Measuring the Digital Economy of Japan in 2015


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Jahm Mae E. Guinto-Alvarez
Consultant for the Asian Development Bank
Recap of key concepts

- The measurement framework is rooted in input-output analysis.
- The Leontief Inverse, $B$, gives the total output requirements from each industry in order to meet final demand for a specific time period.
- Using the $\hat{v}B\hat{y}$ matrix, value-added contribution of the digital economy to the whole economy can be traced.
The core digital economy equation

\[ \text{GDP}_{\text{digital}} = i^T \hat{\mathbf{v}} \hat{\mathbf{B}} \hat{\mathbf{y}} \varepsilon_1 + i^T (\hat{\mathbf{v}} \hat{\mathbf{B}} \hat{\mathbf{y}})^T \varepsilon_1 - \left[ \text{diag}(\hat{\mathbf{v}} \hat{\mathbf{B}} \hat{\mathbf{y}}) \right]^T \varepsilon_1 + (1 - \varepsilon_1)^T \hat{\mathbf{v}} \hat{\mathbf{B}} \hat{\mathbf{y}} \hat{\mathbf{r}} \varepsilon_2 \]
The fourth term

- AKA: The proportionate share in the backward linkage of nondigital sectors that supply fixed capital to the core digital sector
- Why count this?

Core digital sector demands fixed capital from nondigital sectors (final demand side).

Such fixed capital was produced as a nondigital sector output in the production side.

Sector supplying fixed capital derives value-added from the rest of the economy through its backward linkages.
### Sample input-output table

<table>
<thead>
<tr>
<th></th>
<th>Core Digital Sector</th>
<th>Nondigital sector 1</th>
<th>Nondigital sector 2</th>
<th>Final consumption</th>
<th>Fixed capital of nondigital sectors</th>
<th>Fixed capital of core digital sector</th>
<th>Gross output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Digital Sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nondigital sector 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nondigital sector 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value-added</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Gross output</td>
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<td></td>
</tr>
</tbody>
</table>

- Corresponding backward linkage is included in the fourth term.
- Consumption of fixed capital
Exercise

• Economy: Japan
• Year: 2015
• Objective: To estimate $GDP_{digital}$ as a percentage of economy-wide GDP
Thank you!

Digital Economy Team:
Mahinthan Joseph Mariasingham
Faith Hyacinth Balisacan
Jahm Mae E. Guinto-Alvarez
John Arvin C. Bernabe
Ma. Charmaine R. Crisostomo
Anurag Agarwal
Arushi Gupta