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Is Generative AI coming for intangibles

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The right kind of growth fairly shared

Research | Teaching | Engagement

Why do intangibles matter?

Firms use capital assets to produce output

- Machines → cars
- Software → professional services

Investment in intangibles bigger than in physical capital

Strong relationship between intangibles & growth

Intangibles investment increasingly measured by ONS

Which intangibles matter and why?

Figure 1

Rates of Private Nonresidential Investment in the United States, Tangible and Intangible, 1987 to 2021

Source: Authors' elaboration of data on investment by broad category from the US national accounts and US intangibles module of EU KLEMS & INTANProd.
Note: GDP includes all intangible investment.

Corrado et al 2022

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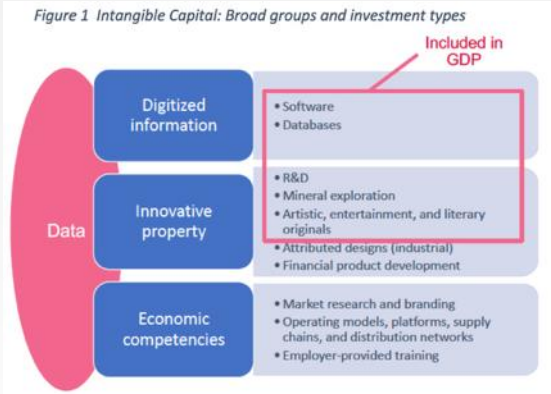
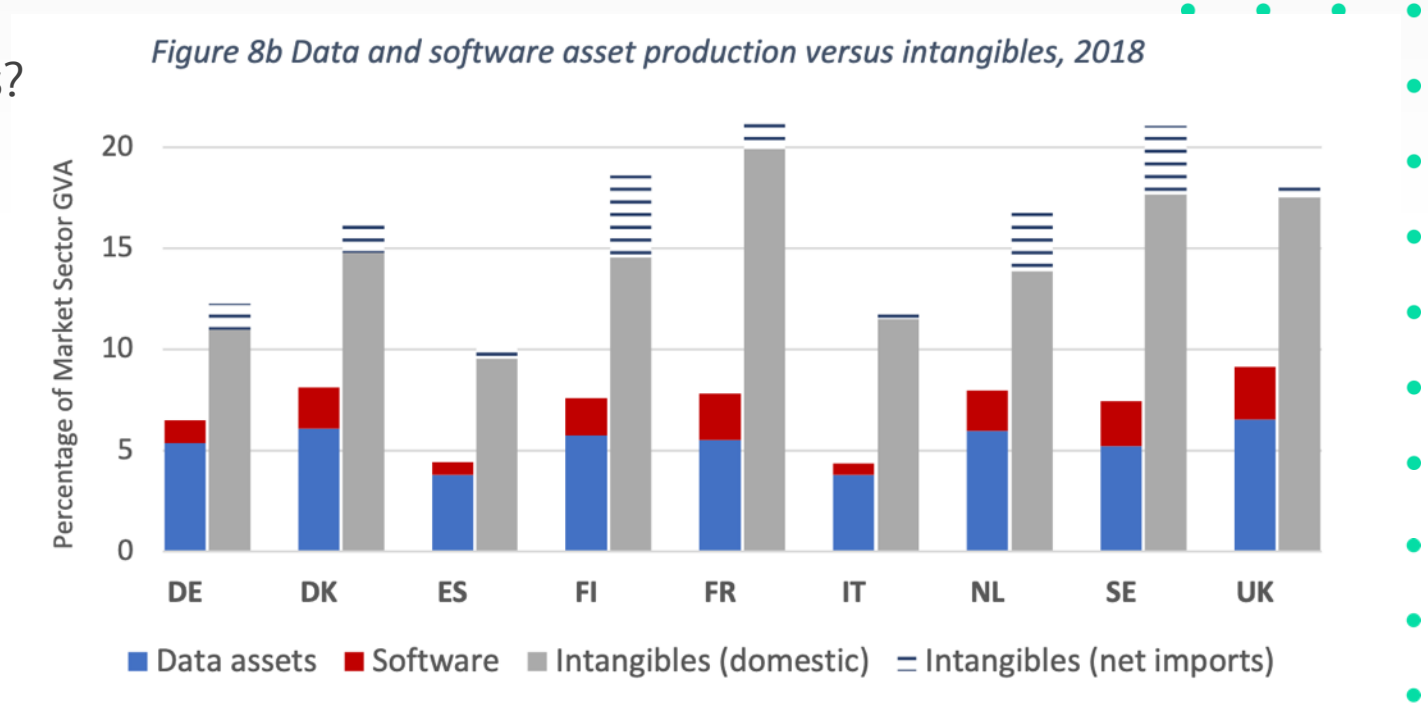
Data is core to AI

