The precarity engine: An alternative, incomplete history of British computing

Carl Rowlands

Premonition of a fire

> Men also, and by his suggestion taught,
> Ransack'd the Center, and with impious hands
> Rifl'd the bowels of thir mother Earth
> For Treasures better hid …

Wartime filmmaker and artist Humphrey Jennings begins his idiosyncratic but compulsive guide to the industrial transformation of Britain with an extract from *Paradise Lost*, which describes how Mammon led the angels expelled from heaven into creating Pandaemonium, the capital of Hell.[1]

This article offers an abridged history of the British computer industry as a way of seeking to understand its own contribution to Pandaemonium, and of revising some of the prevailing narratives that have surrounded the growth of electronics and computing power since the 1940s. It argues that, whilst computer technology has resulted in some remarkable innovations over the years, it is important that we consider these within the continuum of imperial and post-imperial network construction, initiated in the nineteenth century and intensified during the world wars and Cold War of the twentieth century. Though the UK now plays a subservient role in this process, it has never been a complete underdog - it has

DOI: 10.3898/SOUN:89.09.2025

always been one of the leading powers in driving quantitative assessment of the physical and social environment.

There are, of course, aspects of technological development which have been particularly successful and have probably had benign consequences - for example, within the education sector, within medical and environmental sciences and within the pioneering games industry. But this should not distract from the physical realities of overproduction and profit-driven expansion, which are now being compounded by the discourse around the rollout of Machine Learning (ML) and Large Language Models (LLMs), in what is now usually described as Artificial Intelligence (AI). The various consequences and impacts of the computer industry in Britain, taken together, demonstrate a lack of political will or social mechanism to mediate the impacts of technology. Human life in its complexity is increasingly posed as a 'problem' in search of a 'solution'.

The article concludes with an argument for a more assertive conception of the public good, and the need to find ways to realign the tech world so that it interacts with a public sphere, and empowers consideration of impact for each and every technology-related decision that is taken.

In what follows I attempt to trace patterns of development from the nineteenth-century until the present. It may assist readers to refer to the chronology outlined at the end of this article.

Imperial designs

It is difficult to separate the history of the British Empire from the history of the industrial revolution and the growth of British capitalism. And the technology that sustained the Empire is also intertwined in its story. The Empire began with mercantile trading companies and maritime routes, enabled by instruments for navigation, and increasingly precise counters of goods and material. By the time of the Crimean War in 1853, it was clear that using the telegraph for co-ordination and control would be critical. An underwater cable from Varna to the Crimean peninsula had ensured that telegraphed news of battles could reach the War Ministry in London with only a few hours delay. The laying of the first successful transatlantic cable followed in 1866. In 1872, Australia was linked to Bombay via Singapore and China, and in 1876, a link was finally laid that enabled a full imperial telegraph link from London to New Zealand.[2] The early networking of the planet had effectively been completed, and the British had established an early control over the different switches, hubs and connections.

At this point, early 'difference engines' and mechanical calculators had already emerged as part of the drive by mathematicians, often motivated not by the demands of commerce, but by the desire to reduce the amount of manual repetitive calculation, allowing them to focus on more interesting theoretical questions. Following his invention of the 'Difference Engine', Charles Babbage's 'Analytical Engine', whilst being hampered in realisation by the purely mechanical technology of the time, was notable for its introduction of the concept of an internal store, or memory. All actions of the Analytical Engine were to be strictly defined, or 'programmed'. Data items were to be represented as numbers. In other words, the engine required digitisation.[3] Ada Lovelace was quick to see that the machine could have possibilities beyond simple calculation.[4] The input method Babbage suggested, of punched cards, would later become a standard.

The 'total wars' of the twentieth century demanded yet more advances. The First World War drove breakthroughs in transistor and valve technology, and radio started to become compact enough to be provided on a more mobile basis. By the 1920s and 1930s, a clerk equipped with a mechanical hand-calculating machine could 'compute' the standard calculations required for wages, or actuarial tables.

Perhaps most famously, the innovation of radar was crucial in the Second World War and the Battle of Britain in 1940; this was another breakthrough in terms of signal technology, as well as visual display; while some of the first 'supercomputer' usage underpinned British attempts so crack German submarine cryptographic code, as symbolised by Bletchley Park and the brilliant mathematician Alan Turing. The all-electronic deciphering computer COLOSSUS - containing 1500 thermionic valves - had many of the features we would associate with a computer, but for its lack of an internal program store.[5] An advanced electro-mechanical tabulating machine was also built to support the Manhattan Project's calculations, aiding the design of the first atomic weapons.

