Office for National Statistics

Measuring the Sharing Economy of the UK

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Introduction

- There are many challenges to measuring the sharing economy.
  - No internationally-agreed definition, and no official conceptual framework.
  - Identifying businesses
  - A business might not be solely in the sharing economy

- ONS has published three papers:
  - The feasibility of measuring the sharing economy, April 2016
  - The feasibility of measuring the sharing economy: progress update, October 2016
  - The feasibility of measuring the sharing economy: November 2017 progress update, November 2017

- All of the statistics presented are experimental, and ONS is working towards producing standalone statistics on the sharing economy.

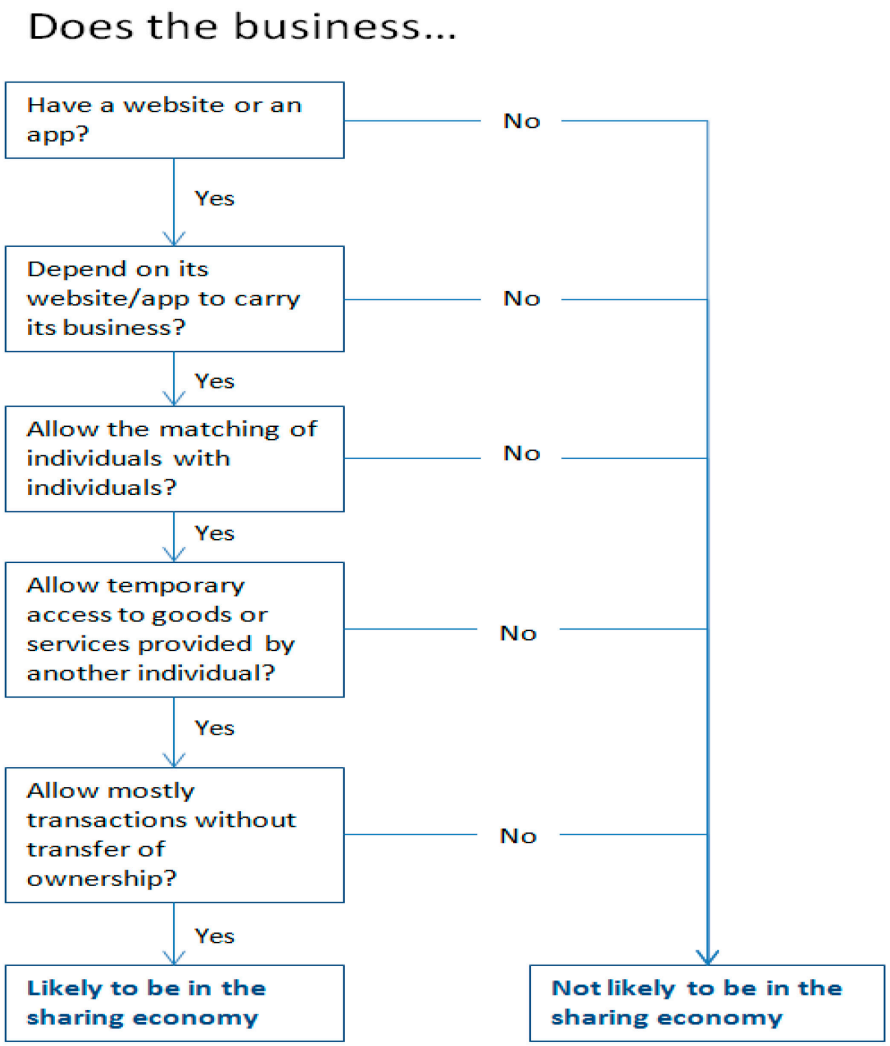
Outline

- ONS definition of the Sharing Economy
- Decision tree for classifying businesses
- Descriptive Statistics (business and social)
- Data Science
- Future work

ONS's Definition of the Sharing Economy

- "the sharing of **under-used** assets through completing **peer-to-peer** transactions that are only viable through **digital intermediation**, allowing parties to benefit from usage outside of the primary use of that asset."

