

# Measuring Services Innovation: Service Sector Innovation Index

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## Measuring services innovation: 2 approaches

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- Industry-based
  - Innovation in services is defined as innovation within service sector firms, i.e. firms active in NACE industries G to K
  
- Activity-based
  - Services innovation covers any innovation activity with service like attributes that can occur in any part of the economy: manufacturing, agriculture, services or even informal parts of the economy

- Innovation surveys do not cover new business models and new customer interfaces



*Source: Forfás (2006), "Services Innovation in Ireland – Options for innovation policy", a report commissioned by Forfás by CM International*



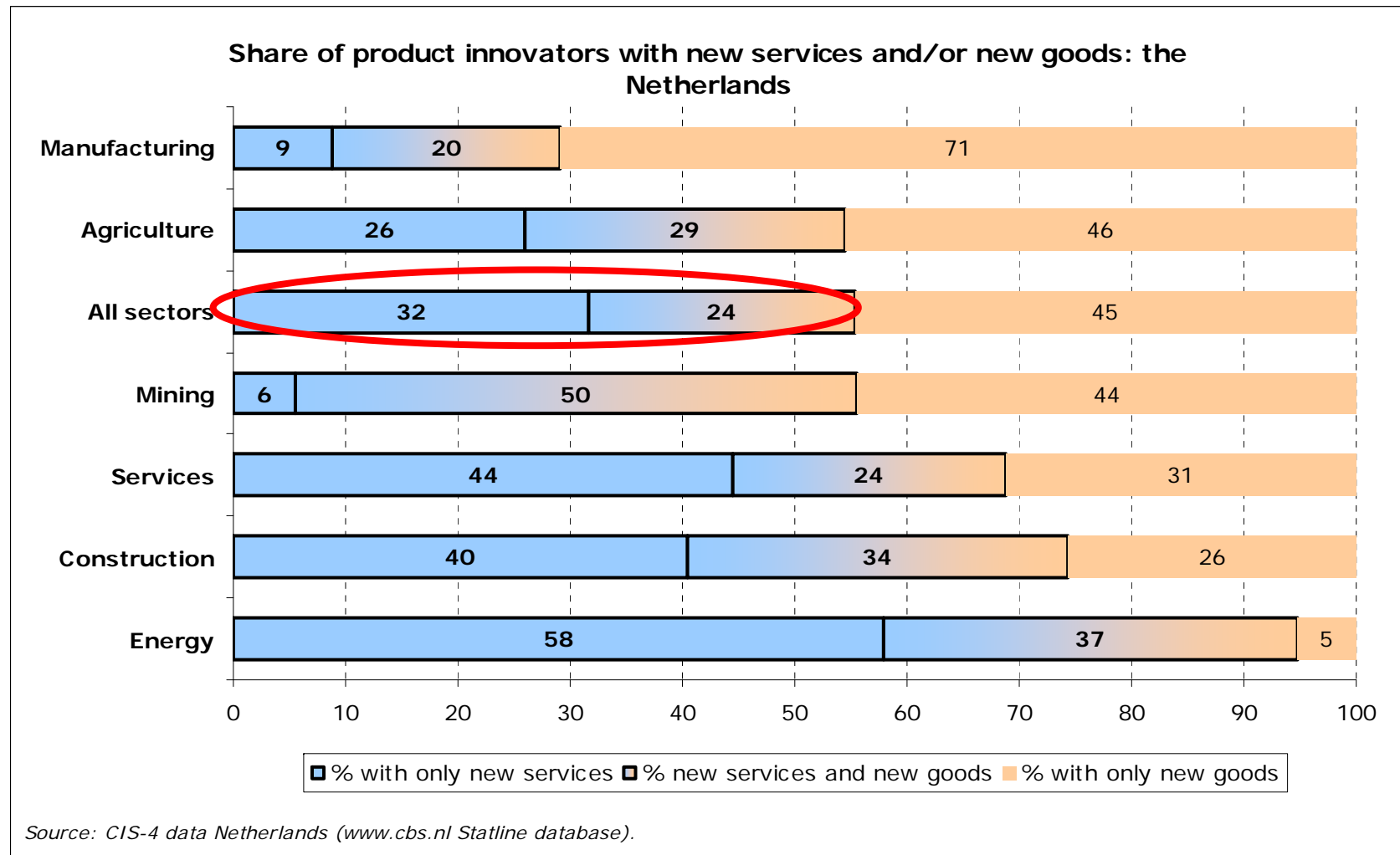
## New services: Community Innovation Survey

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- Cross-sectional survey of all firms over 10 employees in EU Member States and EFTA countries over the period 2002-2004 (CIS-4 with over 60,000 respondents) / 2004-2006 (CIS-2006)
  
- Did your enterprise introduce:
  - New or significantly improved goods?
  - New or significantly improved services?
  