Overall, we can say that during the period up until 1945 Britain had put itself in an excellent situation to benefit from new technologies. It was able to build to scale, using its imperial connections to obtain raw supplies of different materials, via mining, or, increasingly, drilling. It had established itself as a trusted provider of information, with many experts in tech-related subjects such as cryptography, telecommunications and electrical engineering. However, the British economy was effectively bankrupt after the efforts of the war years, and postwar research budgets were a fraction of what the US was able to offer. It is from this period, perhaps, that the formative legend of British computing was to first emerge - that of the plucky shed inventors. This can clearly be considered something of a mythology, given the developments outlined so far, and the fact that defence spending remained at very high levels.

The cradles of British post-war computing were a mixture of defence research establishments and universities. Cambridge University worked to develop a stored-program computer, which was eventually named the Electronic Delay Storage Automatic Calendar (EDSAC), largely based on an existing ambitious American design led by computer pioneer von Neumann. This used mercury delay lines to store pulses, modelled on the clarity of the wartime radar displays that had deployed the same approach. But Manchester University claims the first computer to operate with memory, the 1948 Manchester Mark One, instigated by F.C. Williams, Geoffrey Tootill and Tom Kilburn, which used conventional Cathode Ray Tubes to store information, in an architecture which allowed random access (rather than merely sequential access) to word location memory.[6] Despite its severe limitations, Margaret Audrey Bates, who was one of the leading programmers at the time, was later to write a thesis documenting her successful attempt to carry out higher-order logical reasoning using the Mark One.[7]

In order to co-ordinate and support research, the National Research Development Corporation (NRDC) had been set up in 1949. The NRDC aggressively pursued patents for the projects which it had supported, and by 1956 it had collected 733, resulting from 201 different inventions. Total receipts from the sales and licensing of these patents to the rapidly growing US corporation IBM amounted to over £125,000 - more than £2 million in today's money, and the money received was then invested in further UK research.[8]

The cold-war period was notable for the development of what would become known as a 'systems approach', epitomised by the RAND corporation. In the 1950s and 1960s this type of military modernisation meant that war games and early warning systems could be computerised, and that anti-insurgency operations, such as those undertaken in the Vietnam War, could be supported by computers that could navigate thousands of eventualities.[9]

Business machines in the postwar era

The re-election of an interventionist Labour government in 1964, after a long period of Conservative domination, seemed to signal a step-change in the pace of this digitalisation. Harold Wilson's references to the 'white heat of technology' were not intended to merely laud the capabilities of computing: he also indicated his intention to tie the technology to beneficial social outcomes:

> The danger as things are, is that an unregulated private enterprise economy in this country will promote just enough automation to create serious unemployment, but not enough to create a breakthrough in the production barrier.[10]

Wilson, alongside his Postmaster General Tony Benn, outlined the need for more scientists, more training and better education. By 1968, the initial flush of optimism in the Wilson government had long since dispelled, but there was finally a move to tie up the disparate parts of the UK computing sector: International Computers Limited (ICL), a private-sector company, was to become the biggest computer company outside the United States, with 35,000 employees.[11]

In parallel with the expansion of the higher and further education sector, the early 1970s saw the further spread of computer accessibility on campuses at UK universities and colleges. Providing terminal access and connectivity became a priority. The National Physical Laboratory network, which operated from 1969 to 1986, was the first to implement packet switching for data communications, which was then implemented in ARPANET in the United States.[12] From 1973 onwards, University College London provided the gateway between UK academic institutions and ARPANET. The UK was already deeply involved in the initiation of what would eventually become the internet.

As more people were exposed to computers as part of their education, different uses began to emerge. Games consoles, led by the Magnavox Odyssey in 1972, plugged into standard TVs, and were soon to arrive in the UK, becoming increasingly popular and affordable from 1976 onwards. By then, circuit boards, largely based on solid-state and silicon components, were encroaching into more and more households. Accompanying the growth of this new form of electronic consumerism, a growing range of specialist companies began catering to hobbyists. It is arguable that the genesis of the UK computer industry, as many would know it, springs from these hobbyists and suppliers.[13]

This is perhaps the moment at which to make a point about the role of gender in this history. Women had been deeply involved in the Bletchley Park operations during the Second World War, working on cryptography and the initial waves of post-war computer development. However, as the economy reverted back to civilian mode their presence became less visible. This under-representation is not reflective of the highly important roles that women have played as engineers and developers: rather, it reflects the fact that, after the 1940s, the discipline of computer science became steadily more homogenous. Mar Hicks has documented how the British state in the immediate post-1945 period was able to use female expertise in information processing, only to fail these women in different ways institutionally.[14] Despite this, in the late 1970s there were number of woman innovators working in the computer industry. The most common jobs for women in companies and government departments were as secretaries and typists, so they tended to be linked to early word processing and data inputting. Meanwhile the electronics hobby scene, along with university departments, was in general extremely male dominated.

