



# Technical Change and Productivity

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# Improving the Productivity of Government Services

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## *Structure of this talk:*

1. The essentials of Productivity Path Analysis (PPA) for any public agency
2. Why has productivity analysis not been done before in government? *People misconstrue it, plus it's hard - requiring a sustained holistic approach*
3. Four promising new developments – *robotic process automation; digitally enabled healthcare co-productions; big data; physical robotics*
4. Afterword – productivity and metricization

# Six key steps in measuring services productivity in any government agency

- Identify and count the (absolutely) ‘core’ outputs/ activities
- Develop unit costs or ‘activity accounting’ for core outputs
- Define a ‘cost-weighted total output’ metric
- Get an accurate ‘total inputs’ cost number for the agency
- *Divide total outputs by total inputs* to give a total factor productivity (TFP) number
  - labour productivity is less useful due to outsourcing
- Decide on a strategy for controlling quality issues

# Productivity Path Analysis (PPA)

- The very best comparator for your highly distinctive agency *is* your agency's TFP a year, or five years, or 10 years ago
- PPA focuses on trends in *consistently measured* productivity
  - To make sure the trend line is not falling?
  - Which means it is at least flat, or (better) it's growing
  - If it's rising (as we hope), is it on trend with recent growth?
  - Or is it below trend?
- If you can, find PPAs for a close-comparator set.
  - How does your line or your growth compare with theirs?
  - Are you growing (or at least flat) in line with similar agencies?

# One-off measures of productivity can work in decentralized public sector organizations

- Hospitals, schools, social care organizations, police forces, fire services etc. all deliver services where quality is an important factor
- Ideally choose the fuller quality-weighting approach set out above, reweighting total outputs to reflect quality at some appropriate level
- Large N of delivering agencies makes one-off multivariate regression analysis (fitting a regression line and explaining outliers) useful
- Or a ‘data envelopment analysis’ (DEA) - comparing agencies with the same service mix on costs and efficiency, in snapshot mode
- Comparing productivity paths (consistently measured) is still far better though – but maybe not every year, at first

2. Why has productivity analysis not been done before in government?

# Why has productivity analysis not been done in government?

- Productivity is **not** about surveillance of employees, or making people work harder... in Taylorist or ‘time and motion’ mode
- This misconception strengthens union and Labour opposition

Most likely outcomes of higher productivity?  
UK employees' responses, 2017



# Why has productivity analysis not been done in government? It's hard and takes time

- Nor is ‘productivity’ = ‘everything good’, an omni-measure of progress in past, loose terminology. Instead though:
- Productivity Path Analysis is holistic and whole-organizational – it measures all aspects of your agency’s performance on core outputs divided by inputs – just one of many relevant metrics
- Getting and keeping on a growth path is always very basic and very hard – it requires years of focus and consistent data measurement.
- Any productivity path just shrugs off or dips in response to most management changes, to all political churn, most minor service innovations, and to outsourcing (non-genuine provider succession)

# What factors are key in growing public service agencies' productivity paths?

- Management quality (and pressures on them for change)
- Workforce expertise and morale
- The long run development of the agency's IT systems
- Major ICT systems changes *linked to* new buildings, workforce re-planning, or service re-visioning
- Substantive services task innovation – doing the basic job better, usually with digital changes
- Genuine service mode competition or sector competition

### 3. Four promising new developments (all digital)

### 3. Promising New Developments A

## Co-production of digitally enabled healthcare

- New digital tools are emerging very fast from Silicon Valley that can change relationships between (many) patients and health professionals – reducing dependence and improving self-monitoring. For instance, contrast:
  - In house, health service electro cardio gram analyses, needing GP or hospital room, large ECG machine with 10 leads needing attaching, full-time trained professional to operate, appointments days ahead; with
  - Kardia basic ECG attachment for Apple phone, iPads, or iWatch – requires patient applying two thumbs to pads – allows daily heart rate and pattern monitoring for baseline, emergency monitoring comparisons to baseline if needed, auto-uploads to Cloud and emails physician. Cost \$150
- Add to pervasive video/audio, plus Artificial Intelligence monitoring, already allows wide co-production of care by doctors & nurses/patients &families
- But organizational integration/ professional resistance remain very problematic

