Measuring the Digital Economy in Australia

Australian Bureau of Statistics
Informing Australia's important decisions

Contents

- Definition and background
- Methodology
  - ‘Digital’ products and services
  - Assumptions
  - Current price and volume estimation
- Data sources
- Preliminary results
- Way forward
- Questions for discussion

Definition and Background

- Digital economy can be defined as economic activities enabled by digital technologies, such as advanced computer hardware and networks, smart phones and artificial intelligence.
- Why measure the digital economy?
  - The emergence of better quality products and improvements
  - Rapid growth
  - A notable contributor to the overall economy
  - Current ABS publications do not focus on the economic performance of the digital economy

Methodology

- Follow the BEA approach, as outlined in Barefoot et al. (2018)
- The ABS estimation of the digital economy involves three major steps:
  - Define the digital economy for the account.
    - * Digital-enabling infrastructure
    - * E-commerce
    - * Digital media
  - Identify the Supply-use (SU) products and services according to the definition for the digital economy.
    - * ‘Exclusively’ or ‘primarily’ digital products (some exceptions).
  - Identify the production of the ‘digital’ products with the SU table, and estimate the associated output and value added.
    - * Assumptions

Methodology: 'Digital' Products and Services

Digital Sectors	SUPC	Product Description
Digital media	56005	Radio and TV broadcasting services
	56010	Cable (Pay TV) and other subscription broadcasting services
	57005	Internet publishing and broadcasting
	57010	Internet publishing advertising sales
E-commerce - Wholesale	33005	Wholesale margin
	33010	Other wholesale trade
E-commerce - Retail	39005	Retail margin
	39010	Other retail trade
Infrastructure - Hardware	16015	Recorded media reproduction
	24005	Photographic goods (incl. optical fibres) and ophthalmic equipment (excl. spectacles)
	24025	Computer hardware and peripherals (incl. photocopiers and parts)
	24035	Vending, video, monetary , office and other electronic hardware nec.
Infrastructure - Software	54010	Software publishing
	54020	Copyright leasing
Infrastructure - Support services	57020	Data processing and information storage services
	70005	Computer consultancy, systems design and related services
	94010	Machinery and equipment repair and maintenance services
Infrastructure – Telecommunications	24030	Telecommunication and audio visual equipment
	24040	Electric lights (incl. torches); cables and batteries (excl. automotive)
	57015	Internet services
	58005	Telecommunication services (excluding equipment)

Methodology: Assumptions

- The intermediate consumption to output ratio in the ‘digital’ industry is identical to that in the total industry.

- The digital and non-digital split of retail and wholesale margin is identical across all industries.

Methodology: Current Price Estimation

Supply-use Industry (SUIC) View

Industry Output
- SUPC1 (Digital product)
- SUPC2 (Digital product)
- SUPC3
- SUPC4

:
:
:

Industry total output (sum of "digital & non-digital output)

Industry Intermediate Consumption
- SUPC1
- SUPC2
- SUPC3

:
:
:

Industry total intermediate consumption

Industry Value Added

"Digital" Component of SUIC

Industry "digital" output
- SUPC1
- SUPC2

Industry total "digital" output (sum of the "digital" SUPC's)