In the early 1980s, at the beginning of the Thatcher period, manufacturing industry in the UK experienced an existential crisis, as company after company collapsed, a direct result of the government's adherence to monetarist economics. In the booming world of computer games, however, the lucky ones who 'struck it rich' were often seen as lottery winners. This was a time when worker co-operatives were at a peak in the UK, so it is notable that software development was so strongly based in the private sector. The computer industry epitomised the Thatcherite model. There is an argument to be made that, because the computer industry was largely founded in the late 1970s and 1980s, it has somehow preserved that ethos: this could account for its casual sexism, its sharply defined hierarchies and, amongst other things, the CEO worship that characterises many multinational companies.

The Greater London Council's proposed creation of Technology Networks, outlined in 1985 as part of a wider plan by the Greater London Enterprise Board, envisaged the development of software that would be specifically 'human centred'. This can be seen as an early, tentative, attempt to shift computing from its roots in commercial quantification and 1960s 'systems', towards prioritising health and wellbeing.[15] In general, though, the software industry may have promoted and seen itself as irreverent, but it played by market rules.

IT rollout was integral to the Wapping dispute in 1986. Technology was used by newspaper mogul Rupert Murdoch, assisted by the Thatcher government, to break the power of print workers, in the most inhumane way imaginable, via a lock-out. Word processing and desktop publishing (DTP) software had made certain jobs redundant, but the installation of new working practices was driven solely by the profit motive: there was no consideration given to its effects on workers. To refer back to Harold Wilson's speech in 1963, however: there was no doubt, in the case of the Wapping dispute, that Murdoch's moves did break through the 'production barrier' at the time. It made the Sun, the Times and the News Of The World significantly cheaper to produce.

As well as reflecting the dominant tendencies of the times, the computer industry was also feeding into British culture and accelerating its tendencies. DTP meant that the days of activists using old copiers with typed manifestos and sheets of carbon copy paper would soon be over. Newspapers and information could be disseminated professionally. And this democratised print production. Similarly, art programs democratised and simplified the production of drawings and pictures. Finally, the Atari ST home computer also played an important role in the British culture of the late 1980s. The late 1980s and early 1990s UK dance music scene owes much to the ST: MIDI sequencing was incorporated into the basic models, and the availability of hacked versions of Cubase, a professional standard sequencing application, enabled a democratisation of electronic music production.[16]

The industry's reliance on global extraction

As Kate Crawford argues, the laying of undersea cables in the nineteenth century is a classic example of the disregard for sustainability evident in the pre-history of the computer age. (This disregard was of course not confined to the technology industry: the destruction of natural resources has been a central feature of the long-term growth of capitalism and empire.) The insulation of undersea cables - from decay, and from abrasive materials on the sea bed - proved to be a challenge. The solution which was most widely adopted was to insulate cables with a form of latex derived from Gutta-percha, a tree native to Malaysia. But once this practice had been established, there was a mad rush to monetise Gutta-percha as a commodity. Whole swathes of forest were felled in order to extract as much of the latex as possible, with the destruction compounded by the relatively small amount of resin contained in each tree. Within 35 years, the tree was at the point of extinction: by then, this source of the latex had been largely exhausted.[17]

These days, the material requirements for computing, including the submarine cables which still carry the bulk of the world's data in transit, are less likely to rely on tree resin. But the industry is still dependent on the extraction of a number of rare materials, and this still has direct geopolitical consequences. And its relentless search for growth means that its appetite for such resources is exponentially increasing.

