

Andrei Rogobete: AI and the Future of Work

The advent of Generative AI is challenging and redefining the world of work. While exacting data on its impact remain at a nascent stage, a growing number of both private firms and research organisations have been quick to impart their early predictions. McKinsey & Co. estimates that Generative AI could add as much as \$4.4 trillion to the global economy annually, leading to profound changes in the anatomy of work, with an increase in both augmentation and automation capabilities of individual workers across all industries.¹ Goldman Sachs believes that Generative AI could raise global GDP by as much as 7% with two-thirds of current occupations being affected by automation.² At the macro level AI is poised to reshape the strengths of nation-state economies. Research conducted by Oxford University and CITI Bank found that ‘The comparative advantage of rich nations will increasingly lie in the early stages of product life cycles — exploration and innovation rather than execution or production — and this will make up a bigger portion of total employment. [...] Without innovation, progress and productivity will stall’.³

In September 2023 Microsoft launched ‘Copilot 365’, an AI-driven digital assistant that integrates Office applications such as Word, Excel and PowerPoint to enable the user to harness the capabilities of AI within their workflow. Copilot and other AI agents such as Google’s ‘Gemini’ aim to combine the use of Large Language Models (LLMs) and user generated data to greatly enhance productivity. Microsoft Chairman and CEO Satya Nadella said that ‘[Copilot] marks the next major step in the evolution of how we interact with computing, which will fundamentally change the way we work and unlock a new wave of productivity growth. [...] With our new copilot for work, we’re giving people more agency and making technology more accessible through the most universal interface — natural language’.⁴

These potentially seismic changes urge us to reconsider the fundamental nature of work. They force us to step back and ask how ought humanity shape its future relationship with work. This implicitly raises wider questions of purpose, meaning and a sense of calling that pervades the mere temporal dimension of work. From a Judaeo-Christian perspective it seeks a re-evaluation of the gift and place of human agency and responsibility within creation.

The argument of this paper is therefore twofold. First, we point out that that all technological advancements, including Generative AI, should be harnessed for the benefit and enhancement of humanity. This applies in particular to work but should not be excluded from other spheres of human endeavour such as leisure or recreation. Second, we point out that, while most technological advancements are valuable, a careful and persistent degree of discernment needs to be applied in minimising the novel risks brought on by Generative AI. A central concern here is the capacity for misuse of AI (with all the various facets that that entails), as well as the long-term risk that it presents of a destructive and dehumanising effect on its users.

Defining the Terms

It is worth starting with a brief conceptual analysis of some of the key terms. What do we mean by 'work'? How are we to delineate a 'humanising' versus 'dehumanising' effect on work? Indeed, are we mistaken in assuming any intrinsic value of work in the first place? These are all pertinent questions that require much thought and attention.

In his monograph on *Recovering a Theology of Work*, Revd Dr Richard Turnbull rightly points out that work '...is not a static concept'.⁵ Work evolves in tandem with the ability of humans to learn, pursue and engage with it, which implies an ongoing relational change in both skill and knowledge. This creative ability is, for the Christian theologian, a reflection of the *Imago Dei* that is fundamental to all of humanity. Darrell Cosden, who wrote extensively on the theology of work acknowledges that 'work is a notoriously difficult concept to define'.⁶ Cosden views human work as 'a transformative activity essentially consisting of dynamically interrelated instrumental, relational, and ontological dimensions'.⁷ Work is therefore a multifaceted concept.

If we step back for a moment and consider a more utilitarian interpretation we find some rather crude definitions of work. The Cambridge dictionary sees it as 'an activity, such as a job, that a person uses physical or mental effort to do, usually for money'.⁸ In pure physics work is 'the transfer of energy by a force acting on an object as it is displaced'.⁹ This apparent dichotomy leads us to (at least), two broad and distinct dimensions of work: 1. The physical or mental activity that usually results in quantifiable economic activity; 2. Work in relation to meaning (or semantics), the presence of a personal calling and a higher purpose that serves as an ultimate goal.