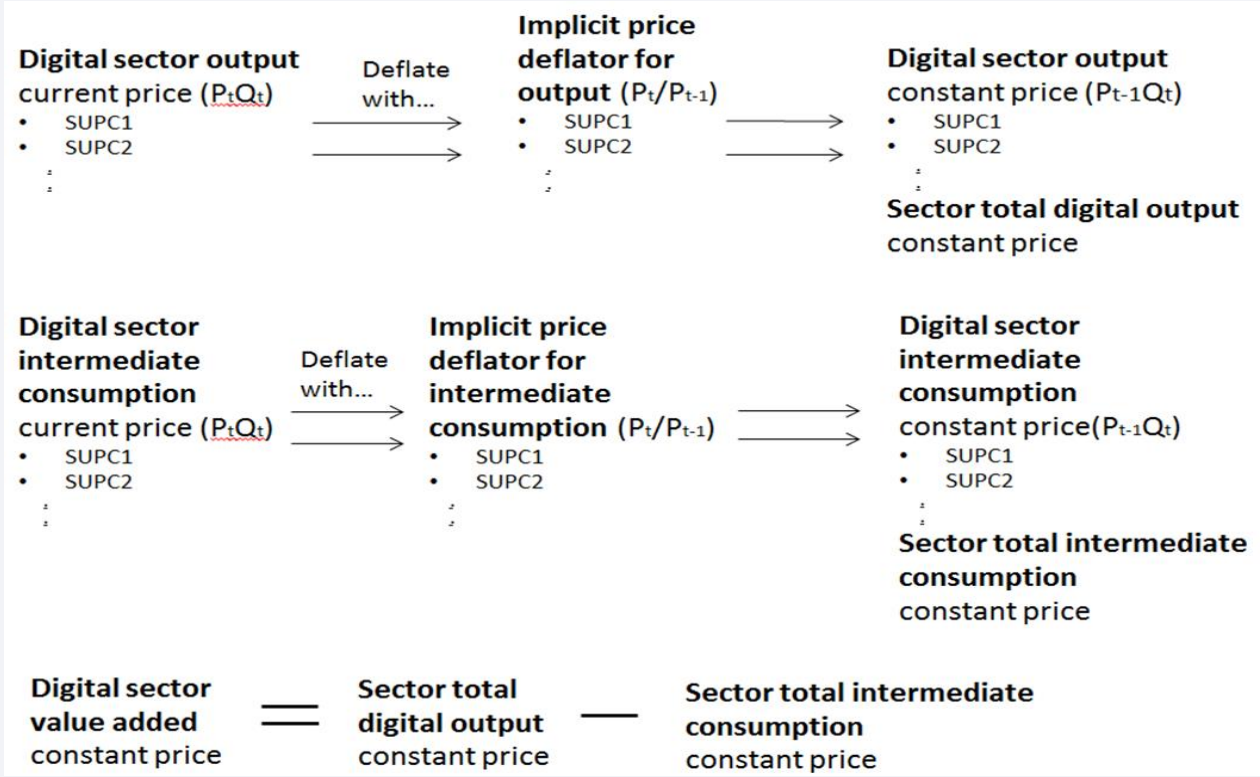
Industry Intermediate Consumption for the production of digital output
= Industry total "digital" output – Industry "digital" value added

Industry intermediate consumption split to SUPC proportionally

Industry "Digital" Value Added
= Industry value added * Industry total "digital" output / Industry total output

- A 'digital' sector is the summation of the relevant digital components across SUIC's

Volume Estimation – Double Deflation



Volume Estimation – Chain Volume Measure

- **Estimating Sector Value Added Volume (also applies to sector output)**

Link 3 – Unchained Volume Index (Annual Growth)

$$\frac{Sector\ value\ added\ PY}{Lagged\ sector\ value\ added} = \frac{P_{t-1}Q_t}{P_{t-1}Q_{t-1}}$$

Link 4 – Chain Volume Index

$$\frac{Q_t}{Q_0} = Link3_1 \times Link3_2 \times Link3_3 \times \cdots Link3_t$$
$$= \frac{P_0Q_1}{P_0Q_0} \times \frac{P_1Q_2}{P_1Q_1} \times \frac{P_2Q_3}{P_2Q_2} \times \cdots \frac{P_{t-1}Q_t}{P_{t-1}Q_{t-1}}$$

Link 5 – Sector Chain Volume Value Added

$$P_{ref}Q_t = \frac{Sector\ value\ added\ CP_{ref}}{Chain\ volume\ index_{ref}} \times Chain\ volume\ index_t$$
$$= P_{ref}Q_{ref} \times \frac{Q_0}{Q_{ref}} \times \frac{Q_t}{Q_0}$$

