

Highest Leverage Work Over Time

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Christopher Kalitin Blog (<https://ckalitin.github.io/posts/highest-leverage-work/>)

Where would I have been working 10 years ago if I'm chasing paradigm shifts?

Useful to list out all of these events to get some certainty that there will always be another thing

Highest leverage work occurred during paradigm shifts, you have the most impact early on.

I'll need to put these into a few categories:

- Extremely early research (idk much about how to be useful here)
- Paradigm shift of existing industry
- Extremely useful things to contribute to (eg. Columbus, Magellan, etc.)

The lower you go the higher the potential of your work? Also the harder it is.

I also need to think about the future!!

Paradigm shifts:

- Wood to coal
- Coal to liquid hydrocarbons
- Internal combustion engine
- Diesel engine
- Electric drives in factories
- Steam engines (Watt)
- Steam turbines
- Electric power generation
- Transformers / distribution?
- Automobiles
- Aircraft
- Steam ships
- Nuclear power

- Solar cells
- Blast furnaces
- Water pumps in coal mines
- Oil powered ships in the UK under Churchill
- Boom in oil drilling in the US
- Fracking?
- Electric cars
- Liquid propellant research
- Semiconductor research (dram, microprocessors, transistors, mosfets, diodes, integrated circuits, etc.)
- Haber Bosch Process
- Extraction of guano and nitrates from South America
- Synthetic rubber
- Early launch vehicles / satellites
- Reusable launch vehicles
- Telecommunications
- Radio
- Early electricity research (Edison to Joule)
- Early computers (ENIAC, Bletchley Park, etc.)
- Early software (Fortran, COBOL, etc.)
- Early internet (ARPANET, etc.)
- Early AI (Perceptrons, etc.)
- Early financial systems (Gold standard, Bretton Woods, etc.)
- Merchantilism to Capitalism
- Early banking systems (Medici, etc.)
- Early stock markets (Amsterdam, London, etc.)
- Early insurance systems (Lloyd's of London, etc.)
- Early trade routes (Silk Road, etc.)
- Early exploration (Magellan, Columbus, etc.) YES THIS ONE IS GOOD!
- Early colonization (Spanish, Portuguese, etc.), who doesn't want to settle new lands

- Agriculture improvements over time (crop rotation, selective breeding, manure, steel mold board plows, etc.)
- Early wind/water mills
- Early metallurgy (bronze, iron, steel, etc.)
- Cellphones
- Smartphones
- Satellite communications (Telstar to Starlink)

Grok:

Prehistoric:

- Foraging to Agriculture
- Domestication of Animals
- Wheel
- Writing

Pre-industrial:

- Water and wind power
- shift from wood to charcoal
- With charcoal, metallurgy
- Early exploration and trade

Industrial:

- Wood to coal
- steam engine
- blast furnaces
- electrification
- internal combustion engine
- telegraph <- copilot
- baber-bosch
- shift to liquid hydrocarbons

Modern / emerging:

- Nuclear
- semiconductor
- reusable launch vehicles
- renewable energy
- EVs
- fusion

More:

- Early internet / telecommunications
- fracking and shale oil boom
- smartphones and mobile computing

ChatGPT:

Pre-industrial:

- control of fire
- draft-animals
- overshot water-wheels and mills
- vertical-shaft windmills
- ocean-going sails

Early chemical and metallurgy:

- gunpowder
- coke-fired blast furnaces
- bessemer steel

transport & prime movers:

- railways (wow I forgot about this one!)
- oil-fired steamships under Churchill
- Turbojet / turbofan engines

- combined-cycle gas-turbine plants (marginal)

lighting, heat, motion (electricity):

- coal-gas street lighting
- Incandescent -> fluorescent -> LED lighting
- factory electrification & individual motors
- Refrigeration and air conditioning
- Hydroelectric dams

Agriculture & food energy:

- Mechanised tractors (diesel engines)
- Synthetic nitrogen fertilizers

High-efficiency and modern frontiers:

- LED solid-state lighting
- Li-ion batteries
- Utility scale wind
- Grid-connected solar PV learning curve

ChatGPT on 1960-2010 (Grok is slop now):

1960s:

- Planar integrated circuit
- Containerised Shipping
- ARPANET

1970s:

- Intel 4004 microprocessor

1980s:

- TAT-8 transatlantic fibre-optic cable, 40k voice circuits
- Utility-scale combined-cycle gas turbines

1990s:

- Commercial Li-ion batteries
- Mosaic/Netscape web browsers
- GPS
- Human genome project?

2000s:

- Horizontal drilling and hydraulic fracturing
- iPhone
- Cloud computing <- copilot

2010s:

- AlexNET
- F9 landing
- 5G

2020s:

- mRNA
- Fusion ignition
- ChatGPT
- Starlink

Future (the reasonable ones it comes up with):

- Fault-tolerant quantum computing
- Direct air capture of CO2
- Starship
- Fusion It gave tons of slop

Now, I'll use my brain to make a list for the future:

Storage: <https://x.com/johnfreehayes/status/1934312768070639651> (<https://x.com/johnfreehayes/status/1934312768070639651>)