Supplier-Maker Network Structures and Capability Improvement of Suppliers in Newly Emerging Vietnam’s Motorcycle Industry

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Presentation Contents

- Introduction
- Frameworks on network structure and capabilities of suppliers
- Newly emerging Vietnam’s motorcycle industry
- Methodology and case-studies
- Case analysis and result
- Discussion
- Conclusion and further research
### Newly Emerging Economies

<table>
<thead>
<tr>
<th>World Ranking</th>
<th>Country</th>
<th>1972 – 2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>Korea</td>
<td>… 543.9512 (in 1974) …</td>
<td>14150.96</td>
</tr>
<tr>
<td>38</td>
<td>Taiwan (China)</td>
<td>551.2961 (in 1972) …</td>
<td>13451.4</td>
</tr>
<tr>
<td>62</td>
<td>Malaysia</td>
<td>509.6329 (in 1972) …</td>
<td>4645.874</td>
</tr>
<tr>
<td>76</td>
<td>Brazil</td>
<td>… 565.7519 (in 1973) …</td>
<td>3325.054</td>
</tr>
<tr>
<td>86</td>
<td>Thailand</td>
<td>… 567.6215 (in 1979) …</td>
<td>2521.494</td>
</tr>
<tr>
<td>112</td>
<td>China</td>
<td>… 578.115 (in 1995) …</td>
<td>1272.043</td>
</tr>
<tr>
<td>113</td>
<td>Indonesia</td>
<td>… 510.841 (in 1987) …</td>
<td>1191.259</td>
</tr>
<tr>
<td>120</td>
<td>Philippines</td>
<td>… 533.364 (in 1986) …</td>
<td>1010.117</td>
</tr>
<tr>
<td>135</td>
<td>India</td>
<td>… 548.021 (in 2003) …</td>
<td>622.413</td>
</tr>
<tr>
<td>141</td>
<td>Vietnam</td>
<td></td>
<td>534.753</td>
</tr>
<tr>
<td>145</td>
<td>Nigeria</td>
<td></td>
<td>499.936</td>
</tr>
<tr>
<td>157</td>
<td>Bangladesh</td>
<td></td>
<td>390.762</td>
</tr>
<tr>
<td>158</td>
<td>Uzbekistan</td>
<td></td>
<td>375.239</td>
</tr>
</tbody>
</table>


List of emerging countries (accept Vietnam) is taken out from list of 64 emerging countries in Hoskisson 2000.
Recent studies on capability improvement process of firms in developing countries
- Role of foreign investors, in knowledge transfer
- In NICs or China mainly with long-term analyses
- Shortage of studies on suppliers particularly
- Shortage of studies on firms in newly emerging economy
  - With the enlargement of global and regional production system and the development of local suppliers
  - Competition of new economies
  - Diversification of production system

Scare understanding of how suppliers in newly emerging economies improve capabilities
Research Question

- Suppliers can gain knowledge from external networks (inter-relationships) with customers (Dyer and Wright 1998, Kohno 2002, Nobeoka 1999)
- In emerging economies, different foreign invested firms (from different countries) build different supplier–maker network structures that have different effects on the capabilities improvement of suppliers (Nishiguchi 1994, Fujimoto 1998, Cusumano and Takeishi 1991, Chen and Chen 1998)

In newly emerging economies having a mix of different network structures, how suppliers can exploit supplier-maker relationships to improve their capabilities and performances?
Network Structures

Arm-length Network Vs. Embedded Network
# Network Structures Comparison

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Arm-length</th>
<th>Embedded</th>
</tr>
</thead>
</table>
| **Features** | - Short-term relationship, large distance, small volume of subcontract; Less information exchange; Low degree of combination  
- Unstable, ask for more governance mechanism | - Long-term relationship, proximity, large volume of subcontract; More information exchange; High degree of combination  
- Stable due to self-guard mechanism |
| **Knowledge improved** | More efficient for explicit (*codifiable, teachable, less complex, low system dependence, observable*) knowledge | More efficient for tacit (implicit) knowledge |
| **Example** | Electronic industry, American automotive industry (particularly before 1990s) | Japanese automotive industry |