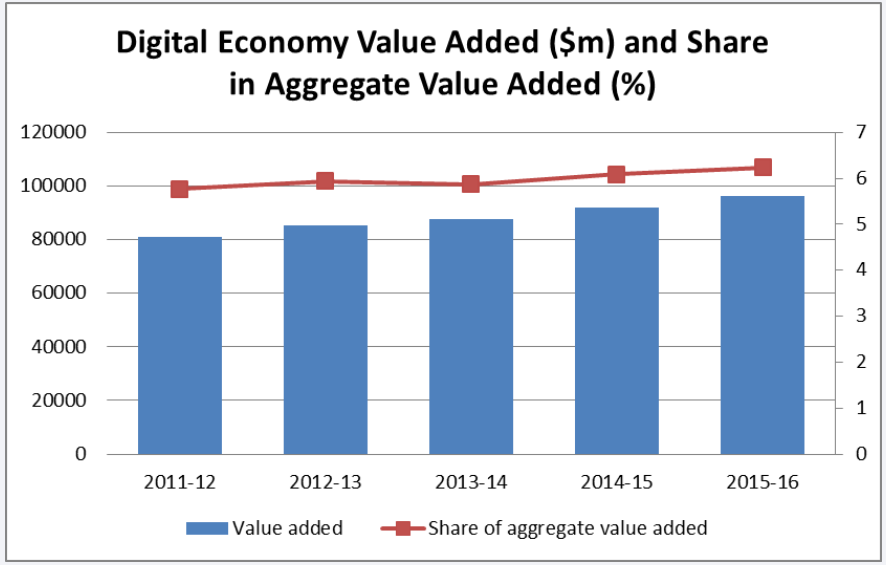
- Digital economy value added growth is the Tornqvist aggregation of the underlying sectors

Data Sources

- ABS Supply-use table, 2011-12 to 2015-16.
- ABS Input-output table, 2011-12 to 2015-16.
- NAB Online Retail Sales Index (NORSI), 2010 to 2016.
- Experimental Estimates of Online Retail Turnover (Appendix), 2014 to 2018, ABS Cat no. 8501.0 – Retail Trade, Australia.
- Summary of IT Use and Innovation in Australian Business, 2005-06 to 2015-16, ABS Cat no. 8166.0.
- Economic Activities Survey (EAS) industry clearance documentation, 2006-07 to 2015-16.

Preliminary Results

Australia



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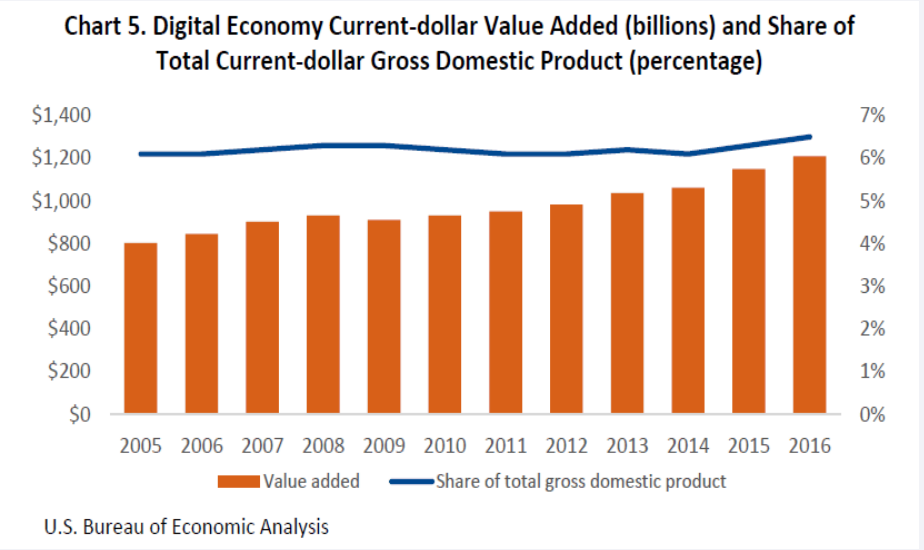