- A *component* of intangibles and an upstream *input*
  - Y = **A**. **F**(K,L,E,M,S,**I**)
- Assumption of diminishing marginal returns?
  - Increasing returns for 'distant' data?
  - Information theoretic element
- Depreciation characteristics
  - Depends on data type?
  - New ESCoE project



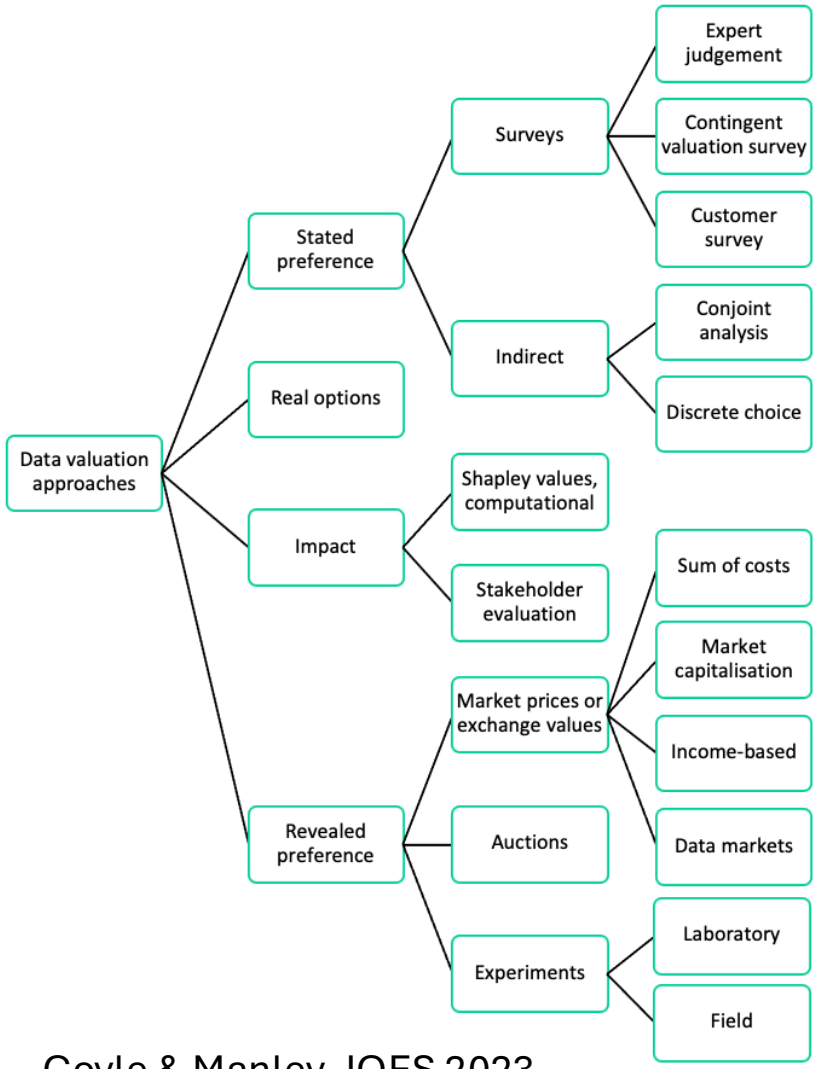


Carol Corrado et al, Technology, Productivity, and Economic Growth chap. 7.