- CIS does not include all services sectors
  
- Aggregate CIS-4 results available from Eurostat, but not the differentiated results for goods/services
  - (CIS-2006 results not yet available from Eurostat)

## All sectors innovate by introducing new services

- In the Netherlands 55% of all product innovators introduced new services (29% in manufacturing, 69% in services)





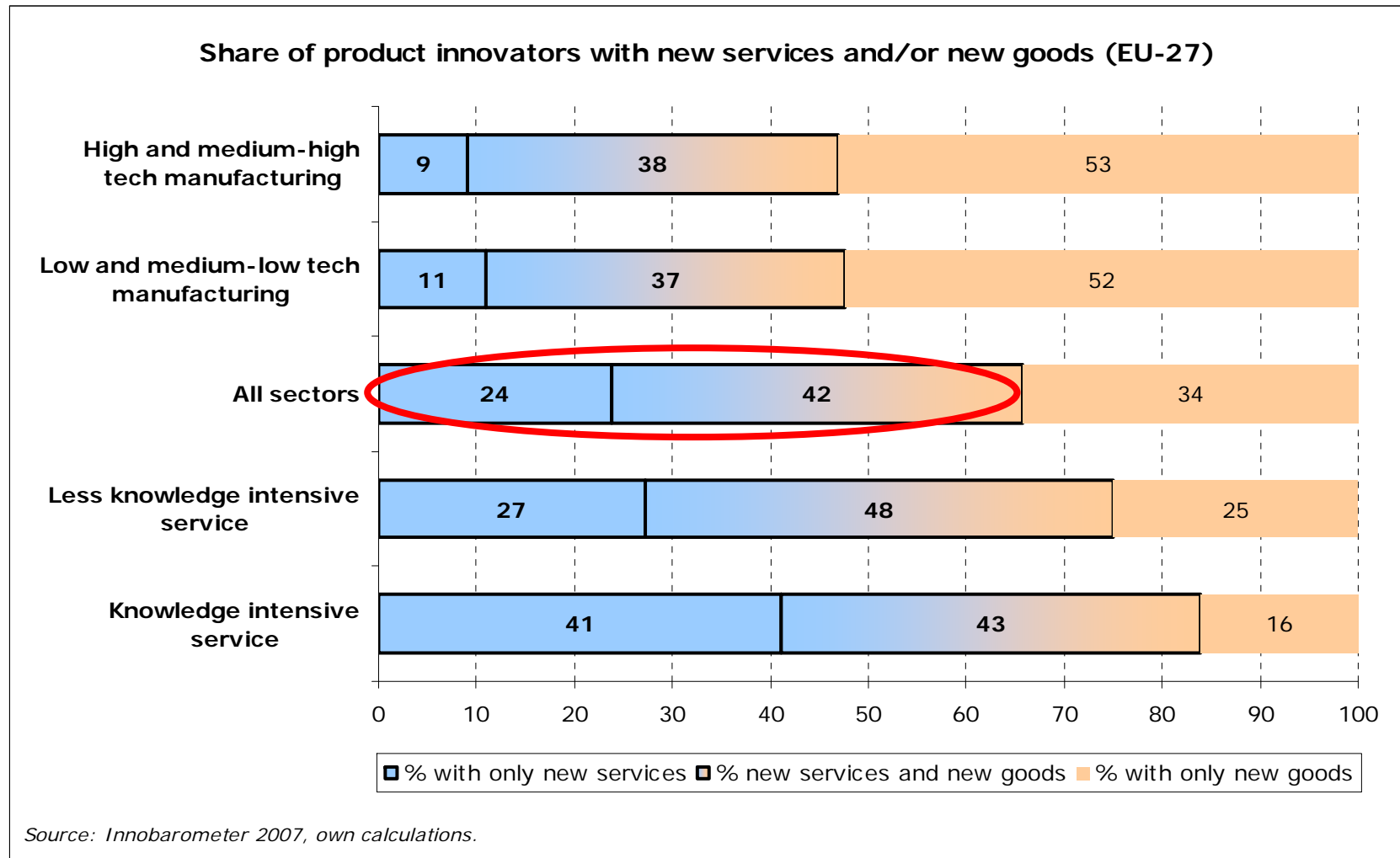
## New services: Innobarometer 2007

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- Quota survey of all firms over 20 employees in EU Member States and EFTA countries over the period 2005-2006 with over 5,000 respondents
  
- In the last two years, did your company perform any of the following innovative activities?
  - Introduce new or significantly improved goods
  - Introduce new or significantly improved services
  
- Innobarometer 2007 includes all services sectors

## New service innovators more prominent in services sector

- In Europe 66% of all product innovators introduced new services, in particular in Knowledge-intensive services





## Industry-based approach

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- Industry-based approach is easier to use from a statistical point of view
  - Availability of data (R&D, Community Innovation Survey)
  - Comparability across countries (R&D)
  
- Synthesis consensus in literature: it is possible to use the same indicators to measure innovation in the manufacturing and services sectors, although some types of innovation are more common in services than in manufacturing (and vice versa)
  
- Service Sector Innovation Index (SSII)
  - Methodology similar to Summary Innovation Index (European Innovation Scoreboard)



# Service Sector Innovation Index: 23 indicators from CIS-4 grouped into 9 themes

## **HUMAN RESOURCES**

- 1.1 Share of firms engaged in training personnel for innovation purposes
- 1.2 Share of firms reporting lack of qualified personnel as an important hampering factor for innovation – *reversed indicator*

## **INNOVATION DEMAND**

- 2.1 Share of firms reporting uncertain demand as an important hampering factor for innovation – *reversed indicator*
- 2.2 Share of firms reporting no need to innovate because no demand for innovation – *reversed indicator*