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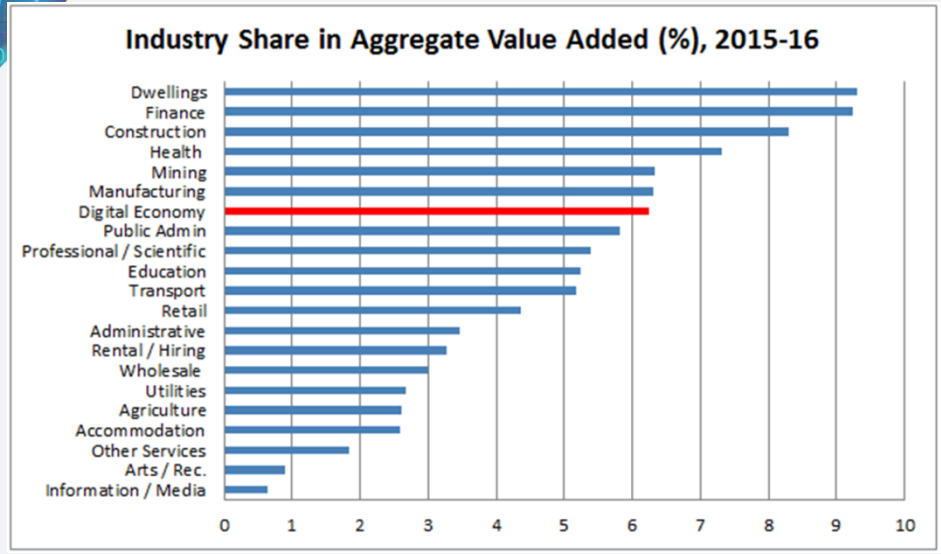
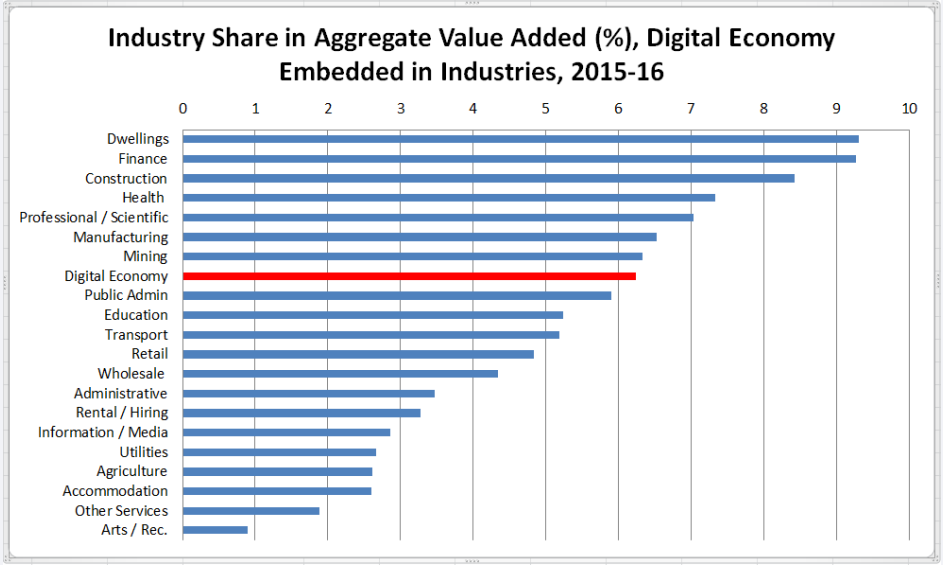
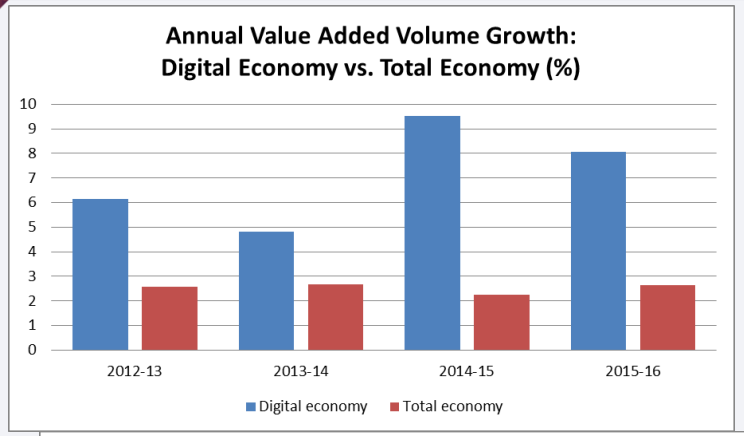




Note: the digital economy's share has not been removed from the industries for Which it is partially embedded, therefore the shares add to more than 100% of GDP.