Production Process and Capability Improvement in Suppliers

Assemblers (Customers)

Idea/design → Assemblers (Customers) → Component

Designing: Function design, Structure design, Process design
Production: Process Setting, Process maintenance, Delivery control
Delivery

Upstream: Designing → Assemblers (Customers) → Component → Delivery control → Upstream
Downstream: Delivery control → Assemblers (Customers) → Component → Designing → Upstream

Source: Clark and Fujimoto 1991
Source: Womark et al 1990
Dynamic Process of Capability Improvement

Core capability, functional capabilities, production process and performance

Dynamic capability improvement process

Source: Created by the author
Proposition 1

- In newly emerging economy, suppliers have limited capabilities
- When suppliers have limited capabilities, makers may assist more suppliers by taking charge of suppliers’ works
- How maker assist supplies is depended on inter-firm relationship

H1: In newly emerging economy, the more embedded relationship with makers the suppliers have, the higher downstream capabilities they can improve
Proposition 2

- Late-coming makers have limited capabilities and ask suppliers to have more independent capabilities
- Due to short-term development, late-coming makers have more arm-length inter-firm relationship
- *Imitation production* allows late-coming suppliers enter an industry in spite of low capabilities
- Upstream capabilities are need for imitation production

H2: In newly emerging economy, the more arm-length relationship the suppliers have, the more upstream capabilities the suppliers can improve
Newly Emerging Vietnam’s Motorcycle Industry

<table>
<thead>
<tr>
<th>Market condition and makers’ strategy</th>
<th>CBU production</th>
<th>First maker (VMEP) entered</th>
<th>Japanese FDI makers entered, built local production systems</th>
<th>Chinese “shock” and local makers penetrated</th>
<th>FDI makers strengthened localization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorcycle supplying industry</td>
<td>Repairing comp. production</td>
<td>Taiwanese Suppliers entered</td>
<td>Vietnamese suppliers entered</td>
<td>Supplying industry boomed</td>
<td>Suppliers diversified</td>
</tr>
</tbody>
</table>

![Graph showing the motorcycle industry in Vietnam from 1995 to 2004](chart.png)

- Suppliers diversified
- Japanese FDI makers entered, built local production systems
- First maker (VMEP) entered
- Repairing comp. production
- Taiwanese Suppliers entered
- Vietnamese suppliers entered
- Supplying industry boomed
- Chinese “shock” and local makers penetrated
- FDI makers strengthened localization
- Market condition and makers’ strategy
Imitation Production and Supplying Industry

Boramtex (Korean FDI)
Kaifa (Tawaneese FDI)
GS Battery (Japanese FDI)
Yaban (Taiwanese FDI)

Boramtex (Korean FDI)
Inoue (Japanese FDI)
Subcontracting Networks in Vietnam’s Motorcycle Industry

Assemblers

Suppliers in Vietnam

High price
Urban Market

Low price
Rural Market

Japanese (in Keiretsu)

Japanese (out of Keiretsu)

 Taiwanese (Korean) FDI

Domestic (1)

Domestic (2)

Abroad suppliers

Honda

Yamaha

VMEP Vietnam (Taiwanese)