## Promising New Developments B

# Robotic Process Automation (RPA)

- Creates a ‘virtual’ worker who reads screens and scrapes data in the same way as a human worker – especially for administrative tasks
- Robot worker is not programmed but ‘trained’ using AI to take actions and make decisions in the same way as human workers – mainly by business/service staffs, without needing (many) IT specialists
- This approach also fits better with retaining existing (legacy) IT systems, rather than building new systems or a new API (automatic programming interface) from scratch
- Robot virtual ‘workers’ have digital presence and work alongside human workers – helpful in keeping activities in-house and connected
- RPA frees up staff to focus on service improvements

# Promising New Developments C

## Physical Robots' development

- Early stages yet, but steadily improving performance – e.g. robot immigration gates



- Widening scope and reducing costs go beyond initial applications – e.g. civil developments of drone technologies and miniaturization



# Promising New Developments D

## ‘Big Data’ and Artificial Intelligence

- Analysis access to *administrative data* in government systems (as opposed to transactions/business access)
- (Anonymized) analysis access to *administrative data in private corporations' online systems*
- Easy external database accessing via *Automated Programming Interfaces* – often free, or low cost
- *Massive textual digitization*, online or accessible, and new analytics – via APIs or other recovery
- *Automated analysis* of online audio, image, video and other data (using AI or machine learning, as in intelligence agencies)
- *Artificial intelligence* takes big data analysis and machine learning into new realms, not necessarily fitting standard causal analysis chains

## 4. Afterword: Productivity and metricization in modern life

# Measuring academic productivity

- “It’s all right for you academics to preach, but we’re the ones grappling with the problems – and we just can’t get the information needed for productivity analysis.”
- In fact, academics are like single-person, own account firms - and for decades they operated largely in the dark about their impacts
- Now, thanks to Google Scholar and other bibliometric databases we have instant information on
  - How we are being cited
  - How we compare in citations with others in our field
  - How we are doing on altmetrics – eg downloads of our papers

# My Google Scholar Profile (February 2018)



Patrick Dunleavy



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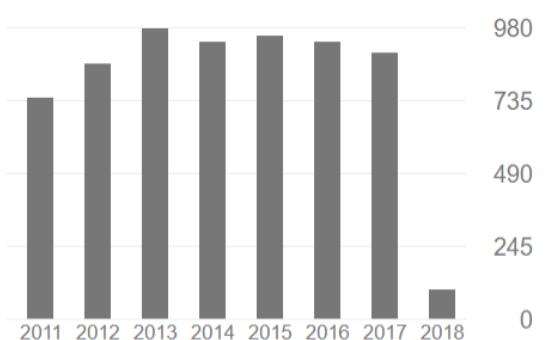
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# Downloads of a (rare) ‘classic’ paper