Preliminary Results



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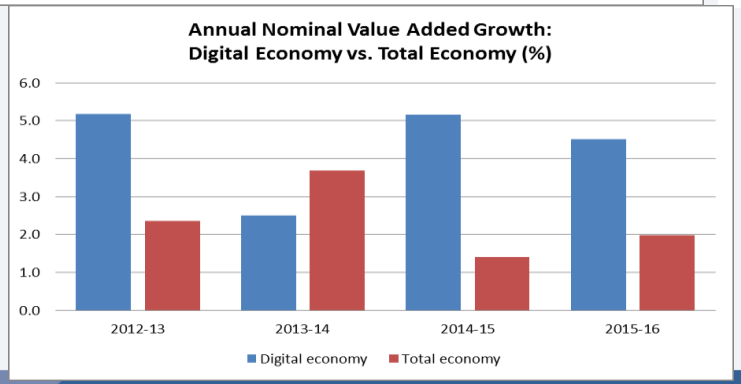

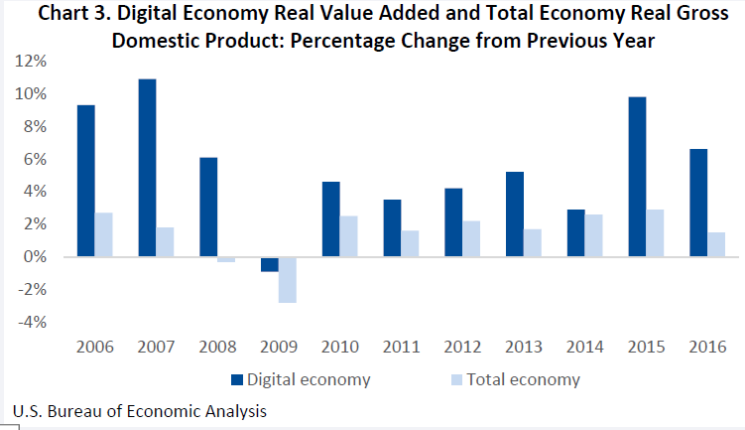

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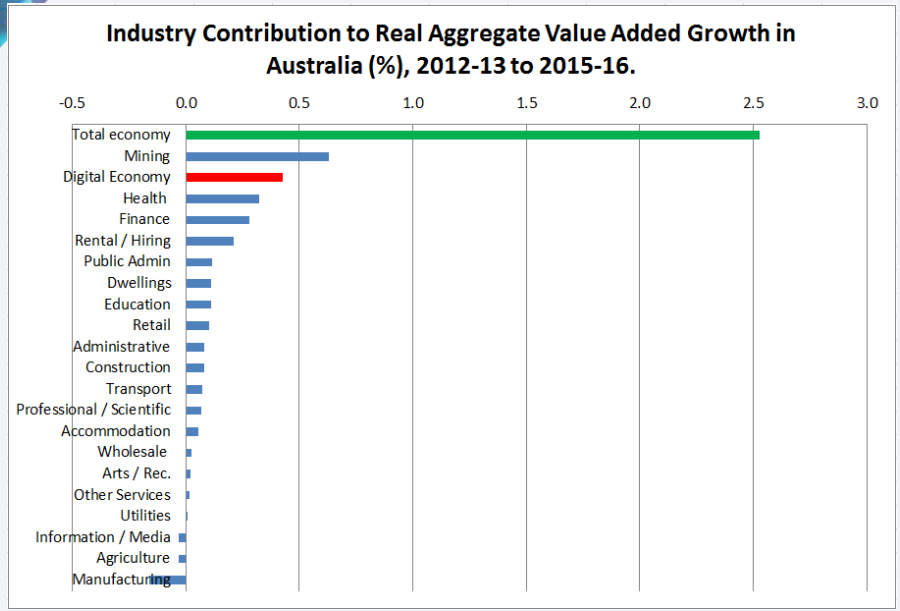

