Debate Bibliography

1.

Wikipedia. (0). *Industrial Revolution*. [Online]. Wikipedia. Last Updated: 0. Available at: https://en.wikipedia.org/wiki/Industrial\_Revolution [Accessed 10 October 2023].

Wikipedia. (0). *Second Industrial Revolution*. [Online]. Wikipedia. Last Updated: 0. Available at: https://en.wikipedia.org/wiki/Second\_Industrial\_Revolution [Accessed 10 October 2023].

The first two references were used as building blocks on which to build the argument. I wanted to see what kind of machines had been created and the impacts on employment at those times. Though none of that featured in my argument, I retain the information as possible counter arguments in trying to anticipate what the other group may argue. These counter arguments have been included in my debate script notes below.

2.

Nicolas Costa. (2023). *Why the Human Brain Struggles with Exponential Patterns? And why it matters when it comes to corporate transformations*. [Online]. LinkedIn. Last Updated: August 29. Available at: https://www.linkedin.com/pulse/why-human-brain-struggles-exponential-patterns-matters-nicolas-costa/ [Accessed 10 October 2023].

Background information in human perception of exponential growth which I remember hearing somewhere was a major case against AI.

3.

Latest Lesson. (0). *Exponential Effects: Humanity's Biggest Blind Spot*. [Online]. Latest Lesson. Available at: https://latestlesson.com/exponentialeffects.html#tab1 [Accessed 10 October 2023].

I mentioned in my statement the evolutionary human blind-spot for exponential growth. I had thought to develop the point better but finally decided that since my topic was the economic impact which AI will have, it would be more beneficial to focus more on that specifically. Time constraints did play a part in this decision.

4.

Darina L. (2023). Rise Of Robots - Jobs Lost to Automation Statistics in 2023. [Online]. Leftronic. Last Updated: 07 March 2023. Available at: https://leftronic.com/blog/jobs-lost-to-automation-statistics/ [Accessed 11 October 2023].

On this website, I found well referenced statistical data and forecasts for the impact automation has had and will have, respectively, on employment.

5.

David Rotman. (2013). How Technology Is Destroying Jobs. [Online]. MIT Technology Review. Last Updated: 12 June 2013. Available at: https://www.technologyreview.com/2013/06/12/178008/how-technology-is-destroying-jobs/ [Accessed 11 October 2023].

Information stated in my debate argument on the correlation between human labour and productivity from World War two until present.

6.

Wikipedia. (2023). 2023 Writers Guild of America strike. [Online]. Wikipedia. Last Updated: 27 September 2023. Available at: https://en.wikipedia.org/wiki/2023\_Writers\_Guild\_of\_America\_strike [Accessed 11 October 2023].

Background on the reasons for the screenwriter’s guild’s strike this year which I ultimately decided to omit from my statement in the debate.

Ben Child. (2023). AI is coming for Hollywood scriptwriters – this is how they are going to do it. The Guardian. [Online]. 12 May, 2023. Available at https://www.theguardian.com/film/2023/may/12/ai-artificial-intelligence-generating-screenplays [Accessed 11 October, 2023].

Further reading on the Screenwriter’s Guild’s strike this year which I did not include in my debate but did provide general information and inspiration for other debate topics. It also provided an overview of just how broad the impact of AI’s effect on employment may be, in this case, affecting even the arts.

7.

Erin Winick. (2017). While U.S. Workers Fear Automation, Swedish Employees Welcome It. [Online]. MIT Technology Review. Last Updated: 28 December, 2017. Available at: https://www.technologyreview.com/2017/12/28/146551/while-us-workers-fear-automation-swedish-employee [Accessed 12 October 2023].

I remember reading about the Swedish answer to job loss caused by automation in manufacturing. According to the article, no other country has responded as the Swedes have and from this, I inferred that no meaningful action has been taken to mitigate the issue. Though I realise that legislation exists I would argue that it is underdeveloped, underenforced and little known, therefore, not meaningful.

8.

David Rotman. (2017). The Relentless Pace of Automation. [Online]. MIT Technology Review. Last Updated: 13 February, 2017. Available at: https://www.technologyreview.com/2017/02/13/153772/the-relentless-pace-of-automation/ [Accessed 14 October 2023].

The above reference provided information about the impact that self-driving cars will likely have on industries related to the automotive industry.

Podcast Bibliography

1.

Texta. (0). *Unleashing the Power of AI: The Essential Hardware Components You Need to Know About!*. [Online]. Texta. Last Updated: 0. Available at: https://texta.ai/blog-articles/unleashing-the-power-of-ai-the-essential-hardware-components-you-need [Accessed 27 October 2023].