Is data value increasing because of AI?

- Much more data use and processing – revealed preference
- Market capitalisations of data-intensive companies high
- Demand for data services
- Sum of costs?
  - But AI makes using unstructured data easier
  - Omitted costs (data architecture; security)
- Link between economic and information theoretic approaches

Figure 1 Typology of valuation methods

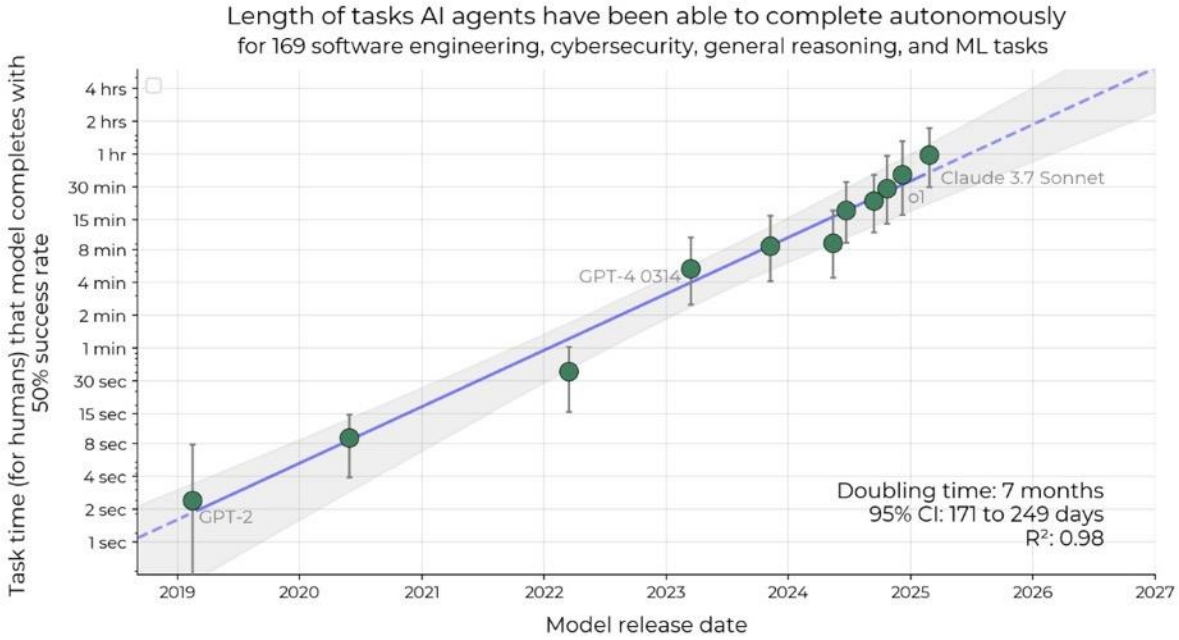


Coyle & Manley, JOES 2023

Other directions in measuring AI transformation

- Other inputs required by AI systems
- Service flows provided by AI
  - AI agents
- Cascading impact of AI services to other outputs
- Work transformation
- Changing org processes and structures
- Time

Coyle & Poquiz, NBER 2025



Kwa et al, METR, 2025

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Job-pocalypse?