As part of the post-Thatcherite political settlement, which sees individual consumerism as a key driver of growth, user-consumers are offered the possibility to freely purchase devices, as highlighted by Alex Williams and Jeremy Gilbert.[18] But each new laptop requires a third of a tonne of CO2 in its manufacture. Approximately 190,000 litres of water are required to extract and process the materials necessary for their production. The many byproducts of their manufacture result from the mining, smelting and refining of the steel and plastics they contain, as well the, at least, 21 metals they require, many of which are 'conflict materials'.[19] These byproducts, which include radioactive waste and untreatable sludge, are often stored in barely secured pits or open quarries. The batteries of a laptop rely upon the extraction of cobalt. Solid State Drives rely upon the manufacture of caustic potash. Until 2006, and a European Union regulation, the solder in computer electronics contained 40 per cent lead.[20]

With every generation of PCs since the 1980s, corporate policy has largely operated a three-year replacement cycle. In 2005, for example, the US made obsolete an estimated 63 million computers. Based on this, an intelligent estimate for the annual number of 'obsolete' devices in the UK would be numbered in tens of millions, especially when also considering mobile telephones and tablets. Even with the most thoughtful disposal of these devices, this adds significant and socialised costs to the long-term containment of untreatable waste products. In the worst case (and widely prevalent) scenario, the plastics scatter, polluting water, soil and air, whilst the slowly disintegrating electronic waste, including poisons such as mercury and cadmium, forms deadly chemical cocktails in unmanaged landfills, affecting water tables and exposing wildlife and human populations to severe contamination. Much of this waste is exported to countries in the global south.[21]

It is quite clear that governments and businesses are some way from implementing the best-case scenario. More invidiously, the dumping of e-waste on countries in the global South is often disguised as benevolence or donations. The consequences of this, in terms of health, environment and injustice, have been well documented.[22] At the same time, given that only around 30 per cent of e-waste is currently recycled in the UK, much of this waste will end up in landfills around the country, slowly affecting its coastlines and soil quality.

Manufacturing decline: the story of Timex Dundee

The declining manufacturing role of the British computer industry is another key part of this account: its story reflects the trends in British manufacturing that began in the Thatcher era, but which subsequent governments of all hues have done little to redress. One of the rare British mass manufacturers of computers since the 1970s, Timex, in Dundee, is a good example of this decline, including in its relationship with the trend towards neoliberal globalisation.

Timex was primarily a watch manufacturer. But after the success of the ZX80, Sinclair Research approached the company to manufacture its next model, the Sinclair ZX81. Timex had two plants in Dundee: one, made up of around 60 per cent male workers, produced tools and components, whilst the other, an assembly plant, employed an approximately 80 per cent female workforce.

For the management of Timex, this was part of its attempt to diversify, at a time when the mechanical watch business was being seriously affected by the popularity of digital watches; and the diversification into electronics tended to benefit the assembly plant, rather than the component-manufacturing plant. In January 1983, management forced the issue: they closed the tool and component facility, making 1,900 workers redundant. After interventions by the Labour council, and prime minister Margaret Thatcher, 1,700 of the workers took voluntary redundancy. But in April 1983, the remaining 200 workers resisted redundancy by occupying the factory. The result was more lost orders. Eventually, all the watchmaking side of the business was brought to an end: 2,200 people lost their jobs as the facility was closed.[23]

This left the assembly plant, whose largely female workforce was responsible for the delicate work of arranging and soldering components onto circuit boards. Nearly ten years later, however, on Christmas Eve 1992, the management of the company, in a truly vindictive spirit, told the workforce that 150 temporary layoffs were necessary. After a quick ballot, a large majority of the unionised workforce voted for strike action, and the strike began on 29 January 1993. About a week later, the management struck back: they were now offering a set of altered and inferior working conditions, and a 10 per cent pay cut.

The striking workers rejected this offer and were promptly sacked: when they attempted to return to work they were locked out. Instead, the company brought in non-unionised workers, for lower wages, providing buses to get them through the increasingly angry and desperate picket lines. Finally, in June 1993, the multinational leadership of Timex decided to close the entire facility, making all workers in the remaining factory redundant.[24] This was the last major computer manufacturing facility in the UK until around 2011, when manufacture of the Raspberry Pi began, at Sony's plant in Pencoed, Wales.

A solid state? UK government support for computer technology

If there has been a genuine British technological success story, the computer literacy campaign from the 1960s to 1990s is probably it - the trunk from which the UK software industry has continued to branch. Innovation ranged from the initiation in the late 1960s of the Open University, which provided what were, at the time, very accessible degrees in Maths and Technology, through to the continued investment by universities and colleges in networked computing facilities.