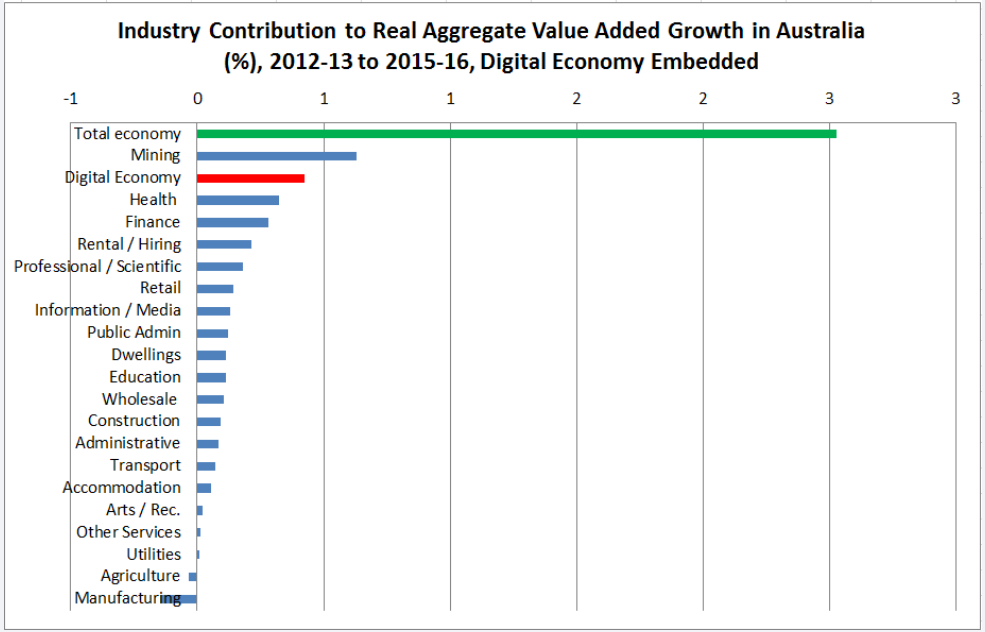

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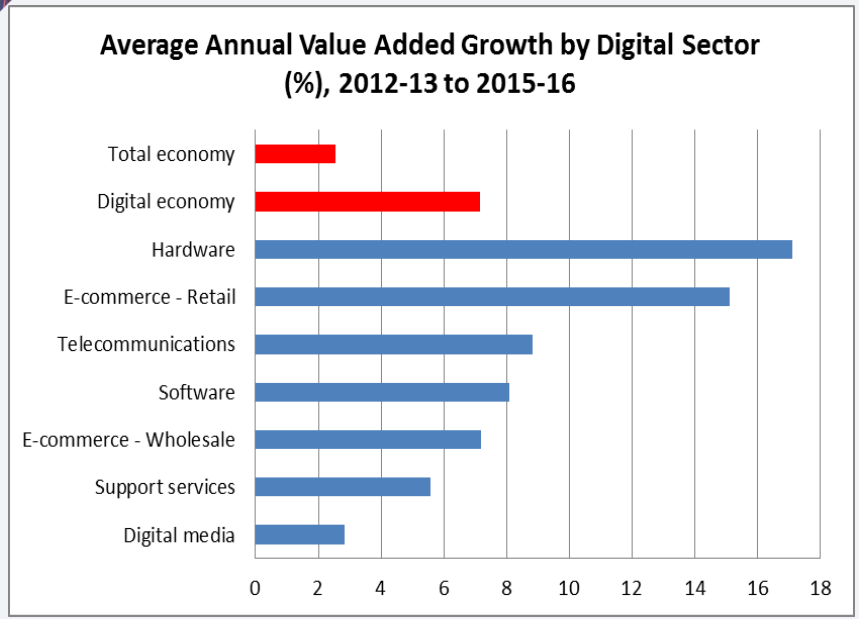