Young will suffer most when AI 'tsunami' hits jobs, says head of IMF

Kristalina Georgieva says research suggests 60% of jobs in advanced economies will be affected, with many entry-level roles wiped out

CEOs at Davos sound alarm over AI threat to jobs

Business leaders were split on how fast artificial intelligence will transform work but agreed that a coordinated policy response is needed

Alex Karp, CEO of Palantir | Credit: Getty

Alex Karp, CEO of Palantir, argues that AI will reshape jobs, as tech firms shift toward skills-based hiring and human-AI collaboration becomes the norm

Dichotomies at work

(Too) many dichotomies

- Manufacturing/services ✕
- Manual/cognitive ✕
- Routine/abstract ✕
- Exposed/not exposed
- **Codifiable/tacit**
- **Expert/generic**

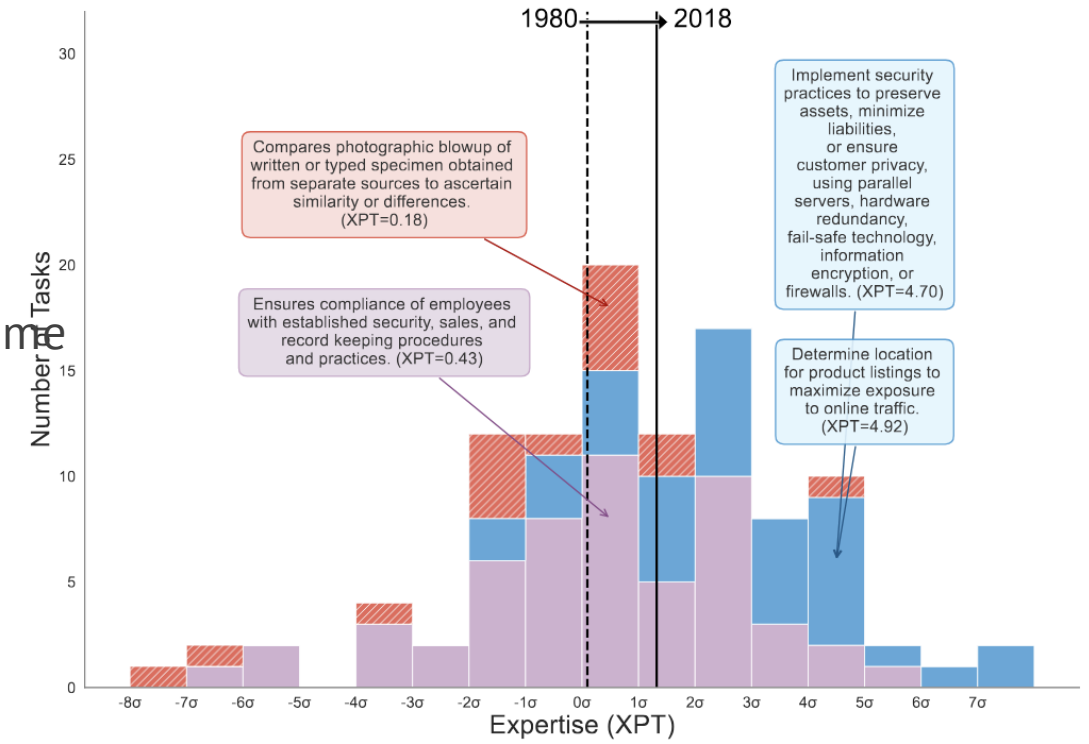
	Codifiable	Tacit
Expert	Programmer Tax consultant Lawyer (discovery)	Systems analyst Manager Lawyer (in court)
Generic	Retail assistant Street cleaner Call centre agent	Social care assistant Postal worker Call centre manager

Task bundles change with AI

Autor & Thompson 'Expertise' 2025:

- Expert jobs more likely to get automated
  - Crossing guard vs Air traffic controller
- Occupations shed routine, gain abstract tasks over time
- Automation can replace some expert tasks
  - → N up, w down
- Automation can augment other expert tasks
  - → N down, w up