The 1970s Labour government set up the Microelectronics Education Programme, covering 50 per cent of the cost of computers for schools. This enabled the introduction to children of actual computing and logic, not just gaming, and included the possibility (if a suitable teacher happened to be available) to learn some basic programming.[25] In 1979, partly in response to the spread of computers in technical colleges, the BBC Further Education department conceived the idea for a series on computer literacy aimed at the general public. BBC Enterprises then saw an opportunity to make available for sale a machine to accompany the series. In an interesting example of Thatcher-era state intervention, the Department of Industry then demanded that a British-made computer was selected. Acorn Computers moved quickly to develop a new prototype of their planned Proton machine, and this was launched in December 1981 as the BBC Micro.

Another success at around the same time was the establishment of JANET, which linked university computers together under a newly designed X.25 standard protocol. It went live in April 1984, hosting around 50 sites. By the time Mosaic was available as a browser, in the early 1990s, and other early adopters had started adapting and populating the hypertext format devised by Tim Berners-Lee, UK education systems were already providing access to what was to become the very earliest stages of the web. However, since the days of the National Research Development Council in the late 1940s, the UK government has gradually abandoned almost all other forms of intervention. The BBC, having been early pioneers of Web 2.0, have since then mostly stepped away from exploiting social media possibilities, and any chance of competing with the big American social networking platforms.[26] Indeed, since the early 2020s the BBC has closed most of its own data centres, moving the majority of its online services and archive to the Amazon Web Services (AWS) cloud.[27]

The ceding of tech sovereignty

It is striking that the new mass US platforms - Facebook, Twitter and YouTube - all came to the fore at around the same time as the implementation of broadband in most European countries, generally between 1999 and 2007. It is also interesting that the first stirrings of the current wave of internet-savvy far-right politics took place at this point; and that one of the most profound effects of the computer industrial revolution has been its impact on conceptions of identity and the self.

The dominance of these companies in the online advertising market has had a number of other impacts. One of these has been to drain local newspapers and both commercial and public service television of revenue, to the point of threatening their basic operations.[28] The Digital Services Tax, introduced in a very tentative and moderate way by Boris Johnson's Conservative government during the 2020 pandemic, was intended as a partial redress for this, but even this mild palliative measure has come under sustained attack by a Trump administration that appears to be deeply committed to its deregulatory tech allies.[29]

Another feature of this shift to providing 'Software as a Service' has been the growth of the cloud. Applications are now increasingly provided by remote data centres, which supply them on a lease basis, whereby they have to be paid for every month. This is deeply controversial for public services and the public interest: government is having to pay, on a per user basis, to continue to access and use its own data. There has been a failure to support alternative, lower-energy cloud and streaming provision, or, for that matter, cloud providers that are autonomously located in the UK, and this has led to an unhealthy dependency on US corporations. It is not only the BBC that relies on AWS: it now provides much of the UK's core information infrastructure.[30] Despite all of the earlier successes in introducing computers to schools and colleges, Britain's educational computing infrastructure now relies almost entirely upon Microsoft Corporation.

Cloud computing increases the fragility of already stressed water and energy supply networks. But computing has made critical infrastructure more vulnerable in other ways. Food, enabled by automated logistics, is increasingly provided on a 'just in time' basis, making it more vulnerable to sudden shocks.[31] And the complexity of modern financial services - enabled by algorithms - has led to an opacity which tends to disguise vulnerabilities. Crucially, the carbon emissions from data centre operations add to the crisis in global warming, and this further endangers the secure provision of basic essentials and increases the risk of climate disasters. The ongoing trade-off between security and profitability has been tending in one direction for a very long time, leading to a situation in which non-UK companies have considerable control over key aspects of its infrastructure. This is before we factor in the dangers and inherent unpredictability surrounding the use of AI within autonomous weaponry (otherwise described as drones).

It should of course be acknowledged that, whilst tech sovereignty is important, British management of digitalisation is in no way superior to systems in other countries. Probably the most outrageous example of its defects is provided by the scandal involving ICL's successor company, Fujitsu, and the sacking and prosecution of so many post office workers on the basis of the Horizon ledger software. This scandal was a direct result of the Blair government's decision, in the late 1990s, to push for the installation across the country of a buggy and largely unfinished application. Many long years of campaigning passed, and much suffering was endured, before there was finally an admission of this injustice by the post office.[32]

The UK computer industry still exists in a number of forms, but dependently, within a globalised system. In terms of hardware, there are a growing number of sites which host supercomputers for scientific and data research. On the whole, however, the UK adopts a passive role as an importer of mostly US platforms, US designs and Chinese manufactures. There are a couple of exceptions: ARM's designs remain the most prevalent RISC architecture for processors on mobile devices; and the Raspberry Pi, a small British-designed device with a RISC processor, mainly designed for embedded and hobbyist use, shows genuine potential as a next-generation modular system, and has a diverse set of uses and strong support base. In terms of software, the UK games industry still has many creative and vibrant aspects and its steady growth in importance - overtaking the film industry in terms of revenue - is still being only very slowly acknowledged. There are also strengths in programming in and around universities, primarily in the natural sciences. But successive governments have done very little to nurture national capacity, or to make UK infrastructure less dependent on US companies.