Sharing Economy Decision Tree



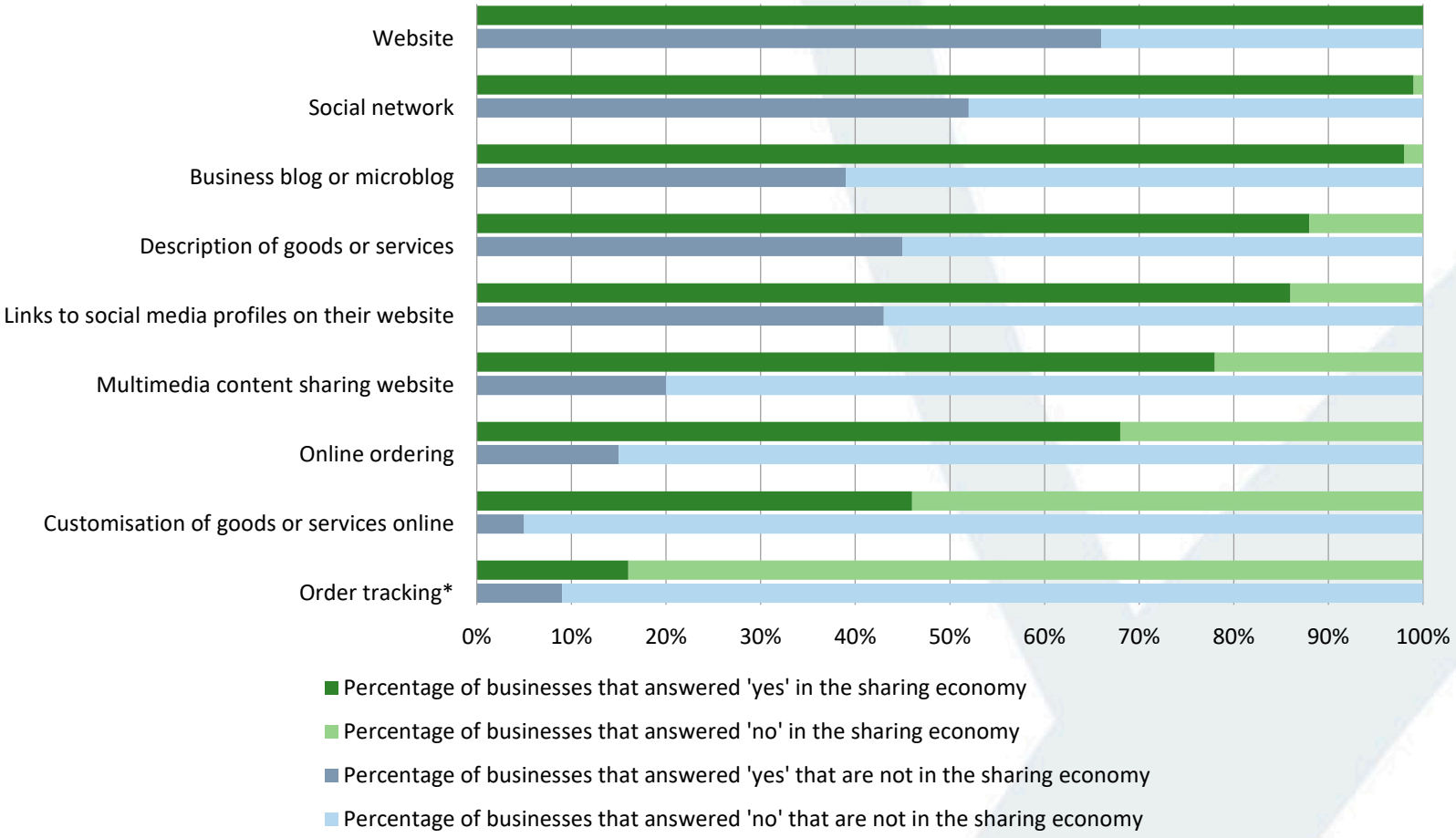
Sharing Economy data sources

- 81 Sharing Economy businesses were sent **Annual Business Survey** and **E-commerce Survey** questionnaires. These businesses have been verified using the decision tree, and are used for both the descriptive statistics and data science analysis.

