

THE DIGITAL TRANSITION: IMPACTS AND DEPENDENCES

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INTRODUCTION

If, as stated by the Generative Artificial Intelligence Committee set up in France in late 2023¹, artificial intelligence is an unavoidable technological revolution, an essential question arises about the societal impacts and dependences that will result from it. This is the subject of this report. We will analyse its effects in the broader context of the digital transition, make some forward-looking assessments and put forward a number of recommendations.

The use of digital technologies has the potential to improve a wide range of processes and practices in a variety of areas, including teaching and learning. Isolated communities have better access to information thanks to computers and mobile phones. Another benefit of digital technology is that it makes information more accessible to individuals with barriers to access or those living with disabilities. For example, 87% of visually impaired adults surveyed believe that technology adapted to their disability is a good substitute for traditional learning aids. It is therefore important to manage and anticipate the impacts of these technologies in order to optimise their use and preserve their positive aspects.

Since the turn of the millennium, the process of digitalisation has permeated every aspect of human existence. The essayist Yves Marry goes so far as to speak of a *homo numericus* to illustrate the anthropological impact of this digitalisation of the world². While the term “digital transition” is ultimately synonymous with a significant increase in digital devices, today artificial intelligence (AI) is broadening and deepening its impact on all aspects of life. According to a 2019 OECD report, an AI system is defined as: “a machine-based system that for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations or decisions that may influence physical or virtual environments. Different artificial intelligence systems vary in their levels of autonomy and adaptiveness after deployment³.”

Some impacts and dependences are well known, for example in the financial and environmental fields, and will simply be recalled, while other, less obvious ones, in the social, ethical, political and geopolitical, democratic and sovereignty spheres, will be discussed in greater detail.

Countries have understood the historic importance of AI and have begun to think about its global governance. In October 2023, the United Kingdom hosted the first global summit on the risks associated with AI. France will follow suit in February 2025.

The questions we are going to answer are as follows:

What is the place of human, social and sovereignty aspects in the paradigm of the digital transition and the transition to artificial intelligence? How should we respond to these changes? What are some possible solutions?

We will propose some solutions to address digital and AI dependences. They are based on education, the development of critical thinking and of the relationship with truth, ethics by design, and the possible implementation of global regulation.

In the first part of our report, we will review the digital transition and AI transition dependences that have already been identified and proven. In the second part, we will discuss and analyse non-financial dependences. In a third and final part, we will put forward some possible solutions to avoid the risks associated with digital and AI dependence.

¹ The Generative Artificial Intelligence Committee was set up by then Prime Minister Elisabeth Borne to help inform government decisions and position France at the forefront of the artificial intelligence revolution. The 14-member committee, co-chaired by Philippe Aghion and Anne Bouverot, presented its report to the French President on 13 March 2024.

² Boucaud-Victoire, K. (2024, March 20). Yves Marry: "*La numérisation du monde pose beaucoup de problèmes à la démocratie*"; Marianne.

³ [OECD Legal Instruments](#).

I- THE DEPENDENCES ALREADY IDENTIFIED

1. ENDLESS NEEDS AND INVESTMENTS

According to the Worldwide Digital Transformation Spending Guide published by the International Data Corporation (IDC)⁴, global spending on digital transformation is set to grow at an annual rate of 16.1% to reach approximately US\$3.9 trillion in 2027.

The concept of smart infrastructure⁵ is gaining ground in major sectors such as energy, railways and construction. It refers to “smart” systems capable of counting and anticipating by collecting and analysing data. These can be useful in the area of maintenance, for example.

In addition, more and more equipment and facilities, such as data centres, are needed to support the digital transition. According to a report by the International Electricity Agency (IEA), the energy consumption of data centres could double between 2024 and 2026, driven by soaring data volumes and a growing reliance on AI and cryptography⁶.

At the same time, the new equipment makes the existing equipment obsolete. Technological obsolescence refers to the fact that a product that is still functional is considered obsolete due to a technological innovation in at least one of its components. This issue affects individuals and organisations alike, and obsolescence also applies to the applications that manage databases or virtual machines. If these are not regularly updated, operational performance will suffer. These processes are costly and time-consuming.

Obsolescence and constant competition raise the issue of the economic model underpinning new digital technologies, as these require endless reinvestment and renewal. This need for constant updating and upgrading represents a significant cost to businesses⁷. **Organisations need to be aware of these limitations and be able to identify and manage the useful life of technology components and applications.**

For example, technology tools in the field of education are often purchased and deployed in response to an urgent need or to fill a gap in education systems, but the long-term costs, whether in terms of usage or data storage, are not always considered. This can have a significant impact on national budgets, particularly in low-income countries. Even in wealthier countries, the funds allocated to the digitalisation of education are not necessarily well spent: in the US, for example, almost two-thirds of educational software licences go unused.

In addition to all these costs, cybersecurity requires considerable human and material investment. As Avast CEO Vince Steckler once pointed out, “[A] few years ago, the only problem we could have with our coffee machine was that it’s mistaken espresso and americano. Today, we are more afraid of [a] security breach which allows hackers to take the control of our entire house⁸.”

Companies need to anticipate and they know that if they fall behind in embracing these new technologies, the cost to bridge the ever-widening technology gap will be even greater. This can lead to serious technology debt⁹.

That said, this need for constant renewal can create opportunities and, for example, lead to local investment. In 2022, for instance, STMicroelectronics and GlobalFoundries announced a plan to expand the Crolles microchip

⁴ Editor. (2023, November 23). *Transformation digitale : le budget continuera de croître*. *La Revue des Transitions*.

⁵ Champion, A. (2019, October 14). *La « smart infrastructure », clé de notre mutation économique*. *Les Echos*.

⁶ *La demande mondiale d’électricité des data centers pourrait doubler d’ici 2026*. (2024, January 28). DCmag.

⁷ Gomane, A. (2017, October 10). *L’obsolescence technologique, un frein pour la croissance des entreprises*. *Les Echos*.

⁸ HubReport. (2019). Best of Viva Technology. <https://insights.hubinstitute.com/hubfs/HUBREPORT%20BEST%20OF%20VIVATECH%202019.pdf>

⁹ Elhaik, Q. (2018, August 16). *Trois raisons d’investir dans la technologie quand la croissance s’essouffle*. *Les Echos*.

plant in France's Isère region. Then, in 2023, Prologium chose Dunkirk as the location for its battery plant¹⁰. The Choose France 2024 summit also attracted new investments (Amazon, Microsoft, Telehouse...).

2. ENERGY AND ENVIRONMENTAL USES AND COSTS NOT YET CONTROLLED

How can technological solutions increase public satisfaction while meeting the demands of digital frugality and the public interest? More broadly, is the general call for energy sustainability compatible with the transition to AI?

New digital technologies are responsible for 4% of global greenhouse gas emissions. That is twice as much as the civil aviation sector¹¹. Data storage is a major consumer of electricity. Add to this the accumulation of electronic objects that need to be recycled in order to minimise their negative impact on the environment¹². The energy and environmental impacts of the global digital system are growing rapidly and seem incompatible with its decarbonisation. In 2021, *The Shift Project*¹³ stated that the average growth rate of greenhouse gas emissions from digital technology was around 6% per year globally^{14,15}.

