the recommended legal form; nonetheless various suppliers are captured in Joint Venture structures due to former legal restrictions:
  - IP protection is a problem in JV structure
  - In addition, a JV structure is becoming an obstacle for MNCs to integrate their China operations within the global production network

- Management of cultural barriers and the improvement of staff are seen as key success factors for the operations in China; many suppliers see mentoring and exchange programs as major trigger for improvements

- Keeping the best employees is very challenging and requires special retention programs

Source: Supplier survey, ADL analysis
Foreign companies need to realize market driven application engineering on site in order to produce products suitable for the Chinese market

### Key findings from the survey – Situation of Multinational Suppliers in China

- Theft of intellectual property in China is not preventable – penalties do not work; accepting this fact and managing the knowledge and product portfolio accordingly is essential, optimized and simultaneous time-to-market are the most promising measures in order to protect intellectual property
- The competition is becoming more fierce - requiring more new product launches in shorter time-frames
- "Over-engineering" – when simple solutions are also possible – is in many cases the reason for the loss of intellectual property and the deficit of market shares against local Chinese companies
- The majority of multinational suppliers has recognized the need and has adapted products to local Chinese demands; market driven application engineering is one of the most important levers – at least ⅗ of the interviewed companies intend to pursue this

### Results of the Study – Research and Development

#### Optimizing time-to-market

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very bad</td>
<td>0%</td>
</tr>
<tr>
<td>Largely bad</td>
<td>8%</td>
</tr>
<tr>
<td>Indifferent</td>
<td>25%</td>
</tr>
<tr>
<td>Mostly good</td>
<td>46%</td>
</tr>
<tr>
<td>Very good</td>
<td>21%</td>
</tr>
</tbody>
</table>

#### Planned future spending in R&D/application engineering

- **Willing to invest in application engineering in China**
  - 67% of respondents are willing to invest
  - 33% are not willing to invest

- **Reluctant to increase R&D in China**
  - 0% are reluctant to increase R&D
  - 13% are reluctant to increase R&D by ≤10%
  - 24% are reluctant to increase R&D by ≤20%
  - 63% are reluctant to increase R&D by >20%

Source: Supplier survey, ADL analysis
Key findings from the survey – Situation of Multinational Suppliers in China

The quality of supplied products is still a critical problem – high quality products have approximately the same price as in home country

Results of the Study – Purchasing and Sourcing (1)

What is the quality level of Chinese suppliers in comparison to home country?

- The quality of supplied products is a critical problem; however, all multinational companies believe their Chinese suppliers can catch up
- More than 10% see their Chinese suppliers as equal or even better than suppliers in home country
- Unlike raw materials, components and modules require specific market know-how and continuous supplier development in order to ensure successful localization of value-added in China
- Smart make-or-buy decisions are major levers to reduce the risk of copying by Chinese competitors supported by own suppliers
- Components with high technical requirements will reach similar price levels in comparison to the home country

Source: Supplier survey, ADL analysis
Continuous communication with local suppliers in China is necessary; strategic sourcing has to go along with leveraging local know-how.

How flexible are Chinese suppliers concerning short-term modifications in comparison to home country?

- 35%: Modifications are not possible
- 12%: Short-term modifications need more time
- 12%: Comparable to home country’s suppliers
- 12%: Modifications are always possible but expensive
- 41%: More cooperative and faster

The flexibility of Chinese suppliers is well known but sometimes misleading:

Chinese suppliers are often more cooperative and faster than MNC competitors, but sometimes at the expense of quality (“trial and error” solutions).

Source: Supplier survey, ADL analysis
Key findings from the survey – Situation of Multinational Suppliers in China

Highly sophisticated processes and a high rate of automation will not necessarily lead to cost efficient manufacturing

Results of the Study – Production

<table>
<thead>
<tr>
<th>Labor utilization</th>
<th>Not acceptable</th>
<th>Potential to catch up</th>
<th>Acceptable</th>
<th>Comparable to home country</th>
<th>Far above industry standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2%</td>
<td>40%</td>
<td>37%</td>
<td>19%</td>
<td>2%</td>
</tr>
</tbody>
</table>

- Most of the interviewed suppliers feel happy or at least confident about catching up with machine utilization in China; this attitude is mostly driven by imported machines and processes from the home country.
- On the other hand, these partly complex processes and cost-intensive machines are major obstacles for cost competitiveness against the Chinese competition.
- The efficiency of the work force is low, but steadily improving due to high training efforts; high turnover of staff is mainly driven by the competition for highly skilled Chinese staff between local companies; currently various incentive systems for workers are in place or being developed.

Source: Supplier survey, ADL analysis
Logistics service providers in China have developed to a high level very quickly in recent years, but their services are still not as good as in Western countries.

In particular for Small and Medium Enterprises (SME), logistics play an important role for a better market penetration.

