Services in Global Value Chains: Manufacturing-Related Services

5 Nov 2015 – ADBI-ESCAP Workshop

APEC Policy Support Unit
Background information

- An APEC Next Generation Trade and Investment (NGETI) project.
- To understand the importance of services in global trade using a case-study approach (22 studies were compiled in total).
- Presentation to focus on:
  1. Understanding manufacturing-related services from the lens of various case studies.
  2. Implications of policies on configuration, operation and location of value chains with emphasis on contribution of services.
‘Servicification’

Sector composition of global gross exports and value added trade, 2008

Share of services value added in manufacturing exports (1995 and 2009)

Source: OECD-WTO Trade in Value Added (TiVA) database

Source: APEC Policy Support Unit computation based on OECD-WTO Trade in Value Added (TiVA) database
Case study approach

**Advantages**

- Allow for fine level of detail considering:
  1. intangibility of services
  2. consequent challenges with services data
- Complement firm surveys and secondary data sources
- Provides insights on where to delve further

**Disadvantages**

- Results are not readily generalized or extrapolated, particularly for small number of samples.
## List of Case Studies

Source: APEC Policy Support Unit compilations.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Economy where firm is located</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft control systems</td>
<td>Philippines</td>
</tr>
<tr>
<td>Automotive components</td>
<td>Japan</td>
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<tr>
<td>Brake hose end fittings</td>
<td>Mexico</td>
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<tr>
<td>Car antenna</td>
<td>Mexico</td>
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<td>Car assembly</td>
<td>Philippines</td>
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<tr>
<td>Chassis parts</td>
<td>Mexico</td>
</tr>
<tr>
<td>Computer servers</td>
<td>Chinese Taipei</td>
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<tr>
<td>Construction machinery</td>
<td>United States</td>
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<tr>
<td>Consumer electronic appliances</td>
<td>Indonesia</td>
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<tr>
<td>Industrial welding</td>
<td>Thailand</td>
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<td>Mining and construction equipment</td>
<td>Japan</td>
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<tr>
<td>Oil and gas equipment</td>
<td>Singapore</td>
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<td>Power generation equipment</td>
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<td>Precision die and machine parts</td>
<td>Thailand</td>
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<tr>
<td>Printed circuit boards</td>
<td>Canada</td>
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<tr>
<td>Refrigerators</td>
<td>Japan</td>
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<tr>
<td>Telecommunications equipment</td>
<td>China</td>
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<tr>
<td>Wastewater treatment</td>
<td>Thailand</td>
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<tr>
<td>Watch</td>
<td>Hong Kong, China</td>
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<tr>
<td>Wine</td>
<td>Chile</td>
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<tr>
<td>Fresh cherry</td>
<td>Chile</td>
</tr>
<tr>
<td>Integrated logistics</td>
<td>Mexico</td>
</tr>
</tbody>
</table>
Case study approach

22 firms
14 from Asian economies, 8 from North American and Chilean economies
9 MNCs, 10 medium-to-large, 1 SME, 2 non-manufacturing

Define the parameters of the value chain:
1) Identification of product
2) Determining the start and end-point of the chain

Mapping services inputs:
1) Identification of services (UN Central Product Classification as guide)
2) Separation of services into 6 stages (establishment; pre-manufacture; manufacture; post-manufacture; post-sales; back office)

Additional information (if possible):
1) In-house or outsourced services
2) Bundling
3) Share of employees
4) Cost or price data
Sample case study: Aircraft control systems (A)

- **Designer and manufacturer** of high performance precision motion control products and systems.

- **Headquartered** in United States but has its largest manufacturing site for aircraft controls in Philippines.

- A **servo actuator** – a device that transforms an input signal (usually electrical) into motion.

- Comes in **various sizes** and the largest one can weigh **up to 200 pounds**.

**Primary Flight Control System**
1) Aileron servo actuator
2) Flaperon actuator and control module
3) Inboard spoiler servo actuator
4) Outboard spoiler servo actuator
5) Electromechanical spoiler actuator and motor control unit
6) Horizontal stabilizer trim actuator and motor control unit
7) Elevator servo actuator
8) Rudder servo actuator

Source: Courtesy of the firm
Sample case study: Aircraft control systems (A)

Dimension of the value chain covered by the case study

A. Pre-manufacturing

Knowledge transfer from design centres to manufacturing facility during transition

Minor iteration between design centres and manufacturing facility (if any) and design finalization

- Procurement of materials and production equipment
- Logistics and customs
- Inspection and testing of materials
- Training of production staff
- Identification of providers of outsourced services such as simple machining
- Planning of production

B. Manufacturing

- Outsourcing of non-proprietary steps
- In-house core manufacturing activities
- Inspection and quality control of products

C. Post-manufacturing

- Transfer of products to third-party logistics provider located on site
- Delivery of products to customer

D. After-sales

- Maintenance, repair and overhaul services of products
- Guaranteed parts supply contracts

Note: Optional activities in the value chain are indicated by green boxes. Source: APEC Policy Support Unit based on firm interview.
Sample case study: Aircraft control systems (B)

Breakdown of services by stages and examples of key services

**Back-office:**
- Headquarter services
- Financial services
- Legal services

**After-sales:**
- Government after-sales certification services
- Maintenance, repair and overhaul (MRO) services

**Post-manufacturing:**
- Packaging services
- Transport/logistics services
- Certification services

**Pre-manufacturing:**
- Engineering services
- Design services
- Procurement services
- Transport/logistics services

**Manufacturing:**
- Engineering services
- Production management services
- Maintenance and repair of equipment
- QA/QC services