## **PUBLIC SUPPORT FOR INNOVATION**

- 3.1 Share of firms that received any public funding for innovation

## **PRODUCT AND PROCESS INNOVATION**

- 4.1 Share of firms engaged in intramural R&D
- 4.2 Expenditures in intramural R&D (% of total innovation expenditure)
- 4.3 Share of firms engaged in acquisition of machinery, equipment and software

## **PRODUCT AND PROCESS INNOVATION OUTPUTS**

- 5.1 Share of firms with highly important effects in reduced materials and energy per unit output
- 5.2 Share of firms with highly important effects in improved flexibility of production or service provision
- 5.3 Share of firms with highly important effects in improved quality of goods or services
- 5.4 Share of firms with highly important effects in reduced labour costs per unit output

## **NON-TECHNOLOGICAL INNOVATION**

- 6.1 Share of firms that introduced organisational and/or marketing innovations
- 6.2 Share of firms that introduced organisational innovations
- 6.3 Share of firms that introduced marketing innovations

## **NON-TECHNOLOGICAL INNOVATION OUTPUTS**

- 7.1 Share of firms with highly important effects in reduced time to respond to customer or supplier needs
- 7.2 Share of firms with highly important effects in improved quality of goods or services
- 7.3 Share of firms with highly important effects in reduced costs per unit output

## **COMMERCIALISATION**

- 8.1 Turnover of new and significantly improved products only new to firm (% of total turnover)
- 8.2 Share of firms that have new or significantly improved products new to market

## **INTELLECTUAL PROPERTY**

- 9.1 Share of firms that applied for a patent
- 9.2 Share of firms that registered an industrial design
- 9.3 Share of firms that registered a trademark



## Service Sector Innovation Index: sectors

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- Manufacturing (NACE D)
- Services, including
  - NACE G51 (wholesale)
  - NACE I (transport, storage and communication)
  - NACE J (financial intermediation)
  - NACE K72 (computer and related activities)
  - NACE 74.2 (architectural and engineering activities)
  - NACE 74.3 (technical testing and analysis)
- KIBS (NACE 72+74.2+74.3)
- Services excl. KIBS