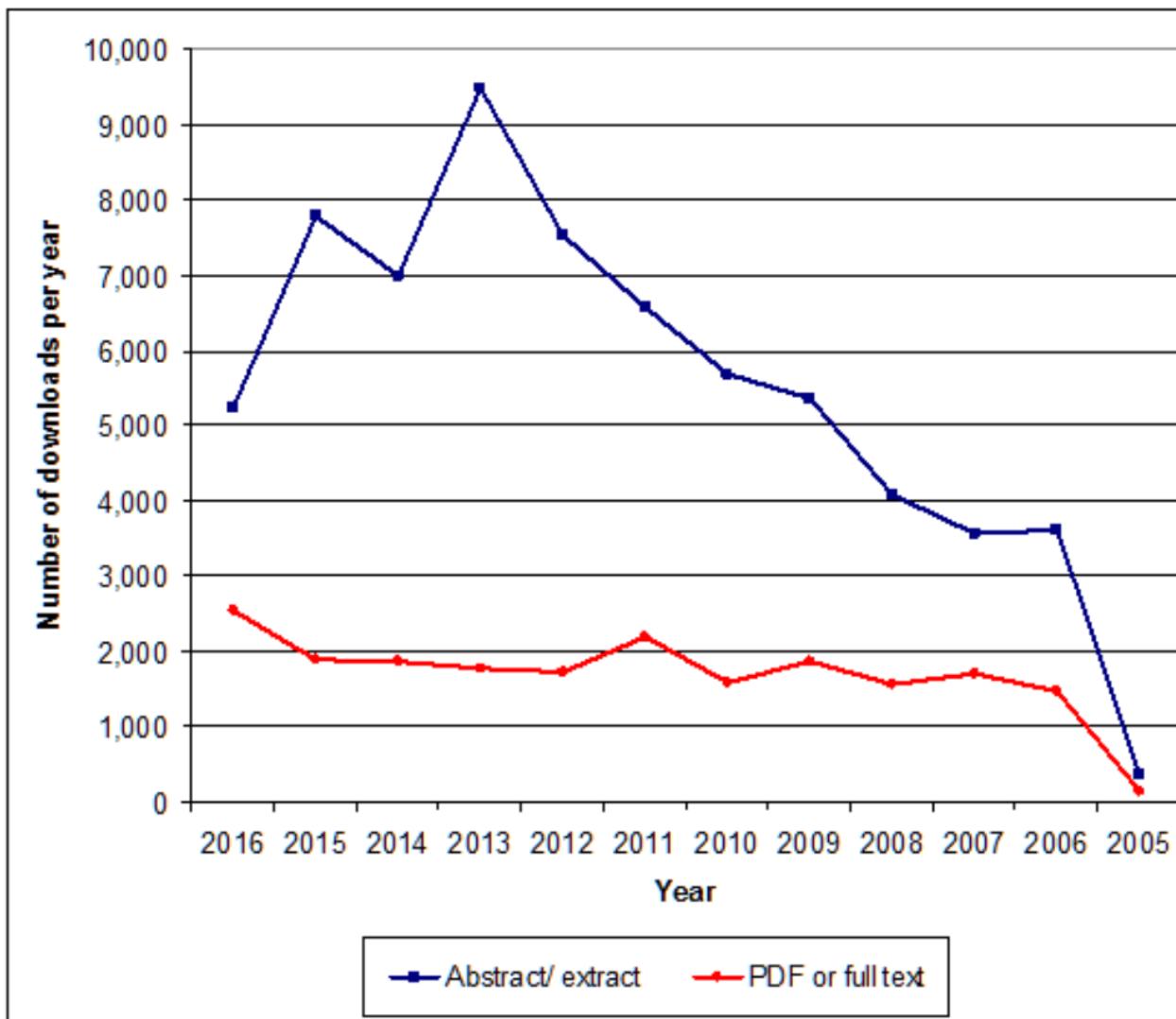
Source: Dunleavy et al, “New Public Management is dead - Long live Digital Era Governance” *Journal of Public Administration Research and Theory*.

Downloads in full (to mid 2016) = 19,030

Downloads of abstract or extract = 64,650

Current Google Scholar score = 1452

Web of science score = 304



# Top 10 Public Management Academics

on Google Scholar Profile, February 2018

| Person           | Place                     | Cites  |
|------------------|---------------------------|--------|
| Peter Miller     | LSE, UK                   | 42,980 |
| Rod Rhodes       | Southampton, UK           | 33,440 |
| Barry Bozen      | Arizona, USA              | 25,290 |
| James L Perry    | Indiana, USA              | 21,210 |
| Kenneth J Meir   | Texas A & M, USA          | 20,680 |
| Martha Feldman   | California, Irvine; USA   | 18,190 |
| Geert Bouckaert  | KU Leven, Belgium         | 19,790 |
| Ewan Ferlie      | Kings College, London, UK | 17,190 |
| Lawrence O'Toole | Georgia, USA              | 15,830 |
| Patrick Dunleavy | LSE, UK                   | 15,260 |

# Afterword on metrics and productivity

- Even diffident academics and scientists can accept metrics, and learn from them, changing their fundamental methods of working very appreciably
  - See P. Dunleavy and J. Tinkler, *Improving the Impacts of University Research* (Palgrave Macmillan 2018, forthcoming)
- Metricization is a pervasive development in modern social life – cf pub discussions of football or cricket performances
- So there's no excuse for still not knowing realistic productivity measures in any substantial agency, and being able to show your performance over time

Thank you for listening