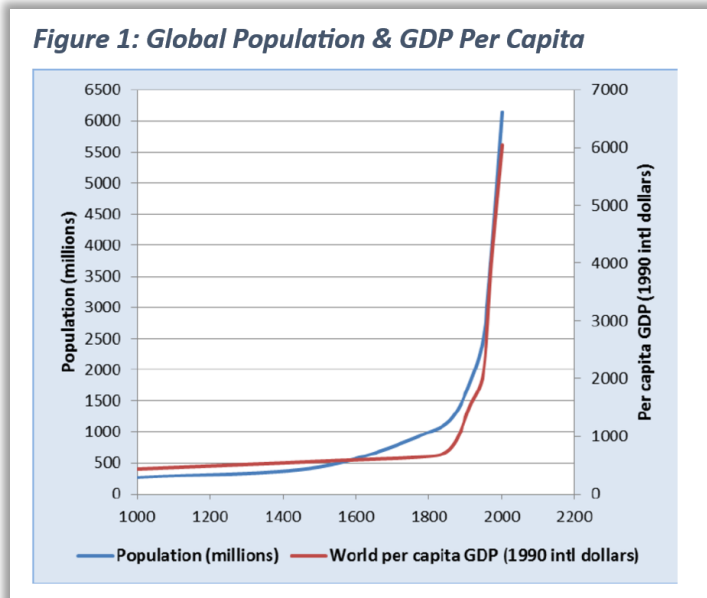
Attempts to categorise the term 'humanising' are also likely to encounter an additional array of definitional challenges. Some dictionaries see it as 'representing (something) as human: to attribute human qualities to (something)',¹⁰ others define it as 'the process of making something less unpleasant and more suitable for people'.¹¹ The common denominator in attempting to describe 'humanising' is the intention to give something qualities that make it suitable for humans to use and understand - an effort which in and of itself no doubt suffers from a degree of subjectivity.

The last major term that we will attempt to define is 'Generative Artificial Intelligence (AI)'. I have [written elsewhere](#) about the concept of intelligence and how it fits within AI, so a detailed discussion on the matter will not be included here. However, what is worth mentioning is that by 'Generative AI' we are referring to complex yet narrow AI systems that currently exist or at most are likely to emerge within the short to medium term (3-5 years). By 'generative' we are referring to AI systems that not only learn from new data but generate interpretable results based on said data – this includes LLMs such as ChatGPT3/4, LaMDA, Google Gemini and so on.

The Impact of Generative AI

There are competing narratives as to which technological changes of the modern era bear the greatest impact on work and productivity. The British Agricultural revolution of the 17th and 18th centuries saw a dramatic increase in crop yields and agricultural output which resulted in the population of England and Wales almost doubling from 5.5 million in 1700 to over 9 million by the end of the century.¹² The

arrival of the steam engine in the second half of the 18th century and the subsequent mechanisation of labour sparked the first and second Industrial Revolutions. The change to the nature and purpose of work during this time was fundamental. Europe moved from a largely agrarian-based society to one that was driven by mass production, standardisation and the development of new skills and abilities in manufacturing and scientific discovery.



One remarkable chart worth revisiting is illustrated in Figure 1.¹³ For over 1,800 years GDP per capita remained largely flat – this only changed in the late 19th century when both GDP per capita and global population experienced a sudden and unprecedented jump in both trajectory and scale. The change was overwhelmingly attributed to the transition of a workforce that had previously been accustomed to hand manufacturing and production to becoming almost entirely machine-driven. This in turn, allowed for more

effective and precise tools, a greater understanding of chemicals and alloys, and widespread availability of these to workers that previously relied solely on manual labour. Some economic historians such as Paul Bouscasse et al. (2021) estimate that the Industrial Revolution quadrupled average productivity by each decade, from around 4% up until the 1810s to over 18% from there onwards.¹⁴

Large-scale industrialisation and the rise of the mechanised factory system created fertile ground for what would later become the digital revolution (i.e. the Third Industrial Revolution). The middle of the 20th century saw the arrival of the first transistor which not only paved the way for modern computing, it more fundamentally enabled the digitalisation of information. This marked a major change in the way in which information is stored and shared, and perhaps unsurprisingly, at least in retrospect, also brought profound changes for the world of work. The first through third Industrial Revolutions represent magnificent events of human advancement that altered the course of history in ways that make the absence of their fruits in contemporary life hard to imagine. Therefore, how would Generative AI fit within such a paradigm?