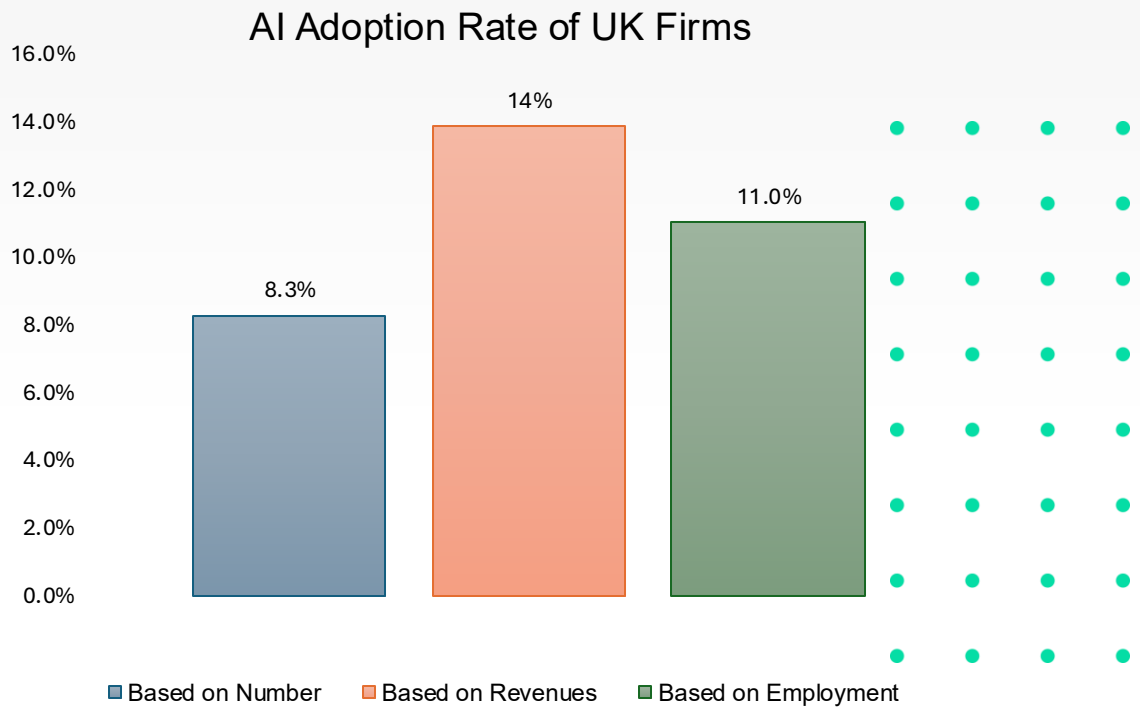
What about organisations?



.. Management support occupations: tasks added, expertise added

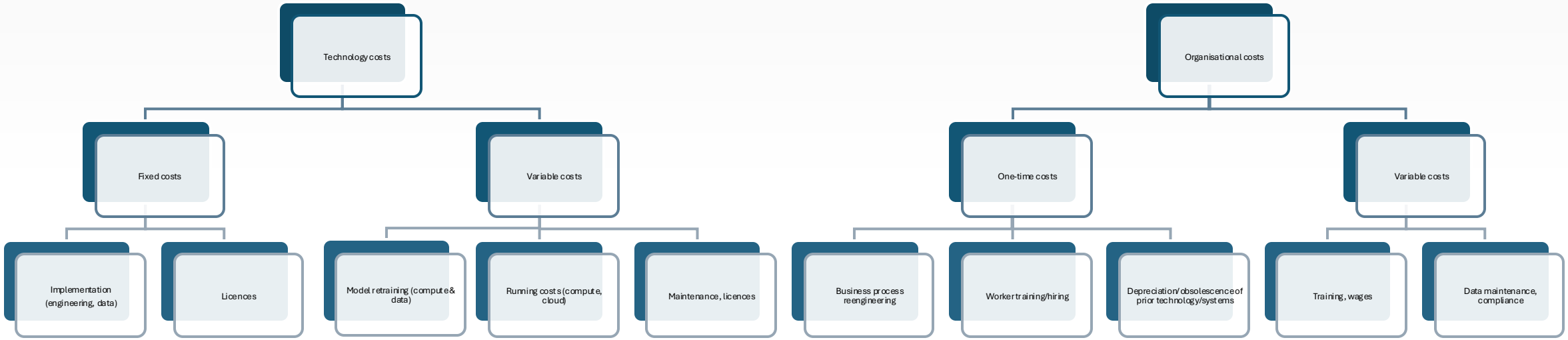
How much is AI being used?