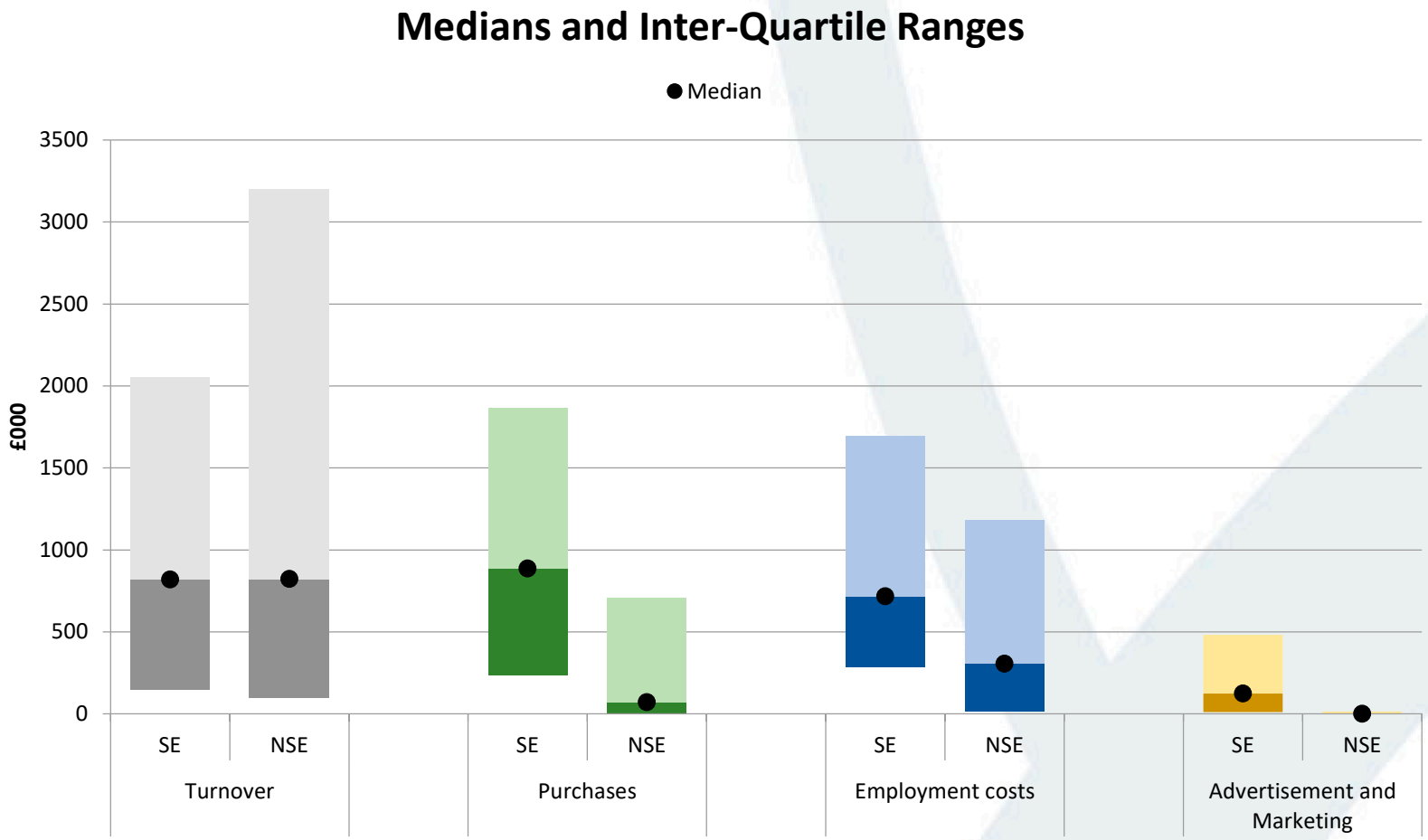
- Questions were added to the **Internet Access Survey** on accommodation and transport sharing economy participation.

- We are also developing our **Living Costs and Food Survey, Labour Force Survey** and a **Time-Use Survey** over the forthcoming year.