The scholastic body of research in this area is embryonic. The ‘Fourth Industrial Revolution’ or ‘Industry 4.0’ coined back in 2013 by former German Chancellor Angela Merkel foresaw a future where the collective power of technologies such as AI, 3D Printing, Virtual Reality (VR), the Internet of Things (IoT), and others could be integrated and used within a (predominantly) unified system.¹⁵ Over a decade later this holistic vision has yet to fully materialise. What we are currently seeing are many of these technologies being largely used in silos rather than fully integrated systems (with a few exceptions such as smart homes). In 2020 a KPMG report found that less than half of business leaders

understood what the 'fourth industrial revolution' meant, with online searches of the term having peaked in 2019 and trending downward ever since.¹⁶

On one level the prophecies of the Fourth Industrial Revolution have yet to be fulfilled. Current research into the impact of AI is therefore reliant upon scarce present data and future predictions that are, more often than not, overhyped and peppered with unlikely outcomes. One more robust piece of research has been an intercollegiate effort between academics at the universities of Leeds, Cambridge and Sussex, which found that 36% of UK employers have invested in AI-enabled technologies but only 10% of employers who hadn't already invested in AI were planning to do so in the next two years.¹⁷ Commenting on the research, Professor Mark Stuart, Pro Dean for Research and Innovation at Leeds University Business School said that,

'A mix of hope, speculation, and hype is fuelling a runaway narrative that the adoption of new AI-enabled digital technologies will rapidly transform the UK's labour market, boosting productivity and growth. However, our findings suggest there is a need to focus on a different policy challenge. The workplace AI revolution is not happening quite yet. Policymakers will need to address both low employer investment in digital technologies and low investment in digital skills, if the UK economy is to realise the potential benefits of digital transformation.'¹⁸

These apparent roadblocks will require a concerted effort on behalf of employers and employees to actively seek and develop new skills that will give organisations the capabilities required to meaningfully integrate AI systems into their workflows. As has been the case with the industrial revolutions of the past, new technologies invariably necessitate new knowledge and training. AI Prompt Engineering is an interesting example of this. Although Large Language Models (LLMs) are built to operate via NLP (Natural Language Processing), they still require specialised training when dealing with more complex challenges or troubleshooting errors. A 'Prompt Engineer' in this sense is a trained professional that creates 'prompts' (usually in the form of text), to test and evaluate LLMs such as ChatGPT.¹⁹ Thus, a well-trained prompt engineer can extract and gain far more from LLMs than the average user.

More importantly, the skills and capabilities gap between AI systems and the end-user need to be bridged in a manner that allows for the concurrent growth of the technology as well as the flourishing of the workforce. This is all the more pertinent when we are talking about a workforce that is predicted to become increasingly reliant on AI. What generative AI has achieved thus far is to fuel a creative springboard that enabled a wider audience to imagine the possibilities (and risks) of AI tools: ranging from relatively banal features such as improved email spam filtering to uncovering disease-fighting antibodies. A report by the International Data Corporation (IDC) estimated that the use of conversational AI tools is expected to grow worldwide by an average of 37% from 2019 to 2026.²⁰ With the accelerated growth of Microsoft's ChatGPT, Google's Bard as well as other tech giants joining the conversational AI race, it is reasonable to expect that this figure may end up being higher.

Yet we do not know exactly what impact this will have upon work. There have been some early studies and working papers that suggest that AI tools are having a positive effect on employee productivity.

The National Bureau of Economic Research (NBER) recently published a paper by Erik Brynjolfsson, Danielle Li & Lindsey R. Raymond which looked at a case study of 5,179 customer support agents using AI tools. The report found that,

‘Access to the tool increases productivity, as measured by issues resolved per hour, by 14% on average, including a 34% improvement for novice and low-skilled workers but with minimal impact on experienced and highly skilled workers. We provide suggestive evidence that the AI model disseminates the best practices of more able workers and helps newer workers move down the experience curve. In addition, we find that AI assistance improves customer sentiment, increases employee retention, and may lead to worker learning. Our results suggest that access to generative AI can increase productivity, with large heterogeneity in effects across workers.’²¹

It appears therefore that while there is an overall increase in productivity, a key factor in its dispersion is dependent upon the varying degrees of employee experience and skill level, with those at the lower end of the spectrum likely to benefit more than those at the top. Another study led by Shakked Noy and Whitney Zhang from MIT looked at an empirical analysis of business professionals who wrote a variety of business documents with the assistance of ChatGPT. The study found that of the 444 participants, those that used ChatGPT were able to produce a deliverable document within 17 minutes compared to 27 minutes for those who worked without the assistance of ChatGPT.²² This translates to a productivity improvement of 59%. What is perhaps more remarkable is that the output quality also increased: blind independent graders examined the documents and those written with the help of ChatGPT achieved an average score of 4.5 versus 3.8 for those without.²³ A third preliminary study looked at the impact of ‘GitHub Copilot’, an AI tool used to assist in computer programming. The paper found that programmers who used GitHub Copilot were able to complete a job in 1.2 hours, compared to 2.7 hours for those who worked alone. In other words, task throughput increased by 126% for developers who used the AI tool.²⁴