As Dan McQuillan has highlighted, since the 2024 election the Labour government has flung the doors open even further to US tech companies, in designating 'AI growth zones' - data centres that are then classified as critical national infrastructure.[33] This means that ministers can override any local planning objections. The global industry is looking for bigger data centres, with many thousands of machines, all featuring energy-intensive Graphical Processor Units (GPUs), in order to enable the execution of more generative AI and LLMs, enabling companies to train their AI sets. It seems extremely likely that copyright rules in the UK will be relaxed in order to accede to this demand.

Even if one were to accept AI as technological progress, with the associated costs seen as worthwhile, it is still quite remarkable that anyone would consider entirely and unreservedly trusting US corporations with so much critical data and infrastructure. The details of the files leaked by Edward Snowden made it very clear that commercial and state secrets, in addition to personal data, were being collated for its own purposes by the US National Security Agency. One would think that this, alongside the aggressive foreign policy of the second Trump presidency, might make the government pause for reflection on commercial considerations such as the protection of UK business and patents. This, however, has not been the case.

Tech companies have continued to work with authoritarian partners in Europe on mutually beneficial and profitable partnerships. Indeed, the 'eroded democracies' of the twenty-first century, such as Hungary or Turkey - much like other countries - would not be able function as smoothly without access to YouTube's algorithms. And it is more than possible that some of the largest tech companies will come to see their main threat as coming not from these illiberal, post-democratic regimes, but from the European Union, on the grounds of its investigations of algorithms used to customise users' 'feeds', and its requirements to declare the chemical composition of electronic products.[34] The EU is almost the only government in the world which has taken a wider view on the electronics supply chain. The UK's estrangement from the EU could be seen as serving a very specific purpose for the tech companies: a weakened post-Brexit UK is more likely to be subservient, in a desperate dash for growth in any way possible; and this, in turn, might encourage a competitor prepared to undercut EU regulations. In this sense, the Starmer government's dash for 'AI growth' is giving a lot of right-wing Brexiters exactly what they wanted.

US-based tech oligarchs have always threatened to redirect public policy (for example, the Gates Foundation), and ultimately to usurp democratic institutions and structures (for example, Elon Musk):[35] and the implicit, and occasionally explicit, ideology underpinning much business computing can nowadays justifiably be described as 'right-wing libertarian'. The historical irreverence of the computer industry is still there, but it is much more selfishly channelled. It is focused on disrupting process, but not on disrupting hierarchy.

When we consider all the ways in which our identity is defined in an increasingly tech-mediated world, the power of these algorithms to create monsters seems self-evident. They can deliberately manipulate a public mood, or even expose individuals within test groups to particular prompts. In the long term, they are capable of feeding fascism with a high-calorie diet of chaos, confusion and hatred. To refer back to John Milton's epic poem, perhaps an attempt is being made to build Pandaemonium by excavating human selves.

Conclusion

It is time to stop avoiding the questions about computer technology that have for so long been largely avoided or skipped. Who is the technology working for? Why is it being adopted, and on whose behalf? How does it benefit the British public? Whilst geopolitics has been a major factor in the development of an autonomous British computer industry, it is crucial to recognise that the computer revolution exists within capitalism. It is capitalism that enabled the 'Big Bang' financialisation in 1987; and the subsequent increased financialisation of our economy and society is now being used as a pretext for an inability to alter 'market logic'. This means that the idea of computing science and technology being harnessed to the public good is increasingly being given short shrift.

There is a general lack of controls over capital and business in the UK; and, more specifically, there is an absence of debate on the boundaries of tech - and this is being starkly exposed by the discourse around AI adoption. Industry associations are driven by commercial decision-making, rather than providing assessments of societal or environmental impact, but there is very little challenge offered to the way they operate. Yet, all the while, the Software as a Service model is accentuating dependency on proprietary technology as part of a new landlord-tenant agreement, turning public providers into renters in a privatised sphere.

