

# The Rise of the Engineer: Inventing the Professional Inventor During the Industrial Revolution

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## This paper's contribution

1. Documents quantitatively the development and content of the engineering profession during the Industrial Revolution.

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We learn several new facts about engineers:

- ▶ What they did (designed and built, but also consulted and advised)
- ▶ They became important during the Industrial Revolution
- ▶ They filed more patents than other patent holders
- ▶ Their patents were better and their work was more diverse and collaborative
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We learn this through the combination of several datasets, careful manual labor and multiple empirical methods.

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  - ▶ Intuitive and fits well into existing theoretical accounts.
  - ▶ Appealing: not a simple causal effect, but interaction with multiple factors.

## Two sets of comments/thoughts/questions

1. Who/what were the engineers of the late 18th century?
2. What was their role in the Industrial Revolution?

# Who/what was the “engineer”?

What we learn:

- ▶ **Timing:** they start becoming important around 1770.
- ▶ **Characteristics:** they are more innovative than other inventors, active in more sectors.
- ▶ **Within-person evolution:** adopting the label of “engineer” is associated with more innovation.



# Who/what was the “engineer”?

How to interpret the information?

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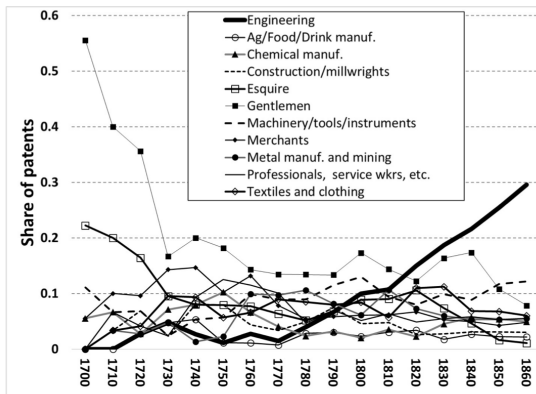
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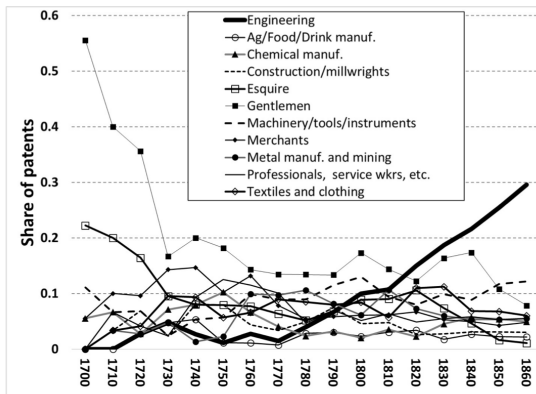
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- ▶ “Engineer” is a term more vague than eg “textile manufacturer.” Is it a catch-all term for inventors of the Industrial Revolution? Was it the term to label any diverse and productive innovator during this time?
  - ▶ Does patent data of occupation switchers allow us to see whether re-labelling follows increase in number, diversity or quality of patents?
- ▶ Rise of a pre-existing profession, or a label for a new type that appears during this period?

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- ▶ What happened to all the gentlemen?
- ▶ Can within-person analysis provide insights on the occupations that provided most engineers?

# What was the role of engineers in the Industrial Revolution?

Framed as causal in most of the paper.

- ▶ “Why was the Industrial Revolution successful at generating sustained growth?”
- ▶ “Moreover, the emergence of professional engineers as a key group of inventors appears to have been a largely British phenomenon, which may help explain why Britain pulled ahead of other European countries during this period.”

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What evidence is there for this framing?

# What was the role of engineers in the Industrial Revolution? – Theory

- ▶ Technology improves slowly, through serendipitous innovation by skilled workers.
- ▶ Investing in professional skills is only profitable after technological innovation surpasses some threshold.
- ▶ Thereafter feedback loop.



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Incorporates two factors:

- ▶ Institutions: researchers can reap rewards of innovation.
- ▶ Supply of craftsmen: skilled labor can build the goods that result from innovation.

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Researchers are specialized workers who pay a fixed cost to enter this profession.

- ▶ Does this fit with the diversity of technologies engineers were engaged in?

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How does innovation and growth correlate over time by sector?

# Conclusion

- ▶ A paper that documents many new patterns shedding light on innovation process during Industrial Revolution.
- ▶ Did the changing nature of the engineering profession drive sustained economic growth?
  - ▶ Perhaps. Linking theory to empirical tests could help support the claim.
  - ▶ Perhaps not necessary for the paper to be important.