On-time delivery is rated differently by foreign companies; only precisely defined tasks and continuous questioning about the current status helps to achieve delivery on-time.

Consideration of long delivery time is required in terms of planning of production lines.

Logistics service providers have developed to a high level in recent years, but infrastructure and its information flow in China need to be enforced in the future.

Source: Supplier survey, ADL analysis.
Key findings from the survey – Situation of Multinational Suppliers in China

In order to increase quality in Chinese manufacturing, strict supervision, training and clearly defined instructions are necessary

Results of the Study – Quality

- Quality Management Systems, continuous monitoring of suppliers and understanding the real demands of the customer will lead to an increased quality level within the value chain
- Due to the strict requirements of foreign parent companies, the quality level within the subsidiaries is rated mostly good by multinational companies
- "Little investment and a lot of profit" is a common Chinese mentality: In order to increase quality in Chinese manufacturing, strict supervision, training and clearly defined instructions/ procedures are necessary
- Supplier development (Quality Management Systems) is crucial

Source: Supplier survey, ADL analysis
## Contents

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Objective and methodology of the study</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Chinese Automotive Market</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Key findings from the survey</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Conclusions and recommendations</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Appendix- Detailed results of the survey</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>About Arthur D. Little</td>
<td>6</td>
</tr>
</tbody>
</table>
Suppliers have to respond to the market trend and Arthur D. Little has seven recommendations

- **OEM Market Trend**
  - Slower growth
  - Industry Over Capacity
  - Declining price
  - Western OEMs are losing market share
  - Emerging market of low cost products

- **Suppliers’ Strategic Imperatives**
  - Export:
    - How to integrate with global production network
    - How to meet international quality standard
  - Find New Customers:
    - How to penetrate local Chinese and Asian OEMs
    - How to penetrate new customers, in general
  - Defend Key Accounts:
    - How to protect IP and block local competitors
    - How to addressing the need for “emerging market”

- **Identified Issues from our survey**
  - Actually, JV structure is becoming an obstacle for MNC to integrate their China operation with global network
  - …..the need for products adapted to local demand
  - ….. complex processes and cost-intensive machines could be major obstacles for cost competitiveness against the Chinese/Asian competition
  - “Over-engineering” …..is in many cases the reason for the loss of intellectual property and the deficit of market shares against local Chinese an Asian companies
  - Theft of intellectual property in China is not preventable …..optimized and simultaneous time-to-market is most promising
  - Smart make-or-buy decisions are major levers to reduce the risk of copying by Chinese competitors……

- **Arthur D. Little’s Recommendations**
  1. Integrate your production network
  2. Consider low cost volume segment
  3. Adapt your product design
  4. Balance level of automation
  5. Establish local R&D
  6. Shorten time-to-market
  7. Create smart make-or-buy solutions

Note: The supplier strategic imperatives and recommendations here are mainly for Western suppliers. For Asian companies, they are doing fine right now, however, they will face similar situation sooner or later.
The Integration of the China operation into global production network is crucial for balancing capacity. If JV structure is an obstacle, evaluate your exit options

- JV is mostly an intermediate solution and is either forced by legal restrictions or to close deficits during the market entry phase. However, significant majority control should always be targeted
  - The conflicting interests of two parties will often result in higher structural management cost (e.g. double management)

- The JV structure is mostly seen as an obstacle for MNC suppliers to integrate China operation into their global manufacturing network

- In any case, the business model as JV should be reconsidered, and exit options should be evaluated
Entering the low cost volume segment could be an option to substitute declining business with Western OEMs.

**Consider low cost volume segment**

<table>
<thead>
<tr>
<th>Share in total sales volume</th>
<th>Dominated by Foreign companies</th>
<th>Premium Market</th>
<th>Segments</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td></td>
<td></td>
<td>High end:</td>
<td>&quot;Global&quot; products</td>
</tr>
<tr>
<td></td>
<td>6%</td>
<td></td>
<td>BMW 7 series</td>
<td>Mostly imported</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td></td>
<td>Audi A8</td>
<td>High brand value</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td></td>
<td>Mercedes</td>
<td>Small volume</td>
</tr>
</tbody>
</table>

| 38%                        | Focus of competition           | Volume Market  | Mid-to-high end: | Adapted "global" product |
|                            |                                |                | VW Bora/Passat  | Partly local sourcing & manufacturing |
|                            |                                |                | Ford Mondeo   | High volume          |
|                            |                                |                | GM Regal      |                  |

| 39%                        | Dominated by local companies   | Low end        | "Emerging market": | Fully localized product |
|                            | 17%                            | Various indigenous manufacturers | Chery QQ/Son of East/Tiggo | Designed for Chinese market |
|                            | 17%                            |                 | Geely: Meiri/Youliou | High volume          |
|                            |                                |                 |                      | Low cost            |

Source: 1) Automotive Report Market Data Insight, ARA; 2) China Automotive Review 3) ADL analysis

Challenges for multinational automotive suppliers in China
Conclusions and recommendations – Recommendation No.2

Suppliers should take a proactive approach to help OEMs to compete in the “emerging market”. A second product line for the low cost segment, sometimes even a second brand should be considered.