## Composite innovation index

- For all sectors and indicators the data are
  - For skewed variables: transformed using a square root transformation
  - Normalised using the Min-Max method

$$x_{cij}^r = \frac{(x_{cij} - \min(\forall_c \forall_j x_{ij}))}{(\max(\forall_c \forall_j x_{ij}) - \min(\forall_c \forall_j x_{ij}))}$$

- The SSII is calculated as the unweighted average of these normalised values

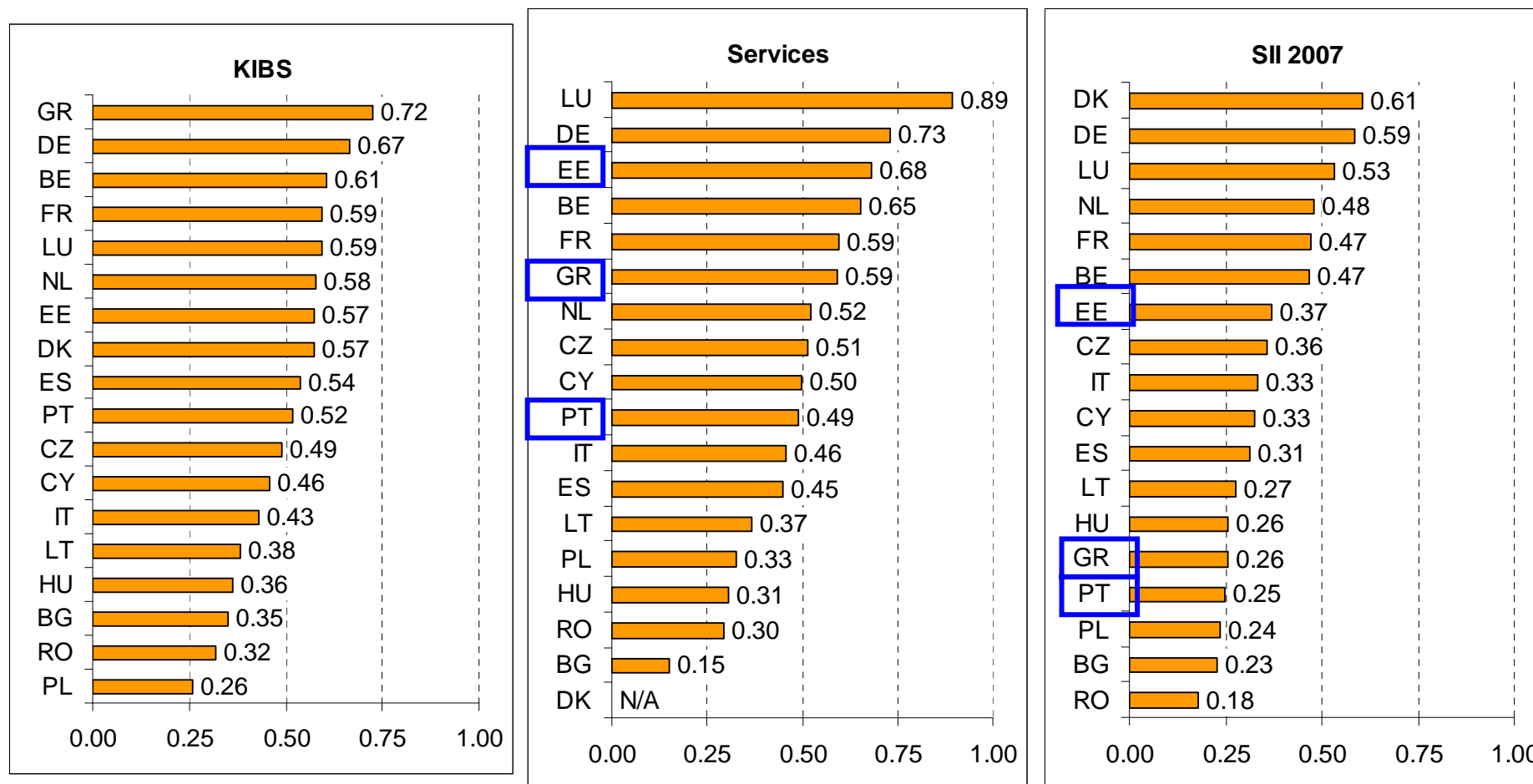
- CIS-4 aggregate data are not available for all countries: a large number of countries could not be included