In discussing contemporary conceptions of the public interest, there needs to be an acknowledgement that computing - for so long the poster child for the power of free markets and the rawest innovations - now requires very specific political direction and intervention - including regulation considerably stronger than that being currently offered by the European Union. The EU, of course, is under constant attack for acting as a block on the go-ahead instincts of Big Tech.

A number of German state governments have been making determined if gradualistic strides to adopt open-source computing alternatives.[36] More radically, Dan McQuillan has talked of the concept of 'decomputing' - establishing boundaries around the application of tech which are relational and 'presuppose limits to property, limits to technology, and limits to scarcity'.[37] This is an attempt to apply the strategies of degrowth to the tech sector.

Perhaps the most prescient warnings of the current trajectory were contained in David F. Noble's 1997 book, *The Religion of Technology - The Divinity of Man and the Spirit of Invention*, which located technologists' desire for Artificial Intelligence within a tendency towards millennial Christianity and transcendence: creation of living machines appears to offer a world beyond mortality. In parallel, the contemporary US tech oligarchs' desire for space travel and colonies on Mars can be traced back to conceptions of the Rapture: as the Earth descends into chaos and conflict, the truly worthy are allowed to ascend to the stars. Concepts lauded by Silicon Valley leaders such as the 'Dark Enlightenment' clearly specify that 'progress' requires an authoritarian state in order drive these events forward.[38]

In designing a response to these developments, there is a need to recognise that sometimes there are no 'solutions', and sometimes there is no socially or environmentally acceptable use of a technology. This runs against the explicit ideology of the British computer industry from its inception: it has always been about 'improvement' via technical interventionism. Attitudes towards AI can be understood as a gauge of technocratic futurism. The futurism of UK politicians, however, seems to be lacking in any noticeable grounding in technological literacy. In this sense, the development of computing power in Britain has inadvertently tracked the decline of political and professional elites, and highlighted their increasing inability to comprehend the way of life which they purport to defend.

Carl Rowlands has worked as a trainer and documentation specialist in the cybersecurity sector for some years. He is also a journalist and lecturer, focusing on politics, society and technology.

Chronology

	1860-1945	1945-1987	1987-present
Connectivity	-Telegraph networks -Radio -Radar -Copper cables	-Packet switching -TCP/IP -JANET -Modems -Satellites -Email	-Ethernet -HTTP -Fibre-optic -Wi-Fi -Social media -Cellular mobile networks -Messenger apps -Teams -Zoom
Platforms	-Mechanical difference engines -Electro-mechanical calculators -Ledging machines -Valve-based supercomputers (COLOSSUS)	-ENIAC, EDSAC -Manchester Mk 1 -Transistor-based supercomputers -Silicon-based mainframes (VAX/VMS, UNIX) -Diverse games consoles and home computers -IBM PCs (CP/M, MS-DOS)	-Desktop PCs (Windows, Mac) -Servers (Linux, Windows) -Cloud (Platform as a Service, Software as a Service) -Mobile devices (Android, iOS)
Dominant companies	-Submarine Telegraph Company (later Cable & Wireless) (UK) -Bell (later AT&T) (US)	IBM (US)	-Microsoft (US) -Amazon Web Services (US) -Google (Alphabet) (US) -Facebook (Meta) (US -Huawei (PRC)

Notes

1. The book was published posthumously, in 1985: H. Jennings, *Pandaemonium: The Coming Of The Machine As Seen By Contemporary Observers 1660-1886*, Picador, 1985. Pandaemonium was the capital city of Hell.

2. A.A. Huurdeman, *The Worldwide History of Telecommunications*, John Wiley & Sons, 2003, pp136-140.

3. S. Lavington, *Early British Computers*, Digital Press, 1980.

4. Mar Hicks, *Programmed Inequality: How Britain Discarded Woman Technologists and Lost Its Edge In Computing*, The MIT Press, 2017.

5. Lavington, *Early British Computers*.

6. Lavington, *Early British Computer*s.

7. J. Swinton, 'Alan Turing's Manchester - Women At The Console': https://www.manturing.net/manufacturing-blog/2019/2/12/women-at-the-console, 2019.

8. Lavington, *Early British Computers*.

9. A. Abella, *Soldiers of Reason: The RAND Corporation and the Rise of the American Empire*, Boston and New York: Mariner Books, 2009.

