Measuring the Digital Economy of Japan in 2015

An exercise prepared for the Capacity Building Workshop: Trade and Trade Policy Analysis for the Post COVID-19 Recovery

9 December 2021

Jahm Mae E. Guinto-Alvarez
Consultant for the Asian Development Bank



Recap of key concepts

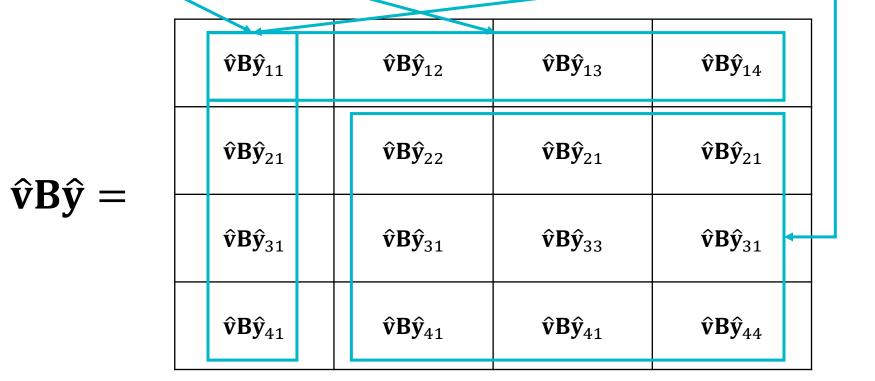
- The measurement framework is rooted in input-output analysis.
- The Leontief Inverse, **B**, gives the total output requirements from each industry in order to meet final demand for a specific time period.
- Using the $\hat{\mathbf{v}}\mathbf{B}\hat{\mathbf{y}}$ matrix, value-added contribution of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





The core digital economy equation

$$GDP_{digital} = i^{T}\hat{\mathbf{v}}\mathbf{B}\hat{\mathbf{y}}\boldsymbol{\epsilon_{1}} + i^{T}(\hat{\mathbf{v}}\mathbf{B}\hat{\mathbf{y}})^{T}\boldsymbol{\epsilon_{1}} - [diag(\hat{\mathbf{v}}\mathbf{B}\hat{\mathbf{y}})]^{T}\boldsymbol{\epsilon_{1}} + (\mathbf{1} - \boldsymbol{\epsilon_{1}})^{T}\hat{\mathbf{v}}\mathbf{B}\hat{\mathbf{y}}\hat{\mathbf{r}}\boldsymbol{\epsilon_{2}}$$





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

	Core Digital Sector	Nondigital sector 1	Nondigital sector 2	Final consumption	Fixed capital of nondigital sectors	Fixed capital of core digital sector	Gross output
Core Digital Sector							
Nondigital sector 1		Corresponding backward					
Nondigital sector 2		linkage is included in the fourth term					
Value-added							
Gross output							

Exercise

• Economy: Japan

• Year: 2015

 Objective: To estimate GDP_{digital} as a percentage of economywide 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