- Correlated with GDP/capita
- Tech sector biggest users
- Surveys cover extensive margin
- We don't really know



Source: 20203 Management and Expectation Survey, Office for National Statistics, UK

AI use is costly



Organisational barriers

- Productivity as cost or operational efficiency – easy-to-quantify KPIs
- Short term gain/cost-savings vs strategic innovation
- AI seen as source of incremental rather than radical improvements
- Organisational silos
- Limited technical understanding on boards
- Need for change management/employee involvement
- Decision-making costs: multiple stakeholders, risk aversion.
- Operational disruptions: running old & new systems in parallel, cultural resistance, coordination gaps.
- Misallocation of resources: sunk costs, abandoned projects, shifting strategies.

My lightbulb moment…

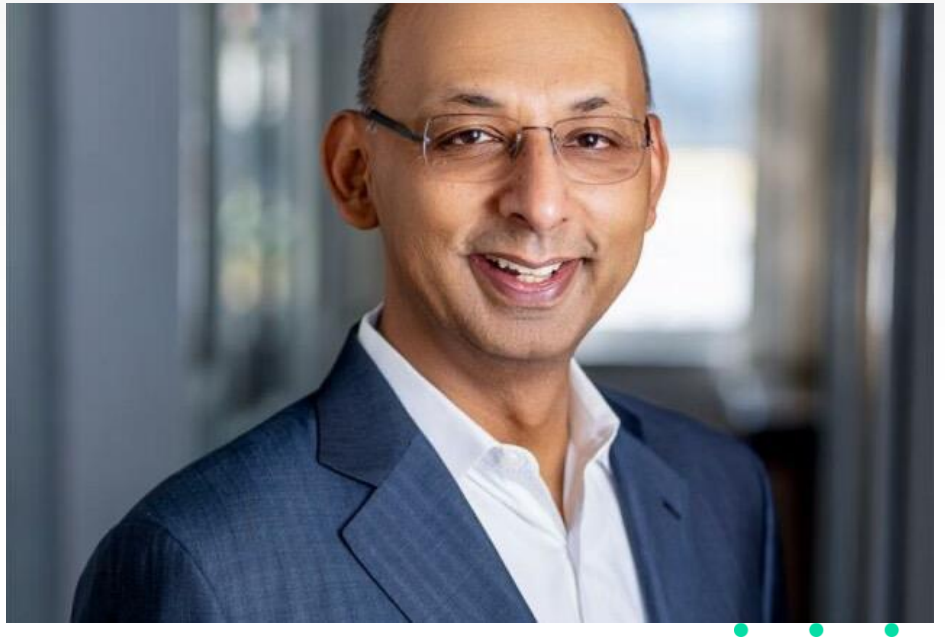
9 July 2025 – WIPO Intangible Investment Highlights

“Dell’s supply chain is its key intangible asset”

“Last year Dell’s revenue rose and its opex fell for the 1st time ever”

“Organisational capabilities are a sustained competitive advantage”

“AI means there is a challenge in measuring these capabilities”



Vivek Mohindra, Dell’s SVP & advisor to CEO

https://webcast.wipo.int/video/OTHER_WORLD_INTANGIBLE_1_2025-07-09_AM_125454 at 1:07:07