10. The I Paper, 'Harold Wilson's White Heat Speech', 2004: https://www.youtube.com/watch?v=vzIg5EXXu9E.

11. R. Edwards and A.Gandy, 'The Industrial Reorganisation Corporation and the 1968 re-organisation of British manufacturing', 2019: https://history.blog.gov.uk/2019/06/17/the-industrial-reorganisation-corporation-and-the-1968-reorganisation-of-british-manufacturing/.

12. D.W. Davies, 'Proposal for a Digital Communication Network', National Physical Laboratory, archived (PDF) from the original on 13 July 2017.

13. T. Lean, *Electronic Dreams*, Bloomsbury 2016.

14. Hicks, *Programmed Inequality*.

15. Greater London Enterprise Board, *London Industrial Strategy*, 1985.

16. BBC, 2019, *Everybody In the Place: An Incomplete History of Britain 1984-199*2.

17. K. Crawford, *Atlas of AI*, Yale University Press 2021.

18. J. Gilbert and A. Williams, *Hegemony Now*, Verso 2022.

19. Circular Materials, 'Raw materials in a laptop', 2019: https://circularcomputing.com/news/raw-materials-in-a-laptop/.

20. A. Wheeler, 'What Raw Materials Are Used To Make Hardware In Computing Devices?', 2018: https://www.engineering.com/what-raw-materials-are-used-to-make-hardware-in-computing-devices/.

21. B. Bongers, *Understanding Interaction: The Relationships Between People, Technology, Culture, and the Environment: Volume 1: Evolution, Technology, Language and Culture*, CRC Press 2021.

22. J. Spaull, 'World's biggest e-dump, or vital supplies for Ghana?', Sci Dev Net, 2015: https://www.scidev.net/global/multimedia/electronic-waste-dump-supplies-ghana/.

23. G. Strachen, 'Dundee Timex workers seized factory amid fight for jobs in 1983', 2023: https://www.thecourier.co.uk/fp/past-times/4040626/dundee-timex-1983/.

24. BBC Scotland, *The Rise and Fall of Timex Dundee*, 2019.

25. Lean, *Electronic Dreams*.

26. D. Hind, *Rethinking the BBC: Public Media In the 21st Century*, Commonwealth Publishing 2016.

27. M. Clark, 'Moving BBC Online to the cloud', 2020: https://medium.com/bbc-product-technology/moving-bbc-online-to-the-cloud-afdfb7c072ff.

28. 'Tech Won't Save Us, Will Google's Monopoly Be Broken Up?', 2024: https://techwontsave.us/episode/238_will_googles_monopoly_be_broken_up_w_rob_larson.

29. M. Labiak, 'UK mulls big tech tax changes to avoid US tariffs', BBC 2025: https://www.bbc.com/news/articles/c8j0dgym8w1o.

30. A. Hanton, *Vassal State - How America Runs Britain*, Swift Press 2024.

31. 'Urgent Action Needed to Ensure UK Food Security, Report Warns', *Guardian*, 6 February 2025: https://www.theguardian.com/environment/2025/feb/06/urgent-action-needed-to-ensure-uk-food-security-report-warns.

32. K. Flinders, 'Post Office Horizon Scandal Explained: Everything You Need To Know', *Computer Weekly*, 2025: https://www.computerweekly.com/feature/Post-Office-Horizon-scandal-explained-everything-you-need-to-know.

33. D. McQuillan, 'Labour's AI Action Plan - A gift to the far right', *Computer Weekly*: https://www.computerweekly.com/opinion/Labours-AI-Action-Plan-a-gift-to-the-far-right.

34. European Environmental Bureau, 'The ban on toxic flame retardant stays, chemical industry dismissed by EU court', 2022: https://meta.eeb.org/2022/03/30/the-ban-on-toxic-flame-retardant-stays-chemical-industry-dismissed-by-eu-court/.

35. On Gates, see 'Tech Won't Save Us, Don't Praise Bill Gates', 2023: https://techwontsave.us/episode/197_dont_praise_bill_gates_w_tim_schwab.

36. S. Harding, 'ARS Technica, German state government ditches Windows for Linux, 30K workers migrating', April 2024: https://arstechnica.com/information-technology/2024/04/german-state-gov-ditching-windows-for-linux-30k-workers-migrating.

37. D. McQuillan, 'Resisting AI': https://www.youtube.com/watch?v=WCnSCB19l7A.

38. J. Ganz, 'Reading Thiel's Op-Ed': https://www.unpopularfront.news/p/reading-thiels-op-ed.