Source: APEC Policy Support Unit based on firm interview.
Sample case study: Aircraft control systems (C)

Reasons for outsourcing:
- Government services
- Required by laws and regulations
- Lack of expertise or specialization in-house
- Need access to best services
- Lack of feasibility to supply services in-house
- Economies of scale
- Need strong relationship with government agencies
- Network economies

In-house vs. outsourced services

Reasons for not outsourcing:
- Core services activities
- Necessary to ensure quality
- Involve proprietary technology

Source: APEC Policy Support Unit based on firm interview.
Sample case study: Aircraft control systems (C)

Services vs. manufacturing employees

**Services employees:**
- A third of firm’s full-time workforce
- Includes management, planning, supply chain services, facilities maintenance, security, etc.
- Likely to account for more than one-third of value-added

**Manufacturing employees:**
- Two-thirds of firm’s full-time workforce
- Includes machinists but also those producing services such as testing, inspection and QA/QC

*Source: APEC Policy Support Unit based on firm interview.*
Results of case studies

<table>
<thead>
<tr>
<th>No. of services entering the case study value chains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power generation equipment; Japan: 74</td>
</tr>
<tr>
<td>Mining and construction equipment; Japan: 74</td>
</tr>
<tr>
<td>Telecommunications equipment; China: 72</td>
</tr>
<tr>
<td>Fresh cherry; Chile: 71</td>
</tr>
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<td>Wine; Chile: 70</td>
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<td>Watch; Hong Kong, China: 43</td>
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<td>Automotive components; Japan: 37</td>
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</tbody>
</table>

Comparisons among the case studies should be treated with caution.

Source: APEC Policy Support Unit computation.
Results of case studies

Incidences of services at different stages in the case study value chains

- Shares refer to number of services, not value contribution.
- Value contribution – significant in post-sales stage for some products.

Source: APEC Policy Support Unit computation.
Results of case studies

In-house vs. outsourced services

Outsourced services range between 38 to 91 percent of total services.

Source: APEC Policy Support Unit computation.
Results of case studies

**Reasons to outsource**
- Mandatory outsourcing
- Cost considerations
- External economies
- Networks

**Reasons not to outsource**
- Strategic factors
- Unavailability of qualified supplier
- Transactions costs
- Risk factors
1) Investment policy incoherence

- With the exception of Chile and New Zealand, **FDI equity restrictions are higher in services (relative to all sectors).**
- Besides equity limitations, other forms of FDI restrictions include screening of foreign investments, restrictions on key personnel and limitations on firm’s operations.
Policy implications
1) Investment policy incoherence

- Prevent firms from operating the most efficient business model.
- Prevent services providers from following the footsteps of their lead firms.
- An alternative would be to partner with domestic providers but it is challenging to find the right ones.
2) Labor-related restrictions

Types of restrictions

- Quotas
- Economic needs test/conditions
- Complex entry requirements & discretionary decisions
- Recognition of qualifications

- Lead to an uneven level playing field e.g. in activities such as contract bidding, possibly causing missed opportunities.
- Hamper firm’s ability to provide the best service for their customers.
Policy implications
2) Labor-related restrictions

Number of APEC economies requiring visa for nationals

- **Visa requirements** among APEC economies **vary**.
- The number of APEC economies requiring visa for specific nationals can **range from 1 to 17**.
Policy implications
3) Localization and human capital constraints

- Lead to higher production costs and hence less competitive products.
- Human capital constraints: Need to pay significantly higher remuneration due to scarcity value.
Policy implications

3) Localization and human capital constraints

But there are success stories...

- Provision of in-house training and upgrading opportunities
- Collaboration with vocational schools in terms of curriculum inputs and internship opportunities
- Implementation of skills certification system
Policy implications
4) SMEs in GVCs and standards conformity

<table>
<thead>
<tr>
<th></th>
<th>SMEs</th>
<th>MNCs</th>
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<tbody>
<tr>
<td>Standards conformity is considered positively</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Compliance with process is relatively easy</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Repeated audits are acceptable</td>
<td>✗</td>
<td>✗</td>
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</tbody>
</table>

- Some MNCs find lack of capability among local companies (including SMEs) while SMEs find participation in GVCs beyond reach because of high compliance cost (sector-specific standards, MNC own standard, etc)
- Frequent and multiple audits impose additional cost which in some cases are considered merely as ‘regulatory bureaucracy’.
Policy implications
5) Technology transfer

Local transfer of technology and intellectual property policies often do not come with Clear guidelines
Ease of compliance
Strong enforcement

- Effect of some regulations end up depriving local economy of advanced technology
- Lengthy patent applications.
- Wide availability of counterfeit products and numerous infringements.
Policy implications
6) Infrastructure bottlenecks

Examples of infrastructure bottlenecks

- Congested ports
- Insufficient roads
- Power outages

- Add significantly to cost and time delays.
- Disruption to manufacturing operations.
Policy implications

7) Government services and trade policy affecting goods trade

Common issues

- Transparency of regulations
- Multiple layers of authority
- Predictability of regulations
- International definition of certain goods (e.g. re-manufacturing)
- Security-related matters
Concluding words

• Project seeks to understand importance of manufacturing-related services in different firms.

• Policy issues: perspectives of firms. Study does not attempt to analyze the public policy objectives underlying the interventions of governments. It is understood that such objectives are diverse and no judgement is intended as to the legitimacy of the objectives behind these interventions. Approach is about efficiency and effectiveness, not legitimacy.

• Final words: Policies carrying unnecessary costs merit careful consideration in economy’s political and economic calculus as it crafts its vision and plans for generating growth, jobs and development.