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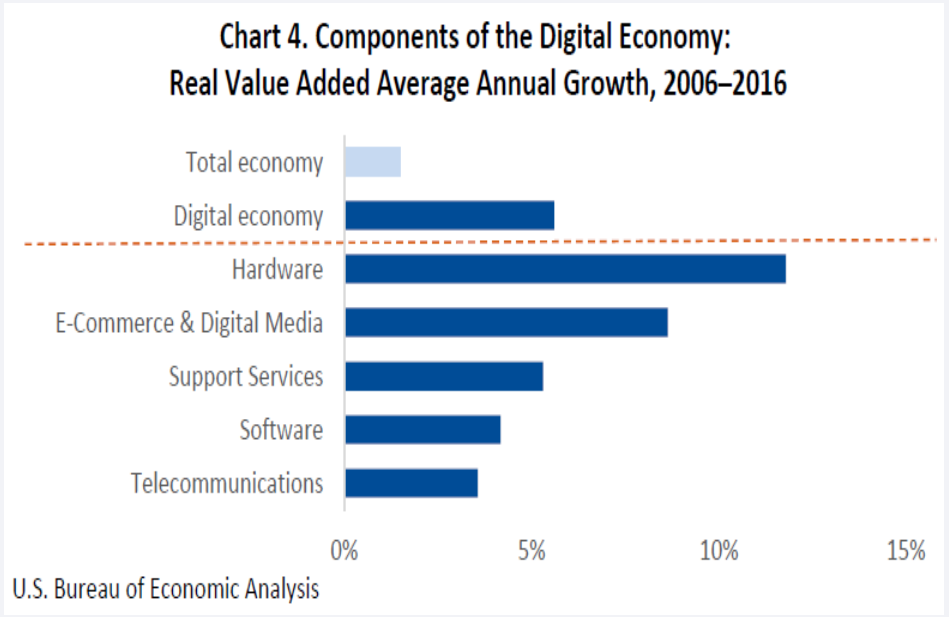
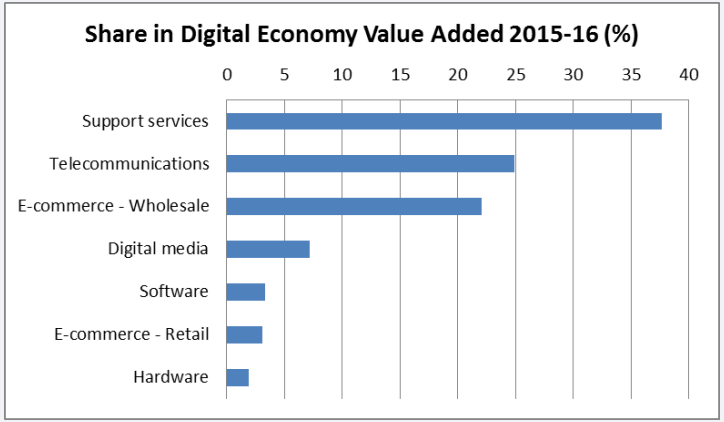


Preliminary Results

Australian Bureau of Statistics



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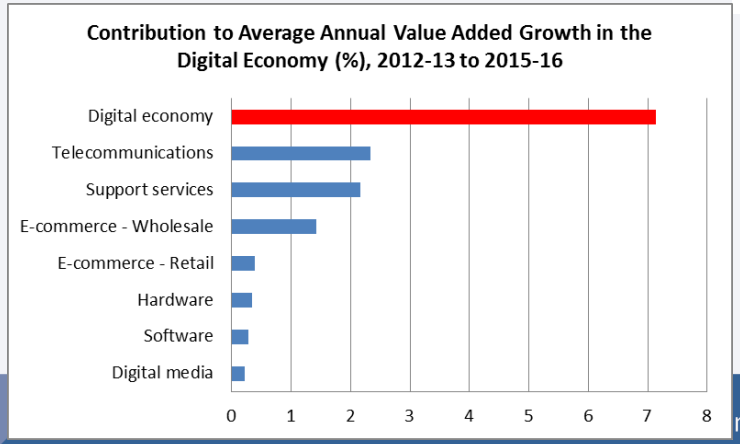

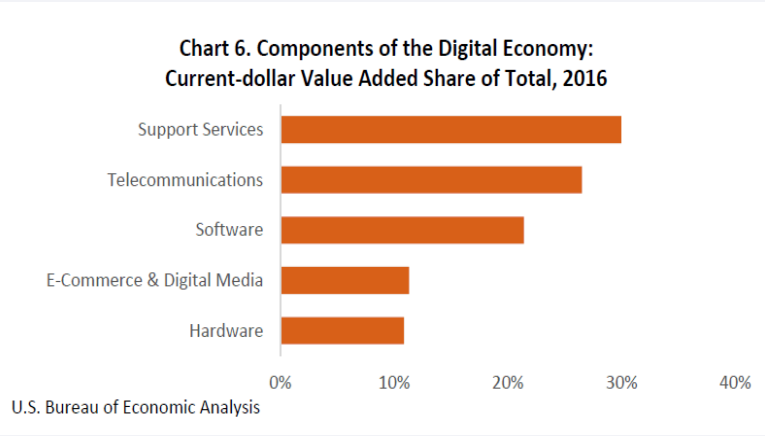

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Way Forward

- Extend the historical time series for the digital economy back to mid 2000's; update with the latest Supply-use data.
- ABS information paper defining and measuring the digital economy in Australia.
- Improve coverage of digital goods and services in product classifications

Questions for Discussion

- Is the definition and approach for measuring the Australian digital economy appropriate?
- Are the preliminary results plausible?
- Would a publication under the BEA approach meet user needs?