Process innovations drive productivity

Date	Process innovation	Description
Early 19th century	American system of manufactures	Use of interchangeable parts in mechanised production processes
Mid-late 19th century	Factory system	Capital-intensive large scale (steam-based) production involving division of labour
Early 20th century	Assembly line (Fordist production)	Reorganisation of production in sequence of small steps, using affordances of the electric dynamo
Late 20th century	Lean manufacturing/Just-In-Time (The Toyota Way)	Elimination of waste and time spent in production, using new control software and computer-aided design and manufacturing, and authorising workers to control quality on the assembly line
Late 20th century	Production networks	Division of production into sequence of increasingly specialised activities more of which could be outsourced, using 1980s onward advances in ICT technologies.

How will AI affect organisations?

Generative AI will affect processes/structures F(I)

… just like digital: supply chains, delayering, platforms…

GenAI may substitute for *routine* cognitive tasks

GenAI may capture *tacit/expert* knowledge

Theoretical debate:

- GenAI *centralises* production
- GenAI *decentralises* production

Image: Nano Banana

De/centralising?

Decentralising: *"Machine learning systems learn from data rather than being programmed step by step, uncovering patterns and rules that neither humans nor machines can easily articulate. In this sense, machines are becoming more human-like: they, too, now "know more than they can tell.* (Chatterji et al 2025).

Centralising: Codifying previously tacit, dispersed knowledge will empower the centre over individuals or divisions (Brynjolfsson & Hitzig 2025).

Does the AI augment or replace expertise?

Image: Nano Banana

Components of intangible assets

Table 2

Intangible Capital: Broad Categories and Types of Investment

Digitized Information	• Software • Databases
Innovative Property	• R&D • Mineral exploration • Artistic, entertainment, and literary originals • Attributed designs (industrial) • Financial product development
Economic Competencies	• Market research and branding • Operating models, platforms, supply chains, and distribution networks • Employer-provided training

Currently included in GDP

Source: Authors' elaboration of Corrado, Hulten, and Sichel (2005, 2009).

An AI-friendly classification of intangibles?

"Knowledge capital" (codified, alienable)	*Purchased R&D services* *Mineral exploration, spectrum rights* *Artistic, entertainment & literary originals* *Standardised software* *Data* Brands Attributed (industrial or product) designs Platform technology, apps, algorithms	Organisational value enabled by legal rights such as copyright and patents, or technical excludability; i.e. value is created or enhanced by market power. Market prices may exist.
"Organisational capital" (tacit, firm- and context-specific)	*Own-account R&D* Professional service product development Custom software Predictive analytics Market and customer insight Operating models Management capabilities Supply chains, distribution networks (relationships)	Organisational value created by firm-specific capabilities; context-dependent; often tacit; inalienable. Hard to value.

Although classification is arbitrary...

KC & OC categories might shift:

- Attributed designs - personalisation
- Platform technology, apps, algorithms - customisation
- Professional service product development - codification
- Custom software - codification
- Predictive analytics - codification

Where does an AI agent go?

Image: Nano Banana

Measuring organisational capital

Table 4. Indicators of organisational capital

	Indicators	Potential data sources
Operating models	Number of divisions; number of levels in organigram; frequency of reorganisation. Expenditures on hardware, software; on services eg cloud use, AI models.	Corporate reporting; Firm-level microdata on expenditures; Data on generative AI use?
Networks	Strategic partnerships; number of suppliers; number of distributors; Length of relationships.	Corporate reporting; Company websites; Transactions data
Management capabilities	Board level AI expertise; Use of KPIs internally and externally	Job postings; Management quality surveys

[To be developed more]

Measuring time use at work

- 'Exposure' is a poor metric
- AI may free people from routine cognitive tasks
  - Formatting references
- AI may replace some expert tasks
  - Writing code
- AI may enhance quality of some tasks
  - Better ideas for papers
- New business models? Eg professional services, education

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Thank you

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