Sector	Number of countries included (out of 27)	Minimum number of indicators per country	Share of total number of indicators (out of 23)
Services (SSII)	17	16	70%
Manufacturing	20	16	70%
KIBS	18	17	74%
Services excl. KIBS	17	16	70%

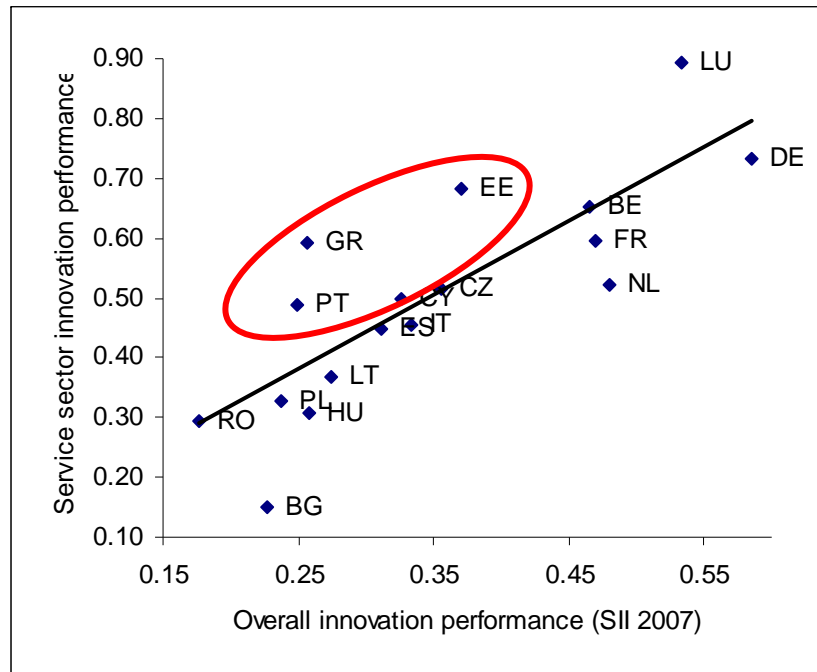
- Due to missing data some countries appear to under or over perform
- Some countries appear to under or over perform due to a national bias in how firms respond to the survey
- Some indicators are based on 'yes' or 'no' questions and do not account for differences in the intensity of an innovation activity
- Results need to be interpreted with care!!

## Service Sector Innovation Index

- Luxembourg best performer in service sector innovation
- Different results for KIBS: Greece is best performer
- SSII correlates well with overall innovation performance



## Service sector innovation is different



- But some Member States with overall weak(er) innovation performance perform relatively well in service sector innovation (Estonia, Greece, Portugal)

- Innovation in manufacturing relies on the accumulation of capabilities that require time to develop (both knowledge stocks and knowledge flows are vital)
- Innovation in services relies more on knowledge flows, permitting rapid 'catching-up' to best practice



## Conclusions

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- Can innovation in services be measured using indicators developed to measure (technical) innovation in manufacturing?
  - Partly, as innovation in services is different as it relies more on knowledge flows permitting rapid 'catching-up' to best practice
  
- Can we compare service sector innovation across countries using CIS data?
  - No, or only within groups of similar countries
  - But, we can compare innovation within specific service sectors within each country



## Recommendations - specific

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- Eurostat/Member States should provide disaggregated results on the question if the enterprise introduced new or significantly improved goods or services
- Include questions on other types of services innovation, i.e. use of new business models and new customer interfaces
- Include all service sectors
  - In particular NACE 73 (research and development) which is a key KIBS sector



## Recommendations - general

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- CIS data at sector level are missing for too many countries
  - Increase sample size
  - Increase response rates by introducing a standardized follow-up questionnaire
  
- Extend time dimension: is your firm using y?
  - If yes, did you introduce y in:
    - Last three years?
    - Longer than three years ago?



Thank you

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- For more details:
  - Arundel, A., M. Kanerva, A. van Cruysen and H. Hollanders (2007), "Innovation Statistics for the European Service Sector", Brussels: INNO Metrics 2007 Thematic Paper: [www.proinno-europe.eu/metrics](http://www.proinno-europe.eu/metrics)
  
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