Chintan Shah. (2023). *8 Key components of Artificial Intelligence*. [Online]. Promact. Last Updated: 29 January 2023. Available at: https://promactinfo.com/blogs/8-key-components-of-artificial-intelligence/ [Accessed 16 October 2023].

rb. (2021). *AI Hardware – What They Are And Why They Matter In 2023 [Updated]*. [Online]. rb. Last Updated: 3 January 2021. Available at: https://roboticsbiz.com/ai-hardware-what-they-are-and-why-they-matter-in-2020/ [Accessed 18 October 2023].

The above three references I read to investigate the area of hardware, in which I would have little knowledge. This lead to the outline of our podcast which attempts to include hardware developments where possible.

2.

Wikipedia. (0). Field Programmable Gate Array. [Online]. Wikipedia. Last Updated: 0. Available at: https://en.wikipedia.org/wiki/Field-programmable\_gate\_array [Accessed 18 October 2023].

Wikipedia. (0). Tensor Processing Unit. [Online]. Wikipedia. Last Updated: 0. Available at: https://en.wikipedia.org/wiki/Tensor\_Processing\_Unit [Accessed 18 October 2023].

These Wikipedia articles about processing power hardware, I studied to help other members of the team who were having trouble including hardware in their research.

3.

Veedrac. (2021). Moore's Law, AI, and the pace of progress. [Online]. Lesswrong. Last Updated: 11 December 2021. Available at: https://www.lesswrong.com/posts/aNAFrGbzXddQBMDqh/moore-s-law-ai-and-the-pace-of-progress [Accessed 19 October 2023].

Though Moore’s law did not directly feature in neither our podcast nor our debate, the article did serve to highlight the exponential nature of AI’s growth by proxy of the law referring to transistors in microprocessors.

4.

Saqib Jang. (2023). The networking imperative for AI applications. [Online]. TechTarget. Last Updated: 9 June 2023. Available at: https://www.techtarget.com/searchnetworking/post/The-networking-imperative-for-AI-applications [Accessed 19 October 2023].

This article highlighted the importance in network developments to the enablement of AI.

5.

Wikipedia. (0). Network Switch. [Online]. Wikipedia. Last Updated: 0. Available at: https://en.wikipedia.org/wiki/Network\_switch#References [Accessed 19 October 2023].

Seatech. (2023). A Journey Through the History of Network Switches. [Online]. Seatech. Last Updated: 12 July. Available at: https://www.seatech-eg.com/post/a-journey-through-the-history-of-network-switches#:~:text=With%20the [Accessed 19 October 2023].

RS. (0). Everything You Need To Know About Fibre Optic Cables. [Online]. RS. Last Updated: 0. Available at: https://ie.rs-online.com/web/generalDisplay.html?id=ideas-and-advice/fibre-optic-cables-guide [Accessed 19 October 2023].

Wikipedia. (0). Remote Direct Memory Access. [Online]. Wikipedia. Last Updated: 0. Available at: https://en.wikipedia.org/wiki/Remote\_direct\_memory\_access [Accessed 19 October 2023].

The above 3 links Iused to gather specific information about hardware advancements in networking.

6.

Johnson-Groh. (2022). What is a quantum network?. [Online]. Symmetry. Last Updated: 26 January 2022. Available at: https://www.symmetrymagazine.org/article/what-is-a-quantum-network?language\_content\_entity=und [Accessed 20 October 2023].

With a view to emerging technologies I thought it important to read about and mention quantum computing and quantum networking.

Debate Script:

Good morning, Ronan Smyth is my name.

1. After WW2, it was noted that an increase in labour lead to an increase in production.
2. By 2000, the rules had changed, due to machine driven automation, increased manpower no longer implied increased output. Then in 2011 it emerged that a decrease in labour normally boosts productivity. In 2023, this issue has compounded exponentially.
3. By 2017, 1.7m jobs had been lost to automation. Between 75m & 375m are speculated to be lost by 2030. What would 2060 look like, even at the more optimistic rate?
4. This is happening now. Meaningful regulation or government intervention is non-existent.
5. Although potential the human suffering is unthinkable, it’s not the only likely economic fallout.
6. Self-driving cars will make motor-insurance companies obsolete. Insurance firms are financial cornerstones of most developed economies the collapse of which would result in catastrophic recession. Insurance is one of many critical industries at risk.
7. A computer program to automate tax preparation might earn millions or billions of dollars while eliminating the need for countless accountants.
8. This is happening now. Meaningful regulation or government intervention is non-existent.
9. The middle class will likely disappear and the gap between upper and lower classes will likely widen. This is not a favorable situation.
10. This will be reflected globally whereby nations who possess Ai become even wealthier than those without.
11. Trillions will need to be spent on retraining schemes and bi-lateral regulation… but likely will not be… in light of afore mentioned catastrophic recession, upper-class indifference or inequality-based global conflict… not to mention tried-and-tested human inability to plan well in the face of exponential growth… all of which have basis in modern history.