E-Commerce Survey Results



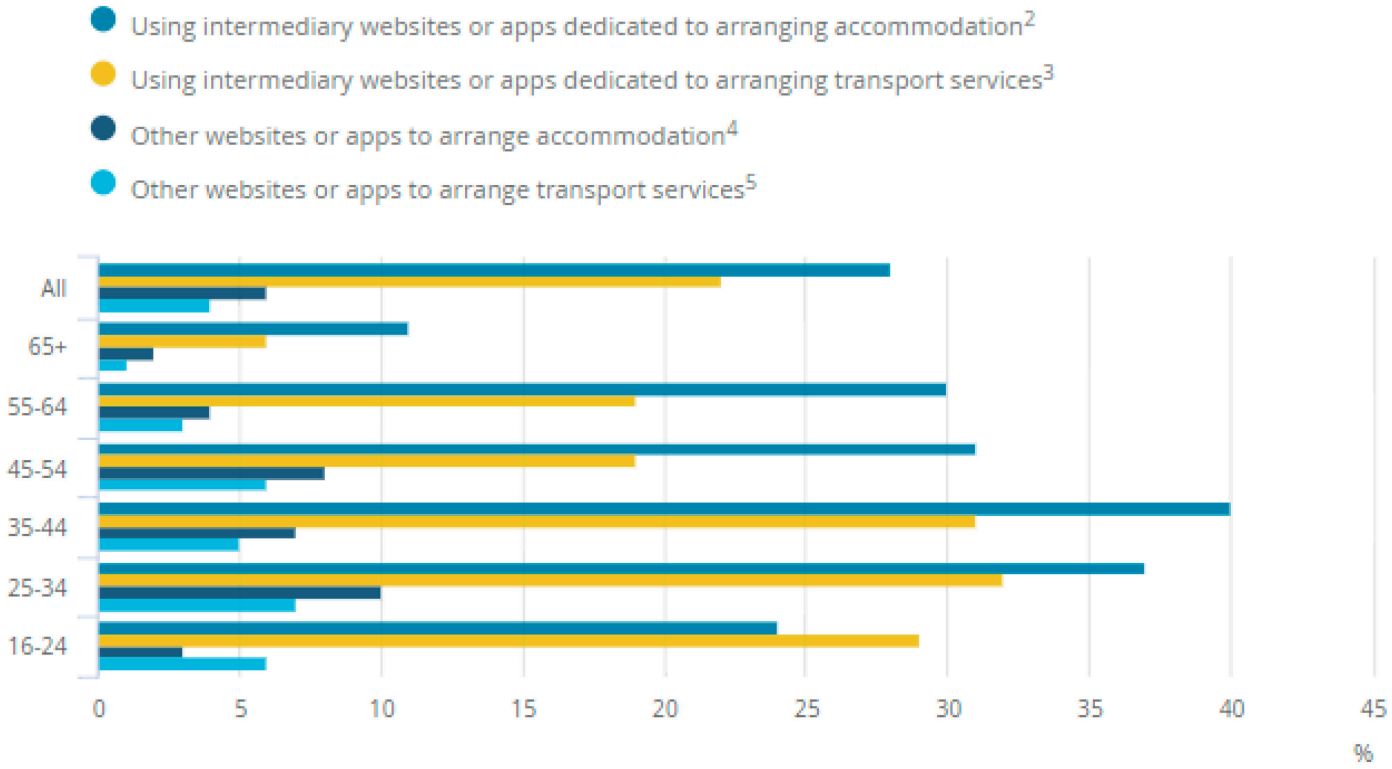
Annual Business Survey results



SE – Sharing economy businesses
NSE – Non sharing economy businesses

Internet Access Survey Results

Use of the internet to arrange accommodation or transport from another individual, by age group, 2017, Great Britain



Source: Office for National Statistics

Data Science Analysis

- The ONS has previously used data science techniques to attempt to predict which businesses on the UK Inter-Departmental Business Register (IDBR) are likely to be within the sharing economy.
  - Using variables such as turnover, employment, birth date, and industrial classification.
  - Using Support Vector Machine and Random Forest models.

- Further experimental analysis has been undertaken using ABS and E-Commerce surveys.
  - To determine if the variables allow for the differentiation between sharing and non-sharing economy businesses.

Data Science Analysis

- K-means cluster analysis compares the characteristics of multiple entities, resulting in similar entities being clustered together and dissimilar entities being clustered apart.

- 11 Annual Business Survey and 10 E-commerce variables were used in the analysis

- Businesses were grouped into 6 clusters based on their characteristics

Data science results

Table 1: Results of clustering ABS data into six groups

Group	One	Two	Three	Four	Five	Six	Total
Proportion of sharing economy businesses	1.2%	7.4%	88.9%	1.2%	1.2%	0%	100%
Proportion of non-sharing economy businesses	0%	5.7%	82.9%	4.3%	0.0%	7.1%	100%

Table 2: Results of clustering Group Three of the ABS data into six groups

Group	One	Two	Three	Four	Five	Six	Total
Proportion of sharing economy businesses	0%	6.1%	12.2%	81.7%	0%	0%	100%
Proportion of non-sharing economy businesses	1.7%	15.5%	5.2%	74.1%	1.7%	1.7%	100%

Data science results

Table 3: Results of clustering E-Commerce data into six groups

Group	One	Two	Three	Four	Five	Six	Total
Proportion of sharing economy businesses	14.8%	48.1%	18.5%	11.1%	2.5%	4.9%	100%
Proportion of non-sharing economy businesses	8.6%	8.6%	15.7%	21.4%	44.3%	1.4%	100%

Table 4: Results of clustering ABS and E-Commerce variables together into six groups

Group	One	Two	Three	Four	Five	Six	Total
Proportion of sharing economy businesses	7.4%	1.2%	3.7%	69.1%	17.3%	1.2%	100%
Proportion of non-sharing economy businesses	20%	0%	4.3%	18.6%	15.7%	41.4%	100%

Future Work

- Improving data collection of sharing economy businesses (adding new questions to e-commerce) which will refine our data science analysis
- Adding sharing economy questions to household surveys
- Exploring administrative data (HMRC self-assessment)
- Web-scrapping and web-crawling
- Continuing to engage with other NSIs, sharing economy organsations, international organsations and researchers.

Thank you for listening…

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