Honda Vietnam

Yamaha Vietnam

Vietnamese domestic companies

Engine or other importance parts

Embedded networks

Arm-length networks

Normal parts

Unimportant parts
# Motorcycle Suppliers and Case-studies

<table>
<thead>
<tr>
<th>Supplier groups</th>
<th>Part producing for makers</th>
<th>Source of knowledge</th>
<th>Case studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>In keiretsu</td>
<td>1996~</td>
<td><em>Internal (mother company)</em></td>
<td>No</td>
</tr>
<tr>
<td>Out of keiretsu</td>
<td>1996~</td>
<td><em>Internal (mother company)</em></td>
<td>No</td>
</tr>
<tr>
<td>Taiwanese, Korea</td>
<td>1993~</td>
<td>Internal and external</td>
<td>Yes</td>
</tr>
<tr>
<td>Domestic (1)</td>
<td>1995~</td>
<td>Internal and external</td>
<td>Yes</td>
</tr>
<tr>
<td>Chinese</td>
<td>2002~</td>
<td>Internal and external</td>
<td>No</td>
</tr>
<tr>
<td>Domestic (2)</td>
<td>1998~</td>
<td>Internal and external</td>
<td>Yes</td>
</tr>
</tbody>
</table>
## Cases Studies (1)

<table>
<thead>
<tr>
<th></th>
<th>Co. A</th>
<th>Co. B</th>
<th>Co. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nationality</td>
<td>Vietnamese</td>
<td>Vietnamese</td>
<td>Vietnamese</td>
</tr>
<tr>
<td>Establishment</td>
<td>1963</td>
<td>1969</td>
<td>1985 (and earlier)</td>
</tr>
<tr>
<td>Labor</td>
<td>850</td>
<td>2000</td>
<td>400</td>
</tr>
</tbody>
</table>
| Motorcycle related Product | Engine gear-wheel, shaft, (Honda 35%, Yamaha 15%, Suzuki 15%, other suppliers 15%) | - Frame parts (for Honda 30%)  
- Muffler (Suzuki, Yamaha)  
- Rim (domestics) | - Rollers, handle shaft (Honda 30%)  
- Rollers, Clutch (Domestics 10%) |
| Other products       | Agriculture used machines, piston ring, piston pin (20%) | - Home used metal ware (60%) | - Bolt-bearing (30%)  
- Gear box (30%)        |
| Relationship with Honda | 1997                             | 1997                                                       | 2003                                                |
| Relationship with Domestics | No                               | 2001                                                       | 1998                                                |
| Other customers      | Japanese companies (Kubota, Morris) | Sweden home-used products (OEM production)                 | Domestic consumers (other products)                 |
### Case studies (2)

<table>
<thead>
<tr>
<th></th>
<th>Co. D</th>
<th>Co. E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nationality</strong></td>
<td>Vietnamese</td>
<td>Taiwanese</td>
</tr>
<tr>
<td><strong>Establishment</strong></td>
<td>1995 (1967)</td>
<td>1994</td>
</tr>
<tr>
<td><strong>Labor</strong></td>
<td>350</td>
<td>1200</td>
</tr>
<tr>
<td><strong>Motorcycle related Product</strong></td>
<td>Cylinder, engine related parts, other parts</td>
<td>- Rear forks, main stand, handle pipe comp., pedal comp. fuel tank comp., rim .. (Yamaha, Suzuki)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Fuel tank comp., bracket, frame comp., rim (VMEP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Rear carrier (Honda), brake comp., (Nisshin)</td>
</tr>
<tr>
<td><strong>Other products</strong></td>
<td>No</td>
<td>-4-wheel motorcycle (OEM production)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Spring house (export)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Consuming products</td>
</tr>
<tr>
<td><strong>Relationship with Domestics</strong></td>
<td>1998</td>
<td>2001</td>
</tr>
<tr>
<td><strong>Other customers</strong></td>
<td>Repairing motorcycle parts</td>
<td>Plastic comp.</td>
</tr>
</tbody>
</table>
Methodology

• Parameter 1: Subcontracting relationship and capability improvement of suppliers

Case Analysis

Technology gained through relationship with Japanese Makers (Honda)
Technology gained through relationship with Taiwanese/Vietnamese Makers

Time scale:
- Alliance effect
- Internal transfer
- Market transfer

1998  2001  2003
Two Patterns of Capability Improvement of Suppliers

Arm-Length Networks

Suppliers’ Upstream Capabilities

Suppliers’ Downstream Capabilities

Embedded Networks

Capability before 1998

Capability after 2003
Discussions

- Two patterns of capability improvement of suppliers in newly emerging economy:
  - Involve in only one kind of production system
    - Develop functional capabilities asymmetrically
    - Reduce the ability to meet new customers’ requirements
  - Switch dynamically from involving in one kind to two kinds production system
    - Develop functional capabilities symmetrically
    - Depended on suppliers’ strategies and technological orientation

- Beside embedded network, alliance or other source to diffuse tacit is critical for suppliers in long term
Conclusion

- In short term, suppliers in emerging economies can participates markets without close inter-firm relationship with a foreign makers due to the development of global production and technology source.
- Due to the cycle-style of capability improvement, and the diversification of knowledge, strategy for setting and changing inter-firm relations is important.
- Deciding functional capabilities for stepwise improving is important.
Further Researches

- How are strategies processes in different companies
- How is the organizational structure for improving different functional capabilities
- What are the roles of managers in capability improving process
- Different capability improvement patterns and firms’ performance
Appendix

Detailed analyses of capability improvement processes in 5 case studies
## Company A

<table>
<thead>
<tr>
<th></th>
<th>Relationship Characteristic</th>
<th>Learning activities</th>
<th>Results (effects)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before 1998</strong></td>
<td>-Start subcontracting with Honda</td>
<td>-Receive experts from Honda in to build technological progress, layout</td>
<td>-Get Honda’s QCD in 1998 ➔ PD, PS, PM, DC</td>
</tr>
</tbody>
</table>
| **1998 – 2001**| -Start subcontracting with Suzuki, Sumitex (Honda), VMEP, Kubota | -Receive comments of Honda, Yamaha, Suzuki, Sumitex in new product (process) development  
-Receive 3 experts of Kubota in 2000 to teach about 5S  
-Get ISO-9000 in 2000  
-Consequent visit of Honda experts (once/1-2 month) and Honda Vietnam factory visits | -Good performance in developing new product (process) ➔ PD, PS  
-Changes in thinking of employees (particularly managers) about workshop management ➔ PM, DC |
Purchase new machines | -Create internal designing capability for worker’s instruction with computer-based method ➔ PD, SD (partly) |
| **2003 – now** | -Increase Japanese customers | -Corporate with new customers to develop new products (process), retain factory visits and corporation in trouble shouting with customers | - Improve internal capabilities in process setting and maintenance ➔ PD, PS, PM, DC |
# Company B

<table>
<thead>
<tr>
<th>Date</th>
<th>Relationship Characteristic</th>
<th>Learning activities</th>
<th>Results (effects)</th>
</tr>
</thead>
</table>
| Bef. 1998 | - Start subcontracting with Honda | - Receive 3 experts in 2 months from Honda to build technological progress, layout  
- Create Joint-venture with Honda Keiretsu’s member | - Get Honda’s QCD requirement in 1998 ➔ PD, PS, PM                                  |
| 1998–2001 | - Start subcontracting with Yamaha, Suzuki, | - Receive comments of Honda, Yamaha, Suzuki in new product (process) development  
- Consequent visit of Honda experts (once/1-2 months) and Honda Vietnam factory visits  
- Diffuse technology from Joint-venture  
- Get ISO 9001 | - Good performance in developing new product (process) ➔ PD, PS  
- Improve QCD ➔ PM, DC                                                                 |
| 2002–2003 | - Develop new product (rim) for domesticcs  
- Retain Japanese cus. | - Receive technology from Taiwan through importing engine; Diffuse technology from Joint-venture about new products  
- Receive assistances of Japanese customers to improve worker’s manufacturing and checking instructions, Repeated visits by customers  
- Corporate more with Honda in changing design or specs of comp. | - Create project dept., successfully develop new products ➔ SD  
- More proposals were accepted ➔ SD, PD  
- Build new factory with new layout, worker’s instruction … ➔ PM, PS, PD, DC |
<p>| 2003–now  | - Increase non-motor customers |                                                                                     | - Improve the capability of project dept.                                          |</p>
<table>
<thead>
<tr>
<th>Relationship Characteristic</th>
<th>Learning activities</th>
<th>Results (effects)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bef. 1998</strong></td>
<td>-Produce mechanical products</td>
<td>-Technology before 1985 from Russia and other East European countries</td>
</tr>
<tr>
<td>1998 – 2001</td>
<td>-Start subcontracting with domestics</td>
<td>-Import engines from Taiwan, China, Japan (second hand) and learning through engine setting up and seller’s factory visits</td>
</tr>
</tbody>
</table>
| 2002 – 2003                | -Specialize in several components | -Improve capabilities through learning by doing.  
- Diffuse technology though mother’s company (VEAM – state-run corporation)  
- Diffuse production related technology through JETRO’s program (Japanese organization) |
| 2003 – now                 | -Set up relationship with Honda, then Yamaha (2005)  
- Reduce sub. with domestics | -Honda experts come and assist in 2 months  
- Corporate in developing workers’ instructions and |

- Developed various motorcycle components ➔ SD, PD (mainly), PM, DC, PS (partly)  
- Upgrade new product development (copying design) ➔ SD, PD  
- Change workers’ and managers’ attitude and skill ➔ PM, DC  
- Improve production layout, delivery, process ➔ PM, DC, PS, PD
## Company D

<table>
<thead>
<tr>
<th></th>
<th>Relationship Characteristic</th>
<th>Learning activities</th>
<th>Results (effects)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bef. 1998</strong></td>
<td>-Repairing market</td>
<td>-Learning by doing</td>
<td></td>
</tr>
<tr>
<td><strong>1998 – 2001</strong></td>
<td>-Start subcontracting with domestics, VMEP</td>
<td>-Import engines from Taiwan, China and get technological transfer through engines purchasing and seller factory visits</td>
<td>Developed various motorcycle components ➔ SD, PD (mainly) PM, DC , PS (partly)</td>
</tr>
</tbody>
</table>
| **2002 – 2003** | -Retain sub contracting with domestics but then stop that with VMEP | -Import machines from Taiwan, China and get technological transfer through machines purchasing  
- Learning by doing                                                                                                                                     | Upgrade new product development (copying design) ➔ SD, PD  
- Can not upgrade quality, cost and delivery                                                                                                               |
| **2003 – now**  | -Reduce sub. with domestics  
- Return to repairing market | -Learning by doing and through importing machines                                                                                                                                                                      | Upgrade new product development (copying design) ➔ SD, PD  
- Can not upgrade quality, cost and delivery                                                                                                               |
## Company E

<table>
<thead>
<tr>
<th></th>
<th>Relationship Characteristic</th>
<th>Learning activities</th>
<th>Results (effects)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bef. 1998</td>
<td>-Start subcontracting with VMEP, Suzuki</td>
<td>-Technology transfer from mother company in Taiwan</td>
<td>-Quickly fulfill the requirement of VMEP and Suzuki</td>
</tr>
</tbody>
</table>
| 1998–2001  | -Start subcontracting with Yamaha then domestics  
-OEM production of motorcycle and other products (to export) | -Receive comments of Yamaha, (Suzuki) in new product (process) development  
-Diffuse technology from mother company in Taiwan | -Good performance in developing new product (process) ➔ PD, SD  
-Improve QCD ➔ PM, DC                                                                                                                                                                                      |
-Diffuse technology from mother company in Taiwan | -Build new factory with new layout, worker’s instruction … ➔ PM, DC, PS, PD, SD                                                                                                                            |
| 2003–now   | -Retain subcontracting with Japanese, Taiwanese and foreign customers | - Learning through development corporation with customers and diversification         | -R&D capabilities with non-motorcycle products ➔ SD (FD, partly)                                                                                                                                          |