<table>
<thead>
<tr>
<th>Consider low cost volume segment</th>
<th>Comment</th>
</tr>
</thead>
</table>
| ![High Quality](image1) | - Movable, with damper  
- Special requirement for surface  
- Ergonomic design and durable material |
| ![Low Cost Design](image2) | - Simple design  
- Low cost production machine and raw material  
- Easy for manual assembly |
| **example** | - The customer requirements for local Chinese market differ from those of western countries – low price is most important key buying criteria against others, e.g. quality, functionality and life-cycle costs  
- To compete in the low cost segment, sometimes MNC OEMs and suppliers need to downgrade their product specs to a more reasonable level – and sometimes it cannot be done by simply adapting their global products. A complete re-design of the product might be needed  
- A second brand should be considered, if MNC wants to protect the value of their prime brand |

Challenges for multinational automotive suppliers in China
Conclusions and recommendations – Recommendation No.3

Suppliers should work closely with OEMs in order to eliminate over-engineered components and carefully adapt product design for cost reduction

Adapt your product design

- **Powertrain incl. Engine (25% of total costs)**
  - Ensure compatibility with regulations
  - Specify according to driving profiles with less power

- **E/E (20-25% of total costs)**
  - Carefully selected functions
  - Consider more low-spec, e.g. regarding temperature range, for non-essential functionality

- **Interior (15-20%)**
  - Up-to-date design
  - Less refined tolerances
  - Cheaper materials
  - Manual assembly

- **Chassis (15% of total costs)**
  - Specify according to local driving profiles, not to Western standards

- **Body (15-20% of total costs)**
  - Adapt to local needs: stiffness, tolerances, …
  - Design for manual assembly

A more radical approach, such as a complete re-design, should be considered if the low cost target cannot be achieved through localization

Illustrative

- **Selectively**
  - Seals on engine
  - Bearings on engine

- **Yes**
  - Infotainment
  - Interior and exterior trim
  - Coatings, …

- **Feasibility for low cost design**
  - High
  - Low
Conclusions and recommendations – Recommendation No.4

Use labor where applicable to leverage low labor cost in China – critical quality steps and specification define level of automation needed

**Balance the level of automation**

<table>
<thead>
<tr>
<th>Western MNC Approach</th>
<th>Local Chinese Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stamping 1</strong></td>
<td>Imported equipment</td>
</tr>
<tr>
<td></td>
<td>Fully automated</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td>Automated transportation</td>
</tr>
<tr>
<td><strong>Stamping 2</strong></td>
<td>Imported equipment</td>
</tr>
<tr>
<td></td>
<td>Fully automated</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td>Automated</td>
</tr>
<tr>
<td><strong>Welding</strong></td>
<td>Imported equipment</td>
</tr>
<tr>
<td></td>
<td>Fully automated</td>
</tr>
</tbody>
</table>

**Comparison of manufacturing process between Western and local Chinese companies**

- **Critical step for quality**
  - Stamping 1: Imported equipment, Fully automated
  - Transport: Automated transportation
  - Stamping 2: Imported equipment, Fully automated
  - Transport: Automated
  - Welding: Imported equipment, Fully automated

**Critical process steps for quality – automated**

- **Non-critical process steps – use manual labor where applicable**

Challenges for multinational automotive suppliers in China
Conclusions and recommendations – Recommendation No.5

Requirements of Chinese customers have to be implied in product development – local R&D is required at least for application engineering

<table>
<thead>
<tr>
<th>Establish Local R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responding to customer needs</td>
</tr>
<tr>
<td>- Customer requirements for local market should be well understood and translated into product design</td>
</tr>
<tr>
<td>- Over-engineering should be avoided</td>
</tr>
<tr>
<td>- Shorter time-to-market is the key for success</td>
</tr>
<tr>
<td>Organization and Process</td>
</tr>
<tr>
<td>- It is important for suppliers to integrate into OEM's R&amp;D processes</td>
</tr>
<tr>
<td>- Local R&amp;D center is needed, at least for application engineering</td>
</tr>
<tr>
<td>- Close to customer for better communication, e.g. co-location of tier one supplier’s design center with OEM</td>
</tr>
<tr>
<td>- Leverage local talent pool</td>
</tr>
<tr>
<td>- Efficient product development processes are crucial</td>
</tr>
<tr>
<td>Core Technology Competencies</td>
</tr>
<tr>
<td>- System integration capabilities are more and more required by OEMs</td>
</tr>
<tr>
<td>- Simultaneous engineering capabilities</td>
</tr>
<tr>
<td>- Ability to integrate systems/modules within and beyond own component scope</td>
</tr>
<tr>
<td>- Keep the advantage of leading-edge technology to block local competitors</td>
</tr>
</tbody>
</table>
Conclusions and recommendations – Recommendation No.6