Counter Arguments

During the 1st and 2nd industrial revolutions we saw innovations principally to assist workers to perform tasks which had previously required great strength or effort. But in each case, made the workers life easier while inevitable costing a relatively small number of jobs, causing a relatively small amount of human suffering.

In 1965 Herbert Simon wrote, "Machines will be capable, within 20 years of doing any work a man can do,". Alan Turing had made a similar comment in the 50s. Most Ai architects since then agree, that sooner or later this will be true.

The principle red flag is the unprecedented exponential growth of generative ai for which Human beings have an innate evolutionary blind spot.

Lack of regulation failures: School shootings, economic crises 2008, covid pandemic, global warming.

Finally, regulation to protect economies will not arrive on time. Ai is growing exponentially. Human beings have a blind spot for exponential growth going back to our days as hunter-gatherers.

I’ll demonstrate. Imagine a grain of rice in a square on a chess board. Double the grain of rice in the next square and double that in the third and so on. By the last square on the board, you would have more rice than exists in the world. Did you see that coming?

Podcast Script:

The advent of the internet has been fundamental to Ai’s enablement. Arguably the most important facilitating factor.

Although as a concept Ai has been around for thousands of years, with automatons being mentioned throughout history and folklore going back thousands of years. And although the first Ai program, Logic theorist was developed in 1956. The drive for Ai and the funding to back it, has principally been motivated by the necessity to or the desire to deal with the huge amounts of data being gathered on the internet.

These vast amounts of data would be very difficult, very expensive, to work with or even store on a server hosted by the company gathering the data.

From this we have the advent of data centers and the increased need to access or transfer data as quickly and as cheaply possible between storage and processing. In more recent years the environment has come into focus and those priorities have expanded to include energy efficiency.

The principal use of Ai to this day is the processing of massive amounts of data now mainly stored on data centers often located far from the machines running the Ai.

As such, the development of Ai and the development of networking technology go hand in hand. Exponential improvement has been seen in all aspects of networking including hardware, software, architecture and protocols.

There has been a steady improvement in networking hardware since the 1970s.

Developments in hardware like high-speed switches and network adapters now enable Ethernet speeds of up to 100 Gigabit.

I thought that an interesting piece of hardware to mention was remote direct memory access network adapters. RDMA adapters allow [direct memory access](https://en.wikipedia.org/wiki/Direct_memory_access) from the [memory](https://en.wikipedia.org/wiki/Main_memory) of one computer into that of another without occupying their [operating system](https://en.wikipedia.org/wiki/Operating_system)s. That negates the need to copy data between memory and buffers and requires no work to be done by [CPUs](https://en.wikipedia.org/wiki/Central_processing_unit), [caches](https://en.wikipedia.org/wiki/CPU_cache), or [context switches](https://en.wikipedia.org/wiki/Context_switch), and transfers continue in parallel with other system operations.

Probably the most dramatic development in networking has been the fiber-optic cable. Just to give some idea of the time new technology may take to become mainstream; fiber optic cables were used in NORAD in 1975. It wasn't until 1996 that the first fiber-optic cable was buried under the Pacific Ocean, enabling the internet as we know it.

My road in West Donegal still doesn’t have fiber-optic internet.

Fibre Channel (FC) is a high-speed data transfer protocol providing in-order, lossless[[1]](https://en.wikipedia.org/wiki/Fibre_Channel#cite_note-fibrechannel.org-1) data transfer within and between data centers. When the technology was originally devised, it ran over optical fiber cables only and, as such, was called "Fiber Channel".

On the software side, not long ago Software-Defined Networking (SDN) has made network switches more efficient. It separates the control plane from the data plane, enabling centralized management and programmability of network switches.

The goal as always; higher speeds, higher efficiency, lower energy consumption, all the things in computing and data that has led to the development of and the increasing necessity for Ai.

Fast networking has allowed for the development of cloud computing and I’m going to pass over to Jordan now to tell us a bit about that.