Moreover, contrary to expectations, the increase in energy consumption has not been offset by improvements in energy efficiency. **To date, there is no scientific consensus to demonstrate that the digital carbon footprint can be offset by a reduction in the footprint of other sectors overall. This means that the energy cost, and therefore the environmental and economic cost, of digital technology remains an uncontrolled cost**, as sustained increases in infrastructure, ICT equipment and data flows are extremely polluting¹⁶. Data centre power consumption is clearly on the rise. The International Energy Agency (IEA) estimated this increase at 10 to 60 per cent globally between 2015 and 2020. At the European level, the Commission estimates that data centre energy consumption rose by more than 40% between 2010 and 2018, and is on track to increase by a further 20% by 2025¹⁷. And of course, with the current shift to AI, the need for data centres is increasing. The massive use of data and the global traffic of data exchanged online, which could grow from 6 to over 100 gigabytes per person per month by 2030, is not conducive to what the French call *sobriété énergétique*, i.e. energy frugality. The sheer size of new data centres is clear evidence of this: CWL1, in Cardiff in the west of the UK, is 1.4 million m², and is only the twelfth largest in the UK data centre market¹⁸. Add to this connected devices, particularly in "smart" buildings, which are growing in number. Some studies, such as the one by James Bowers published in *Polytechnique Insights* on 24 September 2021, estimate that the number of connected devices could reach 100 billion by 2030¹⁹.

In France, digital technology accounted for 2.5% of the country's carbon footprint in 2020, and 11% of national electricity consumption²⁰. Forward-looking studies point to an ever-increasing upward trend in the footprint over the decade 2020 - 2030: +45% according to the French Agency for Ecological Transition (ADEME) and the French Regulatory Authority for Electronic Communications, Postal Services and Print Media Distribution (Arcep). We note that the downward trend in electricity consumption which could have resulted from improvements in energy efficiency has not materialised. Hence the growing importance of decarbonised energy production.

¹⁰ Moreira, E. (2024, February 14). *Réindustrialisation : les grands travaux d'Emmanuel Macron*. *Les Echos*.

¹¹ *Graphic: L'empreinte carbone de nos activités numériques | Statista*

¹² Boucaud-Victoire, K. (2024, March 20). Yves Marry: "*La numérisation du monde pose beaucoup de problèmes à la démocratie*"; Marianne.

¹³ French think tank advocating the shift to a post-carbon economy. <https://theshiftproject.org/en/home/>

¹⁴ The Shift Project (2021). Environmental impacts of digital technology: 5-year trends and 5G governance. https://theshiftproject.org/wp-content/uploads/2023/04/Environmental-impacts-of-digital-technology-5-year-trends-and-5G-governance_March2021.pdf

¹⁵ The Shift Project (May 2023). *Planifier la décarbonation du système numérique en France*.

¹⁶ ADEME & Arcep, 2023; Bol et al., 2020; European Commission, 2020; GreenIT.fr, 2019; IEA, 2022; The Shift Project, 2021

¹⁷ European Commission, 2020.

¹⁸ R, N. (2022, January 17). *Focus sur les dix plus grands data centers au monde*. *LEBIGDATA.FR*.

¹⁹ Bowers, J. (2022, January 10). *Internet of Things: 50 billion greenhouse gas producers?* Polytechnique Insights.

²⁰ ADEME & Arcep, 2023; HCC, 2020

Furthermore, it is not possible to talk about the energy cost of the digital transition without mentioning the cost of embodied energy. Electronic devices are often criticised not only for the electricity they consume, but also for the energy required to manufacture them and to extract the materials from which they are made. This energy expenditure during the manufacturing process is known as embodied energy. It is difficult to evaluate its exact contribution to total energy expenditure, as the industries specialising in this sector have very often moved all or part of their operations to Asia. The preliminary studies carried out for the formulation of European regulations on the energy efficiency of products indicate that the embodied energy of fixed devices accounts for 5 to 50 percent of their operating energy consumption. The embodied energy of smartphones, which use little energy and have a short lifespan, can be five times more than what the device will consume over its lifetime. This completely changes their environmental cost. If we break down these values, we find that embodied energy accounts for around 15% of the total operating energy of digital equipment in France. If we switch to a carbon footprint approach, the weight of manufacturing becomes even greater, as it takes place mainly in China, where electricity is still a major emitter of greenhouse gases.

Also significant is the example of water. It is essential for the cooling process in data centres and for the extraction of rare metals. According to a report published by Microsoft, water consumption in data centres increased by 34% between 2021 and 2022. The company reports having consumed a total of 6.4 billion litres of water in 2022²¹. A large quantity of water is also consumed during the manufacturing process of digital terminals (computers, etc.), to purify the minerals needed to make electronic devices²². **We can live with less AI, but not necessarily with less water.**

Today, from an energy and environmental perspective, the growth of our digital systems seems difficult to sustain. According to an article by Alex de Vries of Vrije Universiteit Amsterdam published in the scientific journal *Joule* in October 2023²³, the data centres that power generative AI systems could consume between 85 and 134 terawatt-hours of electricity per year by 2027. That is roughly equivalent to the annual consumption of countries such as Argentina, the Netherlands and Sweden. **This is a perfect illustration of the paradox our societies face when they encourage people to embrace the digital transition while at the same time advocating energy frugality.** Given AI's increasing grip on society, one could even ask **whether it is possible to combine the transition to AI with digital decarbonisation** without a real energy decarbonisation policy.

The main solutions proposed so far point in several directions.

At the industrial level, the energy sustainability of the transition to digital and AI requires manufacturing processes to be managed and controlled, as its impact tends to become increasingly significant as these processes become more efficient in terms of energy consumption. This means making electronic devices more durable, repairable, reusable and recyclable. **It is also essential to design algorithms that are more energy efficient from the outset.**

The issue undoubtedly requires some form of global planning. The Shift Project suggests planning along four main lines: a quantification of trajectories and levers using quantitative and physical indicators; a systemic vision, combining sectoral roadmaps and highlighting inevitable trade-offs; coordination of actors; risk management (crises, industrial delays, etc.).

In 2023, to help drive a sustainable digital transition, the then French Prime Minister Elisabeth Borne called for an 80% reduction in emissions by 2050. The challenge is to accelerate decarbonisation without resorting to offshoring, to meet the energy needs of the digital transition without sacrificing the economy or the climate.

In this respect, it is interesting to note that while the United States is not particularly known for its propensity to regulate, it is a different story when it comes to the digital transition. This unprecedented commitment to regulation was prompted by the rapid increase in energy consumption. As early as 2015, California introduced measures to regulate energy consumption, particularly in buildings, and in 2023, Governor Gavin Newsom signed two laws requiring companies such as OpenAI and Google to disclose their respective carbon footprints by 2026.

²¹ Cheminat, J. (2023, September 11). *La consommation d'eau liée à l'IA générative inquiète*. *Le Monde Informatique*. <https://www.lemondeinformatique.fr/actualites/lire-la-consommation-d-eau-liee-a-l-ia-generative-inquiete-91508.html>

²² *One Ocean Summit : l'eau et le numérique responsable, quel rapprochement ?* Fruggr.

²³ Volume 7, Issue 10, Pages 2191-2194 (2023, October 18)

Professor Roberto Verdecchia of the University of Florence wants us to pause and reflect. In his view, industry in general, and the digital sector in particular, should “slow a bit down to start applying solutions that we have”. To paraphrase him, we should not make a new model just to improve its accuracy and speed. We should “take a big breath and look at how much are we burning in terms of environmental resources²⁴.” A way of weighing up the costs, particularly economic and environmental, of the digital transition, against its degree of usefulness in all the areas in which it is used.

Considering that the world’s seven most advanced economies, gathered as the G7 (Germany, Canada, the US, France, Italy, Japan, and the United Kingdom), together with the European Union, adopted an AI code of conduct in October 2023, **it is almost paradoxical to see so much concern about the future of generative AI when its energy sustainability is far from guaranteed**. One might even wonder whether the issue of energy sustainability will not prove to be an insurmountable glass ceiling for the digital and AI transition, or even an element that will force us to reverse it and return to less energy-intensive practices... or invent new ones.

²⁴ Tangermann, V. (2023). AI's Electricity Use Is Spiking So Fast It'll Soon Use as Much Power as an Entire Country The Byte. <https://futurism.com/the-byte/ai-electricity-use-spiking-power-entire-country>

II- HUMAN AND SOCIAL IMPACTS TO CONSIDER

1. CHANGES IN THE WORK LANDSCAPE

The constant emergence of new digital technologies is challenging the relevance of entire business sectors. While AI is not yet ubiquitous, its impact on the labour market in terms of job creation or destruction is already very evident, although views on this vary.