Optimizing time-to-market is one of the most favored measures to protect intellectual property and to acquire new customers in China

<table>
<thead>
<tr>
<th>IP Protection</th>
<th>New Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Optimizing time-to-market and simultaneous introduction of products compared to home country is one of the most favored measures to protect intellectual property in China.</td>
<td></td>
</tr>
<tr>
<td>- By doing so, copying these products is no longer that attractive for Chinese manufacturers.</td>
<td></td>
</tr>
<tr>
<td>- Competition is becoming more fierce, thus requiring a higher rate of new product introduction.</td>
<td></td>
</tr>
<tr>
<td>- The ability to rapidly respond to customer needs is crucial to win new customers.</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions and recommendations – Recommendation No.7

Create smart make-or-buy decisions specifically for China to protect your IP and achieve cost savings by using local suppliers

Illustrative

Create smart make-or-buy solutions

1. De-couple the product into smaller modules for better IP protection and for more labor intensive manufacturing

- Core module, IP intensive
- Non-core modules, de-coupled so that these components can be easily manually manufactured/assembled

1. Specific make/buy decision:
- Keep core technology in home country
- Keep integration in-house
- Take advantage of low cost production of local suppliers

External Availability

Strategic Impact

Make or buy

Make

Buy

Arthur D. Little

Quality Management Consulting (Beijing) Co., Ltd.

Challenges for multinational automotive suppliers in China
## Contents

| 1 | Objective and methodology of the study |
| 2 | Chinese Automotive Market |
| 3 | Key findings from the survey |
| 4 | Conclusions and recommendations |
| **5** | **Appendix- Detailed results of the survey** |
| 6 | About Arthur D. Little |
Appendix- Detailed results of the survey

5.1 Section A: General Conditions
5.2 Section B: Research and Development
5.3 Section C: Purchasing
5.4 Section D: Production
5.5 Section E: Logistics
5.6 Section F: Quality
"Open new markets" is the main reason for setting up operations in China

Reason for a set-up in China or cooperation with a Chinese company

- **Reduce cost**: 26%
- **Obtain China market know-how**: 13%
- **Open new markets**: 49%
- **Avoid currency exchange risk**: 3%
- **Other**: 7%

**Conclusion: Suppliers need to go to China due to the presence of the automotive OEMs**

Source: Supplier survey, ADL analysis
Foreign companies' plants in China are often cost-intensive; processes need to be designed with a widespread manual content

<table>
<thead>
<tr>
<th>General Conditions – Intention for set-up in China</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Statements</strong></td>
</tr>
<tr>
<td>- Reducing costs is currently not an essential reason for a start-up in China: <em>&quot;Suppliers have to follow the OEMs to keep the business with them&quot;</em></td>
</tr>
<tr>
<td>- Finding the right location and the right kind of legal form requires intensive analysis and Chinese expertise</td>
</tr>
<tr>
<td>- Capital intensive processes in conjunction with highly trained Chinese employees are currently gainless: <em>&quot;Local content is currently not profitable for a foreign company&quot;</em></td>
</tr>
<tr>
<td>- For suppliers which do not require investment-intensive assets, the cost reduction aspect is more significant</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>- The answers given by the companies largely correlate with the age and size of the interviewed companies: It is more likely that bigger companies set up in China in order to avoid currency exchange risks or to reduce costs. <em>&quot;Newcomers&quot; in China are primarily interested in opening new markets or in obtaining Chinese market specific know-how</em></td>
</tr>
</tbody>
</table>
**1st tier manufacturers are primarily interested in proximity to the customer sites (OEMs); the WFOE is significantly recommended as legal form**

### Most important criteria for your choice of location in China

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity to customer sites</td>
<td>38%</td>
</tr>
<tr>
<td>Infrastructure facilities</td>
<td>20%</td>
</tr>
<tr>
<td>Fiscal conditions</td>
<td>7%</td>
</tr>
<tr>
<td>Competence of employees</td>
<td>14%</td>
</tr>
<tr>
<td>Available partners</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
</tr>
</tbody>
</table>

**Source:** Supplier survey, ADL analysis

### Recommended legal form for entrepreneurship or cooperation with a Chinese company

<table>
<thead>
<tr>
<th>Legal Form</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Venture (JV)</td>
<td>37%</td>
</tr>
<tr>
<td>Wholly foreign owned enterprise (WFOE)</td>
<td>55%</td>
</tr>
<tr>
<td>Dealership</td>
<td>6%</td>
</tr>
<tr>
<td>Not specified</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Source:** Supplier survey, ADL analysis

---

**Conclusion: Finding the right location and the right kind of legal form requires intensive analysis and Chinese expertise**

1) "Proximity to customer sites" is in addition to good infrastructural facilities driven by enforcements from the customers (OEMs) and governmental regulations
2) The comparatively high proportion of the recommended legal form "Joint Venture" is essentially caused by answers given from Chinese interview partners. Multinational interview partners significantly prefer the WFOE as recommended legal form
The kind of legal form depends on the kind of company, government regulations and legal requirements

### General Conditions – Choice of location and legal form

**Core Statements**

- Proximity to the production sites of the automotive manufacturers is the most important issue for the choice of location in China, "vis-à-vis the customer", which also implies good infrastructural facilities.
- Foreign companies definitely prefer the Wholly Foreign Owned Enterprise (WFOE) as legal form in China. Joint Ventures (JVs) are risky due to possible know-how transfer to the Chinese partner company and possible cultural differences.
- The legal form depends on the kind of company and government regulations. However, in special cases the JV legal form is mandatory: "JV only if necessary".
- The importance of availability of highly skilled employees and government incentives depends on the kind of manufacturing which is planned on-site.

**Comments**

- The expertise of the bigger companies came at a high price, due to unfortunate Joint Ventures within the last 15 years.
Chinese employees need to be trained in "structured" and "outside-the-box" thinking from the interviewees' point of view.

How capable are Chinese staff at “outside-the-box thinking”?

- Not acceptable: 11%
- Potential to catch up: 49%
- Acceptable: 17%
- Comparable to home country: 14%
- Far above industry standard: 9%

Conclusion: Mentoring and exchange programs between China and home country are necessary in order to understand the specific way of thinking and acting.

Source: Supplier survey, ADL analysis
China has developed very fast – both from the technological and working style point of view

### General Conditions – Requirements and criteria for Chinese staff

#### Core Statements

- "Structured thinking and creativity" and "outside-the-box thinking" are the most observed unfulfilled requirements by Chinese employees mentioned by the interviewees
- Concerning requirements where the local staff is better than expected, "total dedication to work" was very often stated regarding flexibility and motivation
- The requirements of Chinese employees in general do not differ significantly to those of the home country, e.g. language skills, process related and analytical thinking, expertise and know-how, teamwork spirit, etc.
- Training of traditional business skills needs to take place step by step, combined with mentoring and exchange programs between China and home country

#### Comments

- Creative ideas are largely influenced by the social environment and educational opportunities which have dramatically changed in China within few years
- There might be a danger that multinational companies could underestimate the Chinese way of thinking and working
**Appendix - Detailed results of the survey** – Section B: Research & Development

Two thirds of the interviewed companies are reluctant to increase R&D in China due to intellectual property issues

**Planned future spending in R&D/application engineering**

- **Willing to invest in application engineering in China:**
  - 67%
- **Reluctant to increase R&D in China:**
  - 33%

**Excerpt of section B**

**Conclusion:** Companies which are able to deal with intellectual property issues will invest significantly in application engineering in China; others are reluctant.

Source: Supplier survey, ADL analysis
Foreign companies have to realize market-driven application engineering on site in order to produce goods appropriate for the Chinese market.

Research and Development – Phases of product development

Core Statements
- Up to now there is significant reluctance regarding Research and Development (R&D) in China: "All R&D activities will remain in Europe or in the United States", "If there is an opportunity to get any information which can be copied, it will happen"
- Nevertheless, ⅓ of the interviewed companies are currently planning to have R&D in China; these companies will invest increasing amounts in R&D on-site, 10% or more
- R&D on-site is predominately “Application Engineering” caused by the market and customer needs in China: Modern but not highly sophisticated products engineered for the Chinese market and needs are important in order to be successful in long-term

Comments
- "Over-engineering" – when simple solutions are also possible – is in many cases the reason for failures or loss of intellectual property to local Chinese companies
- Chinese market oriented R&D has to be the most important driver for further investment in R&D; market driven R&D does not necessarily mean cheap, it means appropriate!
- Otherwise, foreign companies have to cope with the risk that their own developments will flow off to local competitors who may be able to produce the same product at considerably less cost due to less sophisticated processes, more local manual labor and even lower quality standards
- Compared to the portfolio of different attitudes of foreign companies in China, the two attitudes of companies' behavior have been confirmed: Attackers "Prospective Eagles" who face the challenges of the Chinese market and the Hesitators (including "Neutral Island" and "Ant-hills")
**Optimized and simultaneous time-to-market are the most promising measures in order to protect intellectual property**

### What kind of measures would you recommend to protect intellectual property?

#### Penalties

<table>
<thead>
<tr>
<th>Rating</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very bad</td>
<td>26%</td>
</tr>
<tr>
<td>Largely bad</td>
<td>22%</td>
</tr>
<tr>
<td>Indifferent</td>
<td>31%</td>
</tr>
<tr>
<td>Mostly good</td>
<td>17%</td>
</tr>
<tr>
<td>Very good</td>
<td>4%</td>
</tr>
</tbody>
</table>

**Source:** Supplier survey, ADL analysis

#### Optimizing time to market

<table>
<thead>
<tr>
<th>Rating</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very bad</td>
<td>0%</td>
</tr>
<tr>
<td>Largely bad</td>
<td>8%</td>
</tr>
<tr>
<td>Indifferent</td>
<td>25%</td>
</tr>
<tr>
<td>Mostly good</td>
<td>46%</td>
</tr>
<tr>
<td>Very good</td>
<td>21%</td>
</tr>
</tbody>
</table>

**Source:** Supplier survey, ADL analysis

**Conclusion:** Theft of intellectual property is not preventable in China; accepting this fact and organizing the knowledge and product portfolio accordingly is essential.
Foreign entrepreneurs cannot expect the Chinese market to retain an awareness of the value of intellectual property or to acknowledge their product identity

**Research and Development – Intellectual property**

**Core Statements**
- Intelligent engineering, such as optimizing time-to-market and simultaneous introduction of products, is one of the most favored means of protecting intellectual property in China; copying such products is less attractive for Chinese manufacturers.
- Positive measures such as rewards for own inventions or retention measures are consistently supported by companies, for the purpose of protecting intellectual property.
- Sanctions such as penalties or limited access to knowledge transfer or documents are less promising, and are essentially a traditional approach to solving that problem.

**Comments**
- "Copying products is nothing scurrilous in China and has a long tradition. Calligraphy, poetry and porcelain manufacturing have been copied for centuries." This fact needs to be acknowledged by multinational companies.
- Multinational companies often overrate their knowledge. If intellectual property will get lost in China, it will happen step by step: "No Chinese engineer would copy a Porsche.”
- For this reason, three steps need to be considered:
  - Evaluation of technological competency and capability
  - Determining what multinational companies are willing to give and how
  - Establishment of control and management measurements for a controlled flow of IP
- It is recommended that the source R&D stays in the home country. Application engineering should be established in China.
Appendix- Detailed results of the survey

5.1 Section A: General Conditions
5.2 Section B: Research and Development
5.3 **Section C: Purchasing**
5.4 Section D: Production
5.5 Section E: Logistics
5.6 Section F: Quality
The quality of supplied products is still a significant problem, but major advantages regarding flexibility of suppliers are identified.

**Excerpt of section C**

**Conclusion:** The level of advanced and continuous communication with local suppliers in China needs to be enhanced; strategic sourcing has to be coupled with leveraging of local know-how.

1) "More cooperative and faster" might be misinterpreted due to the fact that this statement also included lots of "trial and error" solutions caused by the Chinese suppliers.
The quality of suppliers’ products has approximately the same price as the quality of home country manufacturers’ products

<table>
<thead>
<tr>
<th>Purchasing</th>
</tr>
</thead>
</table>

**Core Statements**
- Transparency in the Chinese purchasing market is evaluated differently: With regards to raw materials, there is relatively high transparency, due to international markets
- Local contacts and personal networking are fundamental to successful sourcing
- Good quality of suppliers depends on time to conduct research: Find people who know the Chinese market well and create a list of requirements, which should be harmonized with the supplier
- The quality of suppliers’ goods are, in the majority of cases, worse than in the home country, but there is the potential to catch up: Suppliers who are comparable to MNC companies charge approximately the same prices
- Regarding flexibility, Chinese suppliers are often more cooperative and faster than MNC competitors, although this is sometimes achieved at the expense of quality ("trial and error" solutions)

**Comments**
- High-quality products are also available from local suppliers in China. These products have similar prices and longer production times in comparison to the home country.
On-site material and machine utilization is acceptable in foreign companies, but labor workload can be increased

**Machine usage**

- Not acceptable: 2%
- Potential to catch up: 32%
- Acceptable: 27%
- Comparable to home country: 37%
- Far above industry standard: 2%

**Labor utilization**

- Not acceptable: 2%
- Potential to catch up: 40%
- Acceptable: 37%
- Comparable to home country: 19%
- Far above industry standard: 2%

**Conclusion:** Training of Chinese workers is necessary in order to increase knowledge and quality awareness. This can be achieved through a very strong and clear work culture and a company organization that takes Chinese culture into consideration.
Highly developed, complex processes and a high rate of automation will not necessarily lead to cost-efficient manufacturing

Core Statements
- Due to the fact that machines and processes are mostly imported from the home country, both material and machine utilization is acceptable
- There are accumulated needs with regards to labor efficiency: "A western worker can service 2 or 3 machines; a Chinese worker can only service one machine due to his/her lack of technical education; however, in the long term, Chinese workers will be comparable to their western colleagues"
- The fear of doing something incorrectly is very common amongst Chinese employees. This risk averse behavior raises the issue of work organization and its alignment to Chinese circumstances
- Highly developed, complex processes and a high rate of automation will not necessarily lead to cost-efficient manufacturing; the complexity of machines needs to be lowered within pricing aspects: "The real problem is the on-site maintenance and repair of machines, rather than the utilization of the machines"
- Training of Chinese workers is necessary in order to increase knowledge and quality awareness and this can be achieved through a very strong and clear work culture and company organization

Comments
- Automation for quality reasons will be problematic for low-price targets; establishing manpower-driven and well organized processes, combined with an intelligent bonus/malus-system for workers, will lead to a well-developed quality/price ratio
- "Chinese employees need to better their interactions with Western people and processes". On the other hand, foreign companies have to enhance communication with Chinese staff, in order to reduce the lack of understanding of on-site employees
## Contents

<table>
<thead>
<tr>
<th>5</th>
<th>Appendix- Detailed results of the survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Section A: General Conditions</td>
</tr>
<tr>
<td>5.2</td>
<td>Section B: Research and Development</td>
</tr>
<tr>
<td>5.3</td>
<td>Section C: Purchasing</td>
</tr>
<tr>
<td>5.4</td>
<td>Section D: Production</td>
</tr>
<tr>
<td>5.5</td>
<td><strong>Section E: Logistics</strong></td>
</tr>
<tr>
<td>5.6</td>
<td>Section F: Quality</td>
</tr>
</tbody>
</table>
Logistics service providers in China have developed to a high level, especially in recent years; however, their services are still not faultless.

**Excerpt of section E**

**Appendix—Detailed results of the survey – Section E: Logistics**

**How would you describe the level of on-time delivery of Chinese production?**

- Very bad: 5%
- Largely bad: 25%
- Indifferent: 20%
- Mostly good: 43%
- Very good: 7%

**Source:** Supplier survey, ADL analysis

**How is the information flow criteria fulfilled by Chinese logistics service providers?**

- Not acceptable: 7%
- Potential to catch up: 39%
- Acceptable: 44%
- Comparable to home country: 10%
- Far above industry standard: 0%

**Source:** Supplier survey, ADL analysis

**Conclusion:** On-time delivery must always be controlled and monitored; consideration of long delivery times is required for planning of production lines.
The infrastructure and its information flow in China must be developed in the future

Core Statements
- Chinese logistics providers are mostly comparable to home country providers, although good logistics providers also charge high rates
- Logistics providers are improving rapidly, because the infrastructure is improving
- On-time delivery is rated differently by the interviewed companies; only precisely defined tasks and continuous questioning about the current status helps to achieve on-time delivery
- Just-In-Time (JIT) requirements must be defined by the customer and long-lasting delivery must still be considered
- Regarding the delivery information flow, continuous control is necessary: "As long as you ask the service provider for information, it works fine. You don't get information independently from him"
Appendix- Detailed results of the survey

5.1 Section A: General Conditions
5.2 Section B: Research and Development
5.3 Section C: Purchasing
5.4 Section D: Production
5.5 Section E: Logistics
5.6 Section F: Quality
Due to strict requirements of foreign parent companies, the quality level is mostly good; suppliers need to be trained with Quality Management Systems.

<table>
<thead>
<tr>
<th>Quality Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very bad</td>
<td>0%</td>
</tr>
<tr>
<td>Largely bad</td>
<td>26%</td>
</tr>
<tr>
<td>Indifferent</td>
<td>18%</td>
</tr>
<tr>
<td>Mostly good</td>
<td>53%</td>
</tr>
<tr>
<td>Very good</td>
<td>3%</td>
</tr>
</tbody>
</table>

Conclusion: Quality Mgmt. Systems, continuous monitoring of suppliers and understanding the real demands of the customer will lead to a heightened quality level within the value chain.

Source: Supplier survey, ADL analysis
In order to increase quality in Chinese manufacturing, strict supervision, training and clearly defined instructions are necessary

<table>
<thead>
<tr>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Statements</strong></td>
</tr>
<tr>
<td>- The majority of the interviewed companies evaluate their quality level as mostly good compared to other Chinese plants</td>
</tr>
<tr>
<td>- The company internal quality level normally corresponds to the strict requirements of the parent company</td>
</tr>
<tr>
<td>- Quality levels need to be fitted to local demand</td>
</tr>
<tr>
<td>- Suppliers and employees must continuously be trained in quality issues</td>
</tr>
<tr>
<td>- An essential future challenge will be to stabilize processes together with the suppliers; this will demand an integrated Quality Management System, spanning the value chain, which has to be transferred into a standard code on national level</td>
</tr>
</tbody>
</table>

| **Comments** |
| - The required quality can be delivered by Chinese companies, but it sometimes does not fit with the associated investment; the only solution is continuous employee training in quality issues |
| - "Little investment and a lot of profit" is a common Chinese mentality; in order to increase quality in Chinese manufacturing, strict supervision, training and clearly defined instructions/procedures are necessary |
Contents

1. Objective and methodology of the study
2. Chinese Automotive Market
3. Key findings from the survey
4. Conclusions and recommendations
5. Appendix- Detailed results of the survey
6. About Arthur D. Little
About Arthur D. Little

Arthur Dehon Little, Professor at the MIT, founded the "Research Palace" in Cambridge, Massachusetts in 1886

Based on his vision of "Technology Management" one of the world's leading management consultancies was founded
Arthur D. Little combines global presence – 38 offices in 25 countries – with a strong position in Central Europe, which supports our Chinese operations.
Besides experienced management consultants, we have numerous senior advisors to fulfill your management consulting needs in China.

- ADL can provide a team of Chinese and multinational consultants with broad experience in supporting Western corporations in China.
- In addition, ADL has copied the Chinese system of networking and information sourcing with senior advisors.
- ADL management consultants use senior advisors to gather information and support our clients in market penetration.
- Those senior advisors are former top-business managers, political leaders or members of one of the top universities and are familiar with their industry in China.

Source: Arthur D. Little
Challenges for multinational automotive suppliers in China

Quality Management Consulting (Beijing) Co. Ltd.
Some final words

### VDA QMC Contact

- **Dr. Wolfgang Wagner, General Manager**
  VDA QMC Quality Management Consulting (Beijing) Co., Ltd.
  2018, Landmark Tower 2
  8 North Dong San Huan Lu
  Beijing 100004, P. R. China
  Tel.: +86 10 6590-0067
  Email: wagner@vdachina.com

### Special thanks go to

- All companies which participated in the study and which gave their valuable input
- Mr. Jörg Schüler, General Manager and Member of the Board of the Shanghai Scherdel Spring Co., Ltd., who enriched the results with his comprehensive know-how of the Chinese market.

### Disclaimer

This study is authored by and draws upon research and analysis of Arthur D Little. The conclusions are the results of the aggregation of public materials and information provided in the course of recent interviews with a sample of industry players. At no point in the development of this study was access given to the research team to client confidential information held by Arthur D. Little as a result of our recent and ongoing consulting work in this area. Use of this study by any third party for whatever purpose should not, and does not, absolve such third party from using due diligence in verifying the study's contents.

Any use which a third party makes of this document, or any reliance on it, or decisions to be made based on it, are the responsibility of such third party. Arthur D. Little, its affiliates and representatives accept no duty of care or liability of any kind to any such third party, and no responsibility for damages, if any, suffered by any third party as a result of decisions made, or not made, or actions taken, or not taken, based on this document.

Arthur D. Little does not make investment recommendations, in this study or otherwise, and nothing in this study should be interpreted as an opinion by Arthur D. Little either on market forecasts or on the prospects of specific companies.

© Arthur D. Little GmbH, Germany, 04/2006, all rights reserved.
About Authors

- **Dr. Thomas Schiller, Managing Director China**
  Mr. Schiller is based in our offices in Shanghai and Beijing. His professional focus lies on M&A, strategy and organization, market and sales improvement) in the automotive and manufacturing industry. He has more than seven years experience in industry. Mr. Schiller holds a Ph.D. in Business Administration and Master each in Mechanical Engineering and Business Administration

- **Congjian Wu, Manager Automotive Practice China**
  Mr. Wu is based in our office in Beijing. His professional focus lies on strategy, product development and operational improvement in the automotive and manufacturing industry. He has six years of management consulting experience and three years industry working experience

- **Jens C. Janzen, Consultant Automotive Practice Central Europe**
  Mr. Janzen is based in our office in Wiesbaden, Germany. His professional focus lies on strategy and organization, product development.
Arthur D. Little automotive industry contacts in your regions are

**Benelux**
Jeroen DeKort
dekort.jeroen@adlittle.com
+31 10 2018 817

**Central Europe**
Stefan Lippautz
lippautz.stefan@adlittle.com
+49 89 38088-721

**China**
Thomas Schiller
schiller.thomas@adlittle.com
+86 21 64478866

**France**
Raymond Amour
amour.raymond@adlittle.com
+33 1 5574 2935

**Italy**
Marco Locatelli
locatelli.marco@adlittle.com
+39 02 67376 250

**Japan**
Yusuke Harada
harada.yusuke@adlittle.com
+81 3 3436 8931

**Korea**
Allen Song
song.allen@adlittle.com
+82 2 720 2040

**Nordic**
Per M. Nilsson
nilsson.per.m@adlittle.com
+46 31 758 1022

**Spain**
Emilio Varela
varela.emilio@adlittle.com
+34 91 702 74 00

**United Kingdom**
Nick Toone
toone.nick@adlittle.com
+44 870 336 6677

**United States**
Pierre Boldt
boldt.pierre@adlittle.com
+1 (212) 661-2500

---

Quality Management Consulting (Beijing) Co., Ltd.