Pursuing a Theology of Work

This provokes some wider questions surrounding morality, AI and work. One pertinent question here is not just a matter of *can* we use AI but rather *how ought* we to use AI? Indeed, how are we to best integrate AI in manner that reaps the rewards and minimises the risks? If we consider the Judaeo-Christian perspective, the obligatory prerequisite to answering these questions is a scriptural understanding of the act and role of *work*.

In the Old Testament we find several fundamental passages in relation to work. The first and perhaps most widely cited is Genesis 1:28 and 2:15 where humanity is called to ‘Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground. [...] The Lord God took the man and put him in the Garden of Eden to work it and take care of it.’²⁵ The command here is not just one of stewardship over

creation, but a calling to reflect through human capacities that which is teleologically divine: the ability to order, create, tend to, and indeed destroy (within the premise of the fall).

God himself is portrayed as a worker: 'In the beginning God created the heavens and the earth' (Gen. 1:1), and then in Genesis 1:27 we find that God 'created man in his own image'.²⁶ In this sense human work is fundamentally '...derived from the principle of God's work in creation'.²⁷ While humanity is called to mimic God's creative pursuit, it also has the responsibility to protect and care for the gift that is creation and everything found within it. Genesis 2:15 portrays the garden as an adequate place where man can fulfil his duty and calling of work. David Atkinson in his commentary usefully points out that '...work is not simply to be identified with paid employment. Important as paid work is in our society, both in providing necessary conditions for adequate living standards, and in giving a person a sense of worth in his or her creativity, it is the creative engagement with the world on behalf of God that is the really significant thing'.²⁸ This rather Barthian perspective gives significance to work in as much as it represents a conscious partaking in the establishment of God's kingdom through Christ. The objective is, according to Barth, '...the centre of God's activity. [...] [so] the centre of our human actions as Christians must be to reflect this focus on the kingdom of God'.²⁹ Work therefore encapsulates the temporal and the metaphysical. Human action is not merely a bystander to the cosmic order of events but an active partaker in shaping the journey. The Genesis account of creation therefore does not delineate between secular and pious work - all work in the garden carries some degree of spiritual value. It is important to note that the distinction between the sacred and the secular in the first place can only be made in light of the fall.

This raises another key dimension in developing a theology of work, that is, the notion of *calling* and *vocation*. For Martin Luther there are two kingdoms: the temporal and the eternal. Human endeavour operates entirely within the temporal but the tension between good and evil (or sin) cuts through and is present in both, making the struggle omnipresent. The act of human calling and vocation in the temporal therefore becomes as important and relevant as it is in the eternal. There is a continuous interplay between the two, as Richard Turnbull notes: "there is no dualism here in Luther. Vocation and calling, ethics and behaviour are the ways God is served in the temporal kingdom".³⁰

If we turn to the New Testament we find a series of examples where so-called 'secular' work is used to advance the heavenly kingdom. In Acts Chapter 16 we are introduced to Lydia of Thyratira, a businesswoman in what was considered those days to be expensive clothing or 'purple cloth' (verse 14). We are told that Lydia persuaded the apostles and used her earned resources to care and provide for Paul and Silas: 'If you consider me a believer in the Lord,' she said, 'come and stay at my house' (verse 15). Paul himself, though highly educated in the Hebrew law, maintained his work as a tentmaker (Acts 18:3) and used it to not only financially support his ministry but also to minister to others through it:

'I coveted no one's silver or gold or apparel. You yourselves know that these hands ministered to my necessities, and to those who were with me. In all things I have shown you that by so toiling one must help the weak, remembering the words of the Lord Jesus, how he said, "It is more blessed to give than to receive."' (Acts 20:33-35, RSV)

As a more anecdotal observation, it is interesting to see how Paul, though a scholar, never found himself too proud to undertake manual labour. That was likely driven by his profound understanding of what true Christological self-sacrificial love and service entails – his life as presented in the scriptures embodies it fully.

Peter, Andrew, James and John were the first disciples called by Jesus in Matthew 4:18–22. By most historical accounts they were ordinary fishermen operating within a highly competitive fishing environment that were the shores of Galilee in the 1st Century A.D. It is reasonable to assume that they possessed some degree of business acumen in budgeting, preparing orders, managing stocks and so on. Indeed, Jesus himself worked as a carpenter in his family business (Mark 6:3) and one can imagine that Joseph (and likely Jesus himself) had to utilise their skills and knowledge in budgeting, drawing projects, analysing space, preparing materials and fulfilling orders to clients – there is no suggestion in scripture that this was a *pro bono* affair.

Neither Jesus, nor any of the disciples shied away from what would today be labelled as ‘secular work’. Quite the contrary, they embodied work as: 1. An integral part of their calling before God in the temporal; and 2. A fulfilment of their God-given gifts and abilities in utilising and developing the skills needed to carry out the work. Indeed, Christ vividly illustrated the implications of this aspect in the Parable of the Talents found in Matthew 25:14–30 and Luke 19:11–27.

Conclusions: Towards a collaborative theology of work and AI?

In the introduction we mentioned the necessity and overarching aim that all technological advancements, including Generative AI, should be harnessed for the benefit and enhancement of humanity. This applies in particular to work but also to other spheres of human activity such as family time or recreation. It is also important to note that great care and discernment needs to be applied in minimising the novel risks posed by Generative AI, such as an unhealthy reliance on the technology, disinformation, fraud, and so on. Discernment in this case refers to uncovering the right way of action amidst uncertainty.

We have also seen how Judaeo-Christian teaching places the concept of *Work* as a key part of what it means to be made in the image of God and to actively partake in the eschatological realisation of creation. If work therefore represents an integral element of Christ’s redemptive transformation of the individual (and indeed the world), how does AI fit within this paradigm?

One possibility is arguing in favour of AI as a tool or digital aid to humanity. Within a Judaeo-Christian framework the role of AI ought to be one that contributes to humanity’s holistic development, be that spiritual, economic or scientific. Central to this overarching view of humanity is the promotion and protection of human dignity – a core principle of Catholic Social Thought (alongside the common good, solidarity and subsidiarity). If we are to see AI as a tool for human advancement and productivity, then it becomes part of an economic system that ought to be conducive to upholding human dignity. As Mons. Martin Schlag rightly points out, ‘Economic growth, material prosperity and wealth are without doubt necessary conditions for a life in dignity and freedom but they are not sufficient’.³¹ In this sense,

AI should bring economic benefits whilst not representing a hindrance to spiritual growth (for instance, the creation of 'false idols' or idolatry found in Exodus 20:3, Matthew 4:10, Luke 4:8), or indeed the promotion of scripturally antagonistic values such as greed, deceit, egotism or malice of any kind.

On a more practical level, the concrete steps of integrating such guideposts in AI development will have to come, at least to some extent, from the programme creators themselves. However, it is also equally important to emphasise a degree of personal responsibility that will invariably become necessary when dealing with powerful open-ended AI systems.

AI is then best understood as a gift of human creativity, yet one that can sometimes lead to unpredictable outcomes (such as black box scenarios within LLMs). Digital AI assistants therefore need to be utilised in a manner that is conducive to a harmonious synergy between work and AI tools. The aim here is to augment and transform work rather than replace it. Digital AI assistants ought to be just that: assistants built upon a foundation of ethical values that contribute to human dignity and flourishing. Bill Gates wrote in a recent article that, '...advances in AI will enable the creation of a personal agent. Think of it as a digital personal assistant: It will see your latest emails, know about the meetings you attend, read what you read, and read the things you don't want to bother with. This will both improve your work on the tasks you want to do and free you from the ones you don't want to do.'³² In March 2023 Pope Francis said, 'I am convinced that the development of artificial intelligence and machine learning has the potential to contribute in a positive way to the future of humanity. [...] I am certain that this potential will be realized only if there is a constant and consistent commitment on the part of those developing these technologies to act ethically and responsibly.'³³

The future of AI and work is important not just because of its bearing on the individual but also because of its capacity to influence societal transformations. The advent of the personal computer (PC) for instance sparked profound changes in the world of work in the 1980s-1990s. A human-centric vision of AI will require a concerted effort on the part of all parties (developers and users) to ensure that the implementation represents an enrichment to human life - and as we have seen, considerations of the meaning, value and purpose of work are of fundamental importance. Such an approach would strengthen humanity's position to reap the rewards and mitigate the risks in a myriad of areas – from creative agency and productivity to medical and scientific discovery.

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