The introduction of AI into educational software, which happened on a massive scale during the COVID-19 pandemic, quickly raised the question of how teaching professions would change. Some believe that generative AI will soon be able to teach children how to read and write. According to Bill Gates, AI will eventually be “be as good a tutor as any human ever could²⁵”. Nevertheless, the Microsoft founder sees AI as “an assistant” to teachers rather than a replacement. However, a University of Pennsylvania survey identified teaching as one of the most threatened professions, with the difference between the two approaches being the emphasis placed on pure learning processes, which AI could potentially apply, and that placed on human interactions to create emulation, demonstrate empathy, and adapt teaching methods to the specific needs of each individual. For example, getting children interested in geography requires a different approach depending on whether they are more visual or auditory learners, but the perception of this nuance, especially in young people, comes down to human sensitivity rather than an automatic choice in favour of the approach with the best theoretical effectiveness. Similarly, the affective component of learning is still based on human interaction, which AI is struggling to replicate, although great strides are being made in simulating human emotions, as the recent example of ChatGPT 4o shows.

While new technologies appear to be generally well accepted and adopted, the digital divide, which is often both generational and related to educational attainment, does not spare the labour market. The employability of workers suffering from a form of “digital illiteracy” is becoming as much of a problem in the workplace as traditional illiteracy, and is sometimes linked to it. It is not just a generational issue. Being a digital native and social media savvy does not mean that someone will find it easy to use private and public digital platforms. The younger generations that have grown up using smartphones are not exempt from this problem. Research shows that in the 15-29 age group, 21% do not consider themselves competent to navigate government websites and 14% do not consider themselves competent to use office automation tools²⁶. Indeed, using smartphones and social media is not the same as using a traditional computer. In the digital age, this finding seems paradoxical. **The only way to prevent the digital divide from widening is to start teaching digital literacy at an early age.**

The erosion of jobs is another reality. This has been observed in many occupations, from manual workers to cashiers, etc. Some authors, such as Antonio Casilli in his book *Waiting for Robots: The Hired Hands of Automation*, or Guillaume Pitron in *L'enfer numérique*, have drawn attention to the plight of click-workers, particularly those located in countries with cheap labour and low levels of regulation. The digital transformation has brought some flexibility to the labour market. With the shift to digital, new ways of working have emerged. Today, delivery drivers can work via the Deliveroo platform, drivers via Uber, teachers via Superprof, and so on. However, with these new platforms comes the issue of casualisation of work²⁷. A report by the French Senate on the development of platform-mediated work found that the workers concerned suffer from job insecurity and that, in order to earn a decent income, they generally have to work longer hours than the current legal limit in France²⁸. **Whether we are talking about click-workers or the new occupations, it is clear that the risk of a**

²⁵ The New York Times. (2023). New A.I. Chatbot Tutors Could Upend Student Learning <https://www.nytimes.com/2023/06/08/business/khan-ai-gpt-tutoring-bot.html>

²⁶ Bamas, A., Pasquier-Avis, L., & Uhart, T. (2022, January 28). *Les jeunes Français, victimes insoupçonnées de la précarité numérique*. *Le Monde.fr*.

²⁷ OECD. (2022, November 15). Putting people first in digital transformation. https://www.oecd.org/en/publications/putting-people-first-in-digital-transformation_865f8426-en.html

²⁸ *Plateformisation du travail : agir contre la dépendance économique et sociale* - French Senate. (2021, September 29). French Senate.

casualisation of full-time work exists and that it is imperative to address it in countries committed to labour standards.

Another consequence of the digital transition in the workplace is teleworking. This profound and radical change is difficult to assess. On the one hand, it appears to be an overall positive change in terms of the work-life balance of employees and the time saved by not having to commute. On the other hand, the loss of human contact, skills acquisition and even meaning has yet to be fully assessed, although workers themselves are beginning to raise the issue²⁹. According to an article in *Les Echos*, full-time teleworking leads to an 18% drop in employee productivity³⁰. In any case, companies seem to be moving towards a return to the physical workplace. In Western Europe's business districts, the recovery of the commercial property market is evident: after a drastic slowdown in 2020, more square metres of office space were sold in 2022 than before the health crisis, and the figures for 2023 show a similar trend.

The rapid emergence of AI raises the question of its capacity not just to assist human operators, but to replace them for tasks that are destined to become increasingly complex and numerous. A tweet posted on 10 July 2023 by Suumit Shah, the founder of Dukaan, a company specialising in e-commerce, fully illustrates both the social and moral urgency of this line of questioning: in it, he boasted that he had laid off a number of employees to replace them with a chatbot. It is now an AI-driven chatbot that answers queries from the company's customers. According to the CEO, this choice has dramatically improved service performance. Another on this path is Klarna, the Swedish deferred payment specialist, which in August 2024 claimed to have cut hundreds of jobs and reduced costs since adopting AI to manage customer queries. According to the company, AI reduces the time it takes to resolve issues. Doing the work of 700 employees, it reduces the average resolution time from 11 minutes to just two³¹. The prospect of technological change destroying jobs will become a much more sensitive issue when it affects white-collar workers (lawyers, translators, teachers, etc.) on a massive scale.

So where is the truth between present-day assessments and the realities ahead? Olivier Passet, an economist at Xerfi, looks beyond employment to the relationship between AI and work, and the social and even civilisational consequences for humanity of AI's destruction of work: "Of course, the great AI fantasy, promoted by Elon Musk, is the ability to create specimens that are equal to or superior to humans in every way. So why continue to rely on man? [...] By doing away with work, capitalism would do away with its main source of energy, which is generated by human desire and all the conventions of value sharing. In the best-case scenario, all that would remain is the dystopia of universal welfare and a society entirely given over to play"³².

The jobs that seem least threatened may be those requiring the ability to manage new information and interpersonal skills. This creates a huge paradox, because with the massive spread of sophisticated technologies, human skills will become more valuable than technological ones, soft skills and analytical abilities more valuable than the ability to implement set processes. In fact, we are already seeing, particularly among managers, that transversal skills are becoming more important than job-specific hard skills: project management skills, the ability to work in multidisciplinary teams, networking and communication skills, a good understanding of corporate strategy, awareness of business and strategic issues, etc. **However, hard skills are still essential to maintain the ability to perform and manage one's activities, and in particular to ensure that the use of AI continues to serve the objectives set by humans.**

Today, AI is also being presented as a time-saver and a productivity enhancer. According to a study by the Boston Consulting Group (BCG), 60% of employees say that generative AI saves them five hours of work per week³³. Employees can use this time saved by using AI to perform more or new tasks. In this sense, AI is a real improvement, because this technology frees workers from the need to carry out repetitive tasks. According to the chairwoman of the Generative Artificial Intelligence Committee, the transition to AI will change minor tasks while enabling existing services to be improved, production volumes in a company to be increased, tedious tasks

²⁹ Kassé, R. Revel, C. (2024, June 6). The world of work in transition for youth worldwide. SKEMA Publika.

³⁰ Boone, J. (2024, February 8). Le télétravail intégral nuit significativement à la productivité des salariés. *Les Echos*.

³¹ Rivoli, L. (2024, August 28). *Klarna, spécialiste du paiement différé, réduit encore ses effectifs avec l'IA*. La Revue du Digital. <https://www.larevuedudigital.com/klarna-specialiste-du-paiement-differe-reduit-encore-ses-effectifs-avec-lia/>

³² Xerfi. *Xerfi Canal, Stimuler la réflexion sur l'économie, la stratégie et le management*. 2018 Xerfi.

³³ Durand, K. (2024, July 4). L'IA générative ferait gagner 5 heures de travail par semaine à 60 % des salariés, selon une étude. Le Figaro.

to be offloaded, and productivity gains to be achieved³⁴. In the same vein, Dominique Turcq, President of the Boostzone Institute, believes that “the role of humans is changing, not because they are being replaced by machines – a simplistic, Taylorist vision in which humans become machines performing mechanical tasks – but because we can now give them machines as assistants, enrich these, and increase the quantity and quality of the services offered in our societies. Where digital technology has so far mainly destroyed jobs through automation, AI is set to multiply jobs. It will create an upward escalator for skills.”

There is fierce competition among solutions that use AI to develop or create new business opportunities. Take online educational applications, for instance: this market did not exist ten years ago, but the success stories it has produced so far make it a thriving industry. Examples of success stories include the language-learning application Duolingo, which had 20 million active daily users in 2023, or the collaborative tool Wikipedia, which recorded 244 million views in 2021. Perhaps the most striking development has been the recent advances in generative AI, which have made educational technology tools more powerful and personalised.

Whether the visions are optimistic or pessimistic, we can only emphasise the essential role of education, vocational training and public policies in supporting this evolution of the labour market. It is a question of anticipating to manage the profound structural changes taking place. The transition period will be crucial to making the most of AI's contributions in the future, or not.

2. UNDERESTIMATED ETHICAL COSTS

The ethical costs associated with the digital transition, and in particular with the growing role of AI, are manifold. We will mention only some here, as not all of them have yet been identified. A September 2023 article by Claude Revel and David Fayon of the think tank SKEMA Publika highlights the need to find a *modus operandi* for implementing collaboration between AI and human intelligence that is both effective and morally acceptable³⁵.

The preservation of freedom is a central element of digital ethics, and one that must be constantly evaluated. Digital technology can undermine it in a number of ways. First, insidiously, through the cognitive biases that creep into algorithms, either through their programming or their data. And we are not referring to deliberate fake news here; that is a topic for later. Individuals can be *de facto* deprived of information or, on the contrary, unduly influenced. This limits their choices and deprives them of some of their freedom of thought.

Freedom is also undermined by the increasing traceability of individuals as electronic payment methods – sometimes the only option –, transport passes, online orders, etc. become much more widespread. The disappearance of cash in favour of virtual money raises the issue of the traceability of human activities, and therefore of the control society, not to mention the facilitation of fraud and trafficking on a very large scale. Digital technology is *de facto* creating new surveillance tools, in the hands of companies and governments. Possible abuses range from higher insurance premiums based on an individual's spending patterns – food, sports considered high-risk, etc. – to “social control” of the kind now seen in China and elsewhere. Electronic transactions systematically leave a digital trace, even if it is not necessarily exploited. The possible individual and collective consequences, as depicted in a number of dystopian novels in the past, cannot be ignored. From an ethical point of view, **the trend towards all-digital runs directly counter to the preservation of spaces of freedom**³⁶. These risks will obviously increase tenfold with the wider use of AI and generative AI.

Freedom of expression is also at stake. Paradoxically, it is under threat at a time when, in theory, the internet and social media offer a wonderful space in which to exchange and speak freely. In practice, however, moderation carried out by algorithms with no sense of nuance or humour, and even without any human intervention, tends to standardise the points of view presented, creating a political correctness that leads to the standardisation and “invisibilisation” of opinions: divergent points of view are not only stigmatised, but also tend to be made invisible. As a result, certain topics are virtually excluded from media coverage. There is no point in being able to argue brilliantly when dissenting voices undergo moderation that can sometimes amount to

³⁴ Commission de l'Intelligence Artificielle (2024, March 13). *25 recommandations pour l'IA en France*. elysee.fr.

³⁵ Fayon, C. R. & D. (2023, November 27). *Artificial Intelligence and Algorithms: Ethics and Fair Cooperation between AI and Human Intelligence*. SKEMA Publika.

³⁶ Fayon, C. R. & D. (2023, September 25). *Artificial Intelligence and Algorithms: Ethics and Fair Cooperation between AI and Human Intelligence*. SKEMA Publika.

ensorship or lead to self-censorship prior to posting. Essentially, this moderation can quickly lead to a uniformity of what is considered to be true, dispensing citizens from any use of their critical faculties, and thus disarming them of any ability to develop an original perspective, even though instant access to billions of sources of information and points of view should make this possible. It is not a question of denying the need for moderation – we cannot, for example, allow the glorification of terrorism – but of providing a framework designed to ensure that moderation does not undermine freedom of expression. **One solution to encourage diversity of opinion and avoid intellectual standardisation as a result of AI would be to introduce algorithms that present a certain number of random results to preserve intellectual curiosity and innovation. This requires an approach upstream of the construction of these algorithms, at the level of those who write them. Such an approach has already been thoroughly analysed and is known as ethics by design³⁷.**

It is interesting to note that young people, who are heavy users of digital technology, social media and advances in AI, are fully aware of these risks. In Youth Talks on AI, a recent survey of young people conducted by the Higher Education for Good Foundation on the use of AI in education, the ethical use of AI was highlighted as a key issue, whether in terms of introducing regulations to ensure use in line with human values, or in terms of protecting personal data. Balanced use that maintains an emphasis on human interaction and guards against the risk of reinforcing a single worldview is thus seen as a real added value, both in terms of improving teaching methods and of providing more equitable access to education.

3. LEGAL QUESTIONS

The first question concerns **intellectual property**. AI is capable of creating content, but based on elements that already exist. It works by collecting data that is often protected by copyright. AI systems are designed to imitate human intelligence. AI creates content, but is theoretically incapable of thinking outside of existing human creations (although some researchers and/or retailers dispute this). This ability to create new content from a base of pre-existing elements created by others raises the question of ownership of the content AI creates by juxtaposing elements from other creations. Could an AI creation be sued for plagiarism? Can a course, dissertation or research paper really be considered an original creation if it was produced using generative AI, based solely on the computerised compilation of pre-existing data, most often obtained without the consent of the original authors? This leaves open the question of regulation, in the same way that the use of copies of books or articles made available to students is now regulated.

At present, the creation of a work by AI is not covered by patent law, copyright law or other protections such as trademarks. **Intellectual property law must therefore evolve to fill the existing legal vacuum³⁸.**

Next, the digital transition requires **a change in professional practices**. The rate at which new technologies are being developed differs significantly from the rate at which they can be safely adopted for all possible uses. The legal system's relative distrust of electronic signatures is well illustrated by the decision of the Court of Appeal of Orléans of 8 June 2023, which emphasises that very precise and restrictive conditions must be met for an electronic signature to be enforceable against the borrower. When the decision is analysed in detail, it becomes clear that this legal precedent could be used to invalidate many contracts, as more and more of these are being signed electronically. In addition to the material aspects relating to the authenticity of the signature, this decision shows a clear fear of distortion of consent if the act of concluding a contract is made less solemn by its digitalisation. The legal value of an act performed or consent given electronically could therefore depend on whether it is considered more or less dissimilar to the same act performed or consent given materially, in real life. In our increasingly digitally-infused society, it is perhaps reassuring to know that digital technology is not – or at least not yet – at the pinnacle of legal reliability values.

A third issue is obviously **privacy**. There are numerous national and European regulations in place. Nevertheless, they are not entirely effective when individuals are asked to provide their data in almost every act of daily life and when international legislation (American, for example) clashes head-on with other legislation (Cloud Act vs.

³⁷ Fayon, D. Revel, C. (2023, September 25). Artificial Intelligence and Algorithms: Ethics and Fair Cooperation between AI and Human Intelligence. SKEMA Publika.

³⁸ Cosquer, G. K. L., & Priori, E. (2024, January 31). Opinion | IA : la propriété intellectuelle, grande oubliée ? Les Echos.

GDPR, for example). The issue of privacy arises even in seemingly unaffected sectors like education. In education, as elsewhere, digital tools often expose the data of their young users. And yet, to date, only 16% of countries have legislation in place that explicitly guarantees data confidentiality in education. According to a UNESCO analysis from July 2023, 89% of the 163 digital education tools recommended during the pandemic could monitor the children, and 39 of the 42 governments that provided online education during the pandemic promoted uses that violated or could violate children's rights.

Personal data raises another question: that of its ownership and, one might say, its usufruct. **Is personal data real property? Can it be traded like real estate?** This last point came into much sharper focus in November 2023, for example, when Meta offered Facebook users a paid subscription to prevent their data from being disclosed – something they implicitly agree to by continuing to use the free version. On this point, it is also worth noting that, back in 2017, a report entitled *“Mes données sont à moi. Pour une patrimonialité des données personnelles”*, by the liberal think tank Génération Libre, argued in favour of a proprietary approach to personal data. Today we can see that unless we make this property an inalienable right, it is in danger of being undermined by the logic of so-called Big Tech³⁹. For these multinational giants, the collection, use or even resale of personal data is the quid pro quo for free access to certain services and networks.

The adoption of the principle of ownership of all of one's personal data, even the most private, logically raises the dizzying question of the commercialisation of one's body. If virtual personal data can be sold, why not the body? This is libertarian logic taken to the extreme.

4. THE REINFORCEMENT OF INEQUALITIES

One term that comes up time and again is the “digital divide”. Digital technology was originally designed for specific military and scientific uses. Then all spheres got access to it and appropriated it in their own way and according to their own codes. Each used it, or not, according to their tastes and, above all, their means, within a spectrum of choices more complex than a clear divide between digital competence and incompetence. **The term “digital divide” is often used to differentiate the practices of “classes, and suggests an analysis in terms of deficits and relegation. This is valid, but reductive. The use of digital technology corresponds to individual or group needs and values,** with non-users who suffer from not being able to use it and therefore feel this divide, and people who make a personal choice to use it, even if it is not easy to do so in their daily lives, with a whole range of possible positions in between.

From this point of view, the emergence of new realities generated by AI gives rise to speculations, which generate both excitement and concern, and it remains difficult, at this stage, to know whether or not it is beneficial to society as a whole and, if it does prove to be so, whether it counterbalances a pre-existing sociological bias or contributes to exacerbating it. These technologies are evolving too rapidly to allow an assessment that would inform legislators and enable them to develop a viable public policy framework. Research on the impact of these technologies needs to be more generalised, using common methodologies to produce results that can be applied at a systemic level.

The digital divide sometimes refers to a more subtle form of inequality: **that which distinguishes skilled users from those who are consciously or unconsciously overwhelmed by the tool and the offering they are using.** It was originally thought that, by democratising access to knowledge, digital technology would provide all populations with the keys to understanding the discourse of experts. This is not really the case, especially as the internet does not always make it possible to distinguish between popular science, scientific approximation and biased or false statements. The emergence of self-proclaimed experts on social media during the first COVID-19 lockdown is a good example of this, as many claimed to have “done their own research”, and most had done so, in good faith, but without sufficient objectivity or critical thinking. With the transition to AI, this divide between those who are capable of questioning its output and those who believe it blindly is likely to become even wider. Take, for example, a researcher who used AI to check the completeness of the reference list for his paper: imagine his surprise when an additional article was suggested that listed him as the first author, but which he

³⁹ *In France, collectively called GAFA (Google, Apple, Facebook, Amazon), then GAFAM with the addition of Microsoft, then GAFAMA when Alibaba was included.

had never written! When challenged, the AI admitted a mistake and suggested another article. This one did exist, but it had nothing to do with the topic and the co-authors were made up! The researcher was able to identify the error, but this is unlikely to be the case for many other users. This inequality of awareness is all the more important because it is rarely perceived. Later, we will go into more detail about our solution for learning and applying critical thinking skills.

Another marker of the digital divide affecting those who are the least educated – even internet users – is **distance from the written word**. People with low levels of education use strategies to bypass the written word when using digital technology, relying on a more conversational rather than written form of communication: there are few written words, the phonetics are less formal and, conversely, they use a lot of images and quotations. In fact, the most used media are the least structured in terms of writing: not Twitter, not email, not LinkedIn, but TikTok and text messaging, with a clear preference for ‘SMS language’. **The move to online and paperless services can also be very difficult to deal with**, especially when it comes to government services or making appointments with a doctor... The fact that some people mainly use tablets and smartphones to access the internet adds to the difficulty, as not all applications are compatible with these devices. What is important for these people is to have a written record for the most important administrative procedures. So if tax declarations can only be accessed online, this poses a problem. The lack of technological reversibility in the event of a problem worries them. *Capital Numérique* explains, for example, the exclusion caused by the digitalisation of many administrative procedures, and the reassuring role of local information and assistance centres. This reality has been taken into account in France, where *France Services*⁴⁰ centres have been set up to provide free help. Another example is that some people continue to update their jobseeker status in person at the Pôle Emploi (now France Travail) agency, even though they know they can do it online, because it reduces their fear of making a mistake. **Hence the need to develop a principle of digital subsidiarity, to avoid this kind of dependence. We will come back to this later, but the principle is the preservation of non-digital solutions.**

Another source of inequality, at the international level, is the conditions under which the data is created, for example in the field of education: **nearly 90% of the content in higher education repositories including open educational resources (OER) was created in Europe and North America**. 92% of the content in the OER Commons global library is in English, even though 75% of the world's population does not speak a word of Shakespeare's language! While this language bias is less prevalent on the general internet – 55% of which is nonetheless English-speaking –, it is above all a barrier to accessing the most qualified information. Of course, we can assume that AI translation applications will solve the problem in the not-too-distant future, but this does not address the fact that, beyond language, content and the way it is conveyed are largely influenced by the unconscious cultural context of its creator. Some of the hard sciences can perhaps be conveyed accurately through translation, but for the humanities, art, literature or economics there is inevitably some loss of meaning, or at least of the subtext, when sentences are simply transposed from one language to another. For this reason, even if the means for simultaneous translation of any document becomes available to everyone, the quality of knowledge delivered online will not necessarily be the same for non-English speakers.

5. THE INDIVIDUAL AND COLLECTIVE CONSEQUENCES OF THE ALL-DIGITAL APPROACH

The general move to digital is also having a human impact, in the sense of **human interaction**. Take the digitisation of payments, for example: it is creating a world in which the vast majority of people never actually carry cash. Under these conditions, what will happen to everyday activities such as firefighters selling calendars at the end of the year, schoolchildren selling raffle tickets on Bastille Day, giving to the homeless on the street, not to mention tipping? And of course, some people feel that charitable acts should be anonymous, which is technically impossible with digital payments because they are traceable. How do you run a successful garage sale when the majority of passers-by do not have coins in their pockets to buy an item on a whim?

In addition to this direct human impact, which can be easily felt and measured in everyday life, there is a more indirect impact resulting from the fact that decisions in the interactions between citizens, consumers and businesses are increasingly made by computers which, however sophisticated, operate only on the basis of duly

⁴⁰ French Ministry of the Economy, Finance and Industrial and Digital Sovereignty. (2023, December 11). *France services : les services publics près de chez vous !* <https://www.economie.gouv.fr/particuliers/france-services>

catalogued situations, thereby removing much of the nuance and sensitivity required to take individual situations into account. In the case of school assignment, for example, the algorithms are the result of public policies aimed at promoting social diversity and reflect the vision of the designers, which is little or poorly understood by the users. This creates feelings of frustration. More than that, it gradually eliminates human characteristics. AI systems could arbitrarily filter out content that uses humour or irony, for example, or that does not reflect popular opinion. Algorithms should never be regarded as neutral, not only in terms of content, but also in terms of their human consequences.

The psychological and cognitive effects of going all-digital are probably still not sufficiently taken into account. From a public health perspective, the digital transition can have direct and indirect effects on mental health, through cyberbullying on social media for instance. A February 2023 IFOP report entitled "*L'impact du numérique sur les enfants de 0 à 6 ans*" claims that there is a link between the use of digital technology and developmental problems in children. For 9 out of 10 doctors and paediatricians, this link is well established. They explain that the developmental problems manifest as behavioural, mood and sleep problems⁴¹. However, a study by the French research institute Inserm shows that it is not so much the presence of screens that affects children's cognitive development, but when and how they use them. This study, conducted in France, followed 14,000 children between the ages of two and five-and-a-half in their homes and found that the negative effects associated with the length of time the children were exposed to screens were limited. The study emphasises that other family habits should be considered instead, such as the lack of real interactions, as these are replaced by screen time⁴². Microsoft founder Bill Gates himself spoke about this issue in a famous interview with the British newspaper *The Mirror* in 2017: "We don't have cell phones at the table when we are having a meal, we didn't give our kids cell phones until they were 14 and they complained other kids got them earlier."⁴³

If used inappropriately or excessively, digital technologies can also have **a negative impact on education**: according to a PISA survey⁴⁴, there is a negative correlation between excessive use of information and communication technologies (ICT) and student performance. According to data collected in 14 countries, it appears that the mere proximity of a mobile device distracts students and is negatively correlated with the quality of learning. What remains to be determined is what constitutes excessive use, and who will be able to define it and channel it.

There is also evidence that the intensive use of digital tools, and in particular AI, in education may lead to **a loss of individuals' ability to retain information**. One of the consequences is the weakening of intuition, which is based on memories and experiences.

In France, a bill to prevent excessive exposure of children to screens is being considered, as part of a public policy to prevent screen-related risks and limit psycho-social disorders⁴⁵.

Social media also imposes **the weight of the social norm** and a principle of 'normalisation' on the behaviour of young people around the world. In an insidious form of social control, social media is influencing the behaviour of young people by reinforcing the idea of a norm to which they must conform. According to SKEMA Publika's EYES report, young people mentioned the psychological pressure to appear "elegant" and "rich" on social media⁴⁶. Through social media, digital technology projects a perception of reality that is at odds with the reality of the world. Today, with the emergence of AI, this distortion of reality is accelerating, as the user is guided towards the norm and virtual normality by the system of algorithms. This distortion of reality by AI is all the more worrying as, with the advent of GPT-4o, it is now possible to have a voice conversation with an AI. The French legislator also addressed the issue of digital abuse in the law of 21 May 2024 on the security and regulation of the digital space. The aim is to control the risks associated with internet use, guarantee that what is illegal offline

⁴¹ IFOP. (2023, May 15). *L'impact du numérique sur les enfants de 0 à 6 ans* - IFOP.

⁴² Campistron, M. (2023, September 15). *Les écrans dangereux pour les enfants ? Une vaste étude conclut à une influence « limitée »*. leparisien.fr.

⁴³ Brouste, N. (2017, April 25). *Bill Gates a interdit le smartphone à ses enfants avant 14 ans*. *Le Figaro*.

⁴⁴ PISA is the OECD's Programme for International Student Assessment.

⁴⁵ *Vie Publique*. (2023, March 8). *Proposition de loi relative à la prévention de l'exposition excessive des enfants aux écrans*.

⁴⁶ Vallée, S. Revel, C. (2022, April 27). *EYES REPORT: Thoughts of International Youths* SKEMA Publika.

is also illegal online, and ensure that competition in digital markets is fair and equitable, to the benefit of consumers, innovation and national sovereignty⁴⁷.

⁴⁷ *Projet de loi visant à sécuriser et réguler l'espace numérique - Assemblée nationale.*

III. PREVENTING THE RISKS OF DIGITAL DEPENDENCE

1. SOVEREIGNTY AND DEMOCRACY

a) Digital transition and sovereignty

In April 2024, French Prime Minister Gabriel Attal unveiled France's new AI tool, Albert, which is set to revolutionise public services. The aim is to improve efficiency and eliminate time-consuming administrative tasks for agents, allowing them to focus on more important duties⁴⁸. This transformation of the public service could raise sovereignty issues, as the AI software runs on Nvidia's American processors. A similar sovereignty issue was highlighted in 2019 in relation to the Health Data Hub, the French government's project to centralise healthcare data. The French government had chosen Microsoft to host the data of French citizens. However, members of civil society called for an end to this partnership in the interests of sovereignty. Indeed, as an American entity, Microsoft is bound by the Cloud Act. In addition, the Foreign Intelligence Surveillance Act (FISA) of 1978 and the FISA Amendments Act (FISAA) of 2008, which have been systematically strengthened over the years, authorise the US government to compel American companies to provide access to the data of American citizens, foreign nationals and foreign companies that they host. This means that as long as foreigners use the services of US companies, the American authorities have the power to collect the foreign data without a warrant. FISA was extended for five years in 2018, and its Section 702 was extended for two years in 2023. When it comes to hosting, Bpifrance's choice of Amazon Web Services to store the public bank's data poses the same risk of compromising sovereignty. **If we are not careful, the price we will have to pay is increased dependences and the sacrifice of our sovereignty in the face of the risks of cyberattacks and espionage.**

Another sovereignty issue related to digital multinationals is their stranglehold on the internet since its inception, a stranglehold that is tightening since the creation of AI. According to the National Intelligence Council's forward-looking book, *Global Trends 2040: A More Contested World*, digital multinationals are likely to compete with national intelligence services for data collection. They are also in a position to set their own standards. In the space of just a few years, the Big Tech giants have gone from being service providers to non-state actors capable of playing power games with governments. In a world where everything is moving to the digital medium, these companies are amassing vast amounts of information and data on entire populations. Who will have access to this data? Who will be able to stop the tech giants from selling their data to the highest bidder? In June 2024, OpenAI announced the appointment of Paul Nakasone, former director of the National Security Agency (NSA), to its board of directors to help strengthen the company's cybersecurity. This appointment raises the question of collusion between US tech multinationals and the country's intelligence agencies⁴⁹. **These issues underline the urgent need for governments to regulate the activities of these companies. In short, it is worth asking the question: to what extent does digital sovereignty fail to embody the new precondition of national sovereignty?**

The dependence on digital equipment and infrastructure must be taken into account in industrial policy. Semiconductor production is an important factor in digital sovereignty. Most semiconductors are manufactured by the Taiwan Semiconductor Manufacturing Company, the world's leading semiconductor foundry. In total, 60% of the world's production and 90% of the most sophisticated semiconductors come from Taiwan⁵⁰. The United States has clearly understood this sovereignty issue. Through the Inflation Reduction Act, their goal is to reshore and secure this production that is essential for digital sovereignty. In 2024, the Taiwan Semiconductor Manufacturing Company plans to build a factory in Arizona that is set to begin operating in 2025⁵¹. However, it seems to be encountering a problem with water supply.

⁴⁸ *La Revue du Digital*. (2024, April 25). *L'IA générative chargée de révolutionner les services publics par le Premier Ministre*.

⁴⁹ *OpenAI appoints former top US cyberwarrior Paul Nakasone to its board of directors* | AP News. (2024, June 14). AP News.

⁵⁰ Saillouf, M. (2023, January 10). *Guerre technologique : 10 points sur les semi-conducteurs* | *Le Grand Continent*. Le Grand Continent.

⁵¹ Lesnes, C. (2024, February 19). *L'Arizona, le « Silicon Desert », dopé par la guerre des semi-conducteurs*. *Le Monde.fr*.

Another example is the establishment of Microsoft data centres in eastern France. At the Choose France summit in Versailles in May 2024, Microsoft signed an agreement to invest four billion euros in its data centre infrastructure. This is the largest investment ever made in France, with the stated aim of helping to accelerate AI adoption, skills development and innovation. On the surface, this investment is seen as good news, but from a broader perspective, it raises questions: given the extraterritoriality of the American Cloud Act and FISA laws, the location of these data centres run by the US tech giant could pose a threat to sovereignty. It is also an obstacle to the implementation of a sovereign AI and cloud.

France has ambitions to develop a French artificial intelligence. To prevent a brain drain, three businessmen, Xavier Niel, Rodolphe Saadé and former Google CEO Eric Schmidt, set up Kyutai, a non-profit open science AI lab. Based in Paris, the research lab aims to attract French talent with an enticing offer⁵². **Because preventing a brain drain is another major challenge in the battle for AI sovereignty in France and Europe.** Statistics show that the United States is no longer producing enough engineers. As a result, Silicon Valley is turning to Europe for engineering talent, or even investing directly in the Old Continent to meet its needs. This Silicon Valley strategy is being facilitated by the most prestigious engineering schools, which are forging partnerships with major US companies⁵³.

Finally, another aspect related to sovereignty is the loss of wealth caused by the free flow of data to foreign owners – data that is used to feed and improve their AI models. Given that data is now the king of resources, just as fossil fuels once were, it is astonishing how casually contracts, especially public contracts, are awarded to the companies that acquire the data as a result. Not only do they get it for free, but they are also paid to acquire it. As mentioned earlier, the Health Data Hub and the partnership between Amazon Web Services and Bpifrance are now high-profile examples that hide a forest of similar practices.

In practice, many of these issues can be addressed by implementing an appropriate public procurement strategy. The US successfully encouraged its private sector (the Silicon Valley start-ups of the 1980s) to create and develop innovative digital products and services, not through subsidies but via orders from major government agencies (DARPA, NIH, etc.). Today, these small companies have become the global titans we all know. The example is well known, but France and Europe have not been able to replicate it. And over time the gap has become so difficult to bridge that it is now easier for our awarding authorities to turn to these giants, who are also very well equipped to lure them in a variety of ways. For R&D, it is also easier to use tax instruments, such as the research tax credit, which is open to all, including foreign companies that pay little or no tax. Both in France and at the European level, we must fight against this tendency to take the path of least resistance. The French Public Procurement Code helps in this respect, and it would be useful to refine it, but the agents in charge also need to be trained in how to use it. The criteria of environment, innovation and social responsibility must not be empty words. Only a proactive policy will be able to steer agents away from this path. French and European companies have the capacity to meet most needs. But they must be given the means to do so.

b) Digital transition and democracy

The question of the democratic impact of the digital transition and the transition to AI is a legitimate one. Especially when you consider that the digital market is concentrated and dominated by a handful of companies, often referred to collectively as Big Tech. This digital “cartel” raises the issue of an oligopoly or concentration of companies dominating the AI race today. Even the Federal Trade Commission is concerned about this concentration: the US justice system recently investigated possible anti-competitive practices by Microsoft, Open AI and Nvidia⁵⁴. This hegemony of the tech titans over the digital industry is problematic in that their economic weight gives them colossal resources that enable them to wield great political influence outside the instruments of democratic representation.

From a more philosophical point of view, one could also ask whether this digital transition does not **run counter to the French democratic model of universalism and national cohesion**. According to the French Constitution,

⁵² Manens, F. (2023, November 17). *Kyutai : Xavier Niel, Rodolphe Saadé et Eric Schmidt lancent un OpenAI à la française*. *La Tribune*.

⁵³ Krim, T. (2024, May 14). *La France laboratoire de la Silicon Valley 2.0*. Éditions Cybernetica.

⁵⁴ Samain, M. (2024, June 7). *Le gouvernement américain a Nvidia, Microsoft et OpenAI dans le viseur*. *Les Echos*.

the French Republic is one and indivisible. But the digital world is based on the logic of communities of followers or members communicating with each other in a closed circuit. There is a trend towards communitisation, where individuals in the digital space are part of circles where others have a similar way of thinking. These communities follow their own rules and are beyond the control of governments. The new digital technologies and the resulting communication methods are driving segmentation and individualisation. Digital technology was supposed to bring people together, but today we are realising that it primarily divides them. It also encourages the emergence of a culture of clash and immediacy, with simplistic, aggressive and binary discourse to the detriment of tempered, nuanced and considered speech. While, in its early stages, the digital information society raised hopes that it would teach citizens to make better choices as a result of them being better informed, it is proving to be, on the contrary, a vector for polarised points of view on all issues. It is legitimate to ask ourselves in what way this fragmentation of the digital space into communities constitutes a threat to the one and indivisible Republic.

The digital transition also facilitates the spread of conspiracy theories. While these have always existed (one sad example that comes to mind is the Protocol of the Elders of Zion), they can now reach a much wider audience through content posted on websites and social media. The heart of the problem lies in the new logic that has developed among those who subscribe to these theories: **the reversal or inversion of proof**. To convince someone or to prove a fact, it is no longer enough to present evidence or develop an argument in support of a claim. The onus is now on the proponents of the scientific and other evidence to prove that they are right. Challenging the official line and reversing the evidence to de-legitimise it then becomes the basis of the discussion. This kind of logic, based on systemic (rather than scientific or Cartesian) doubt, can pose a threat to democracy.

The use of AI will increase the production of fake news and deepfakes, in the form of content and perhaps even more so in the form of images. The recent video showing Kamala Harris and Donald Trump together is a particularly striking example, but certainly not an isolated one. This is all the more important as public debate has shifted to social media networks, often to the detriment of the traditional media, or worse, with their support as they desperately chase scoops. According to several studies, the amount of time spent watching television decreased by 30 minutes per person between 2020 and 2022⁵⁵.

However, the impact of digital technology and AI on information cannot be reduced to its negative aspects alone. It should be noted that **research in general, and whistleblowing in particular, is also enhanced by these new technologies**, as sources can now be cross-checked to an extent previously impossible. Leaks such as the Panama Papers are the result of this exploitation of the digital medium. Of course, this also poses a risk for government "agencies", as it creates a formidable problem between access to information for the common good and the need for countries to ensure national security. The Assange and Snowden affairs are a perfect illustration of this. Beyond the challenge posed by fake news, the question of **how to qualify information** now seems fundamental in a context of information overload. In the past, citizens struggled to keep themselves informed. Now they face the opposite challenge: that of managing the vast amount of information that reaches them. There is an urgent need to arm citizens against the growing volume of communication and information, by developing critical thinking and Cartesian doubt from an early age, so that individuals are equipped to question a source.

Finally, **the digitalisation of public services always takes place in the context of a political vision and raises the question of the relationship with citizenship**. Here are two examples.

The first, that of Estonia, which digitalised almost all its public services in 2001 to make them accessible from a single platform, may be valuable in that it provides two decades of visibility on the consequences of this technological and societal paradigm shift. The change was tough, especially for the older generations, but it seems to have been explained and accepted. However, while this change was presented to citizens as a positive step, one might wonder whether the real economic attractiveness strategy behind it was explained and whether it left room for considerations relating to the democratic process or the intrinsic value of belonging to the national community. The aim of Estonia's e-Residency programme is to recruit "10 million e-Estonians", or in other words to make it easier for foreign companies to register in the country, which is already attractive due to its advantageous tax system. The economic aspect was therefore the main driver for this move.

⁵⁵ Louis Maurin (2023, September 22). *Assistons-nous à la fin de la télévision ?* Centre d'observation de la société.

The second example is electronic voting. A number of French municipalities opted to use voting machines instead of ballot boxes and paper ballots, arguing that they are more environmentally friendly and save time and manpower. It is also worth mentioning that French citizens living abroad also have access to electronic voting. It is not unreasonable to raise possible doubts about the fairness of the results, the risk of error or even the traceability of the votes, and yet no specific security measures or appeals process have yet been envisaged. It is not so far-fetched to think that one of the most important principles of the electoral process - the secrecy of the ballot - could be undermined. No site, not even those of the world's most sophisticated intelligence agencies, has been shown to be perfectly capable of protecting all its data against the risk of intrusion, so how could a simple voting machine? Moreover, the digitalisation of the voting process removes some of its solemnity and any involvement on the part of citizens, for whom voting becomes just another "click". Their help is no longer needed as the machine outputs the results as soon as the polls close, and all that remains to be done is to record them and sign the record. And yet participation in the vote count was often the first voluntary act of civic engagement, with a strong symbolic dimension of being a doubly engaged citizen.

2. EDUCATION: THE CENTRAL PILLAR

a) Education through digital tools and AI: finding the balance

One major issue is the place of digital technology and AI in education, and particularly in early learning. The new digital technologies can be excellent tools to support learning, but they must not replace human input. For example, getting children interested in geography requires a different approach depending on whether they are more visual or auditory learners, but the perception of this nuance, especially in young people, comes down to human sensitivity rather than a digital approach, which will necessarily favour the method with the best theoretical effectiveness. In the US, an analysis of the results of more than two million students showed that learning inequalities had increased during the period when education was delivered exclusively through distance learning: the brightest students tended to be the most independent and able to work this way, and they were often the most likely to receive tutoring at home⁵⁶. The key is clearly access to quality teaching; digital tools may be one way of achieving this, but there is no evidence yet that they are the only way, or even the best way. To ensure that new digital technologies, including AI, are used to best effect in education, it is essential that students and teachers be trained in both their technical aspects and best practice. Given the rapid evolution of the tools available, this training will need to be updated regularly – this is not a “one and done” exercise.

In the Global Education Monitoring Report (2023), UNESCO points out that it is extremely difficult to assess the value that digital technologies add to education, due to a lack of data. Technologies are evolving so rapidly that it is very difficult to assess their impact: on average, educational technology products change every 36 months. Moreover, existing data is partly biased: because it comes almost exclusively from rich countries, and overwhelmingly from the so-called West, it does not reflect universal realities. It will therefore remain difficult to make an objective assessment of the impact of digital technology in education as long as there is no common frame of reference for this purpose, using culturally unbiased criteria, or providing a means of correcting for possible cultural biases.

There is no single, uniform reality when it comes to the adoption of digital technology in education. Indeed, in addition to the specificities of each country, it is clearly at the level of higher education that digital technologies are being adopted most rapidly and are bringing about the greatest changes. In 2021, more than 220 million students attended online courses open to all. On the face of it, this is a positive dynamic, but it does raise new questions and challenges, not least because the digital platforms that deliver these courses are in part redefining the role of universities, leading to regulatory and ethical issues, particularly in relation to exclusive subscription offers or the processing and use of student data.

Recent advances in AI have increased the power of educational technology tools. The emergence of this new reality is leading to speculation that technology could replace human interaction in education. At the moment, this seems largely inconceivable for the youngest children: their learning is largely linked to affect and the desire to please the adult who is passing on the knowledge. But up to what age are we too young to be able to detach

⁵⁶ UNESCO (2023). *2023 GEM report: Technology in education: a tool on whose terms?*

ourselves from this preponderance of affect in the act of learning? And who can guarantee that we recall and apply knowledge equally, when it is useful, whether it was acquired with or without affect?

A few decades ago, it was thought that making such valuable data available to everyone, for free or almost free, and without the need to travel, would be tantamount to providing universal access to instruction, or even education. We now know that this was wrong. **Learning requires a process of construction**, a kind of initiatory journey in which the keys to understanding emerge only when the information is confronted with the world... or with the point of view of one's teachers, whether the latter play this role implicitly or explicitly. The wonderful wealth of documentation now available to all does not provide the tools for incorporating the knowledge it contains into the intellectual and moral construction of the human being, and it would be highly doubtful – and probably highly detrimental – if the emergence of AI could change this in any way. In this sense, it is access to knowledge that is greatly facilitated, but while knowledge is an essential component of education, it is not the only component. In this area, the digital transition offers tremendous opportunities, provided that we do not overestimate them or confuse their nature.

Therefore, education should not be completely digitalised, but rather a balance should be struck with traditional teaching using textbooks and pens. In 2023, after 10 years of an all-digital strategy, Sweden found that the results were very much not what they had hoped for: they saw a general decline in levels in all subjects⁵⁷. Sweden's Schools Minister, Lotta Edholm, identified a widespread “reading crisis”. According to experts, the percentage of Swedish 10-year-olds with reading difficulties had risen from 12% to 19% in five years⁵⁸.

In addition, the use of digital tools such as smartphones in the classroom can be a source of distraction for pupils. From a practical point of view, the use of smartphones could be limited simply by installing jammers in classrooms. This would avoid the need to ban the device, while making it impossible to use on school premises.

Given this example from Sweden, is it any wonder that opinions on the extent to which digital technologies can improve the quality of education vary so widely? Some believe that these technologies create stimulating learning environments, boost student performance and simulate situations. Others feel that they tend to promote an individualised approach to education, reducing learners' opportunities to make social connections and develop related interpersonal skills, and disconnecting them from real-life situations. As we move forward with the digital transition in education, we are collectively faced with the challenge of striking the right balance in the interests of our students. Moreover, the question of the appropriate use of digital technology in education cannot be fully resolved by saying that it is relevant where it is beneficial, because there is no consensus on what is beneficial. This is why we propose the concepts of **complementarity** and **subsidiarity** later in this report.

It is reassuring to note that young people around the world show a real awareness of these issues, as indicated by the data from the recent Youth Talks study on AI and youth. Young people have a moderate approach to AI, as they are aware of both the benefits and the limitations of this new technology. AI is a positive step forward in healthcare, anti-discrimination and climate change. However, they are aware of its limitations, particularly its negative impact on social interactions, dependence and the ability to develop critical thinking skills. In short, young people are in favour of the creation of an AI for the common good that is ethical and sustainable.

b) Develop digital literacy

In the context of new digital media, it has become more difficult to assess the reliability of information based on criteria such as consensus and expertise. For example, to show approval, 'likes' can be given to ideas expressed on social media and school websites. Web search engines rank results in a way that suggests an order of quality, or at least relevance. Users who are unaware of the nature of likes (how they are given, whether they can be faked, etc.) or of the way search engines rank their results (the criteria used, whether they are based on relevance to the user or on the popularity of the result, etc.) run the risk of misusing these indexes, for example by giving a source more credibility than it deserves. To make good use of the internet and new media, a better understanding of these aspects is therefore a must, but the knowledge needed to achieve this understanding is

⁵⁷ The Guardian. (2023). Switching off: Sweden says back-to-basics schooling works on paper. <https://www.theguardian.com/world/2023/sep/11/sweden-says-back-to-basics-schooling-works-on-paper>

⁵⁸ Ink, R. (2023, August 21). *La Suède arrête l'enseignement via le numérique et revient aux manuels scolaires.* RMC.

little known outside of IT, communications and community management circles. In cases where our evaluative skills fail us due to lack of knowledge, it is at least essential that our metacognitive evaluation mechanisms come to the rescue by letting us know that we are entering unknown territory and that we must remain humble and cautious. This is why individuals need to be **taught best practices and given a good understanding of digital technology** from an early age.

As the digital transition gathers pace, many countries are beginning to identify the digital skills they wish to prioritise in curricula and assessment standards. In 2023, 54% of countries worldwide had standards in place for digital skills⁵⁹. However, in many cases these standards were set implicitly by companies with an interest in product placement, rather than by public authorities. This is not insignificant in the context of the digital society or digital education. Hence the need for **a neutral digital education: it is a necessary adaptation to the world in which we live.**

c) Combating inequality

Online learning proved invaluable in limiting the collapse of education during the COVID-19 school closures, although the digital divide and disparities in households with computers were particularly evident during this period, even in wealthy countries where, while commonplace, home computers are not in all households, especially those less economically privileged. During the pandemic, nearly half a billion schoolchildren, or 31% of the world's schoolchildren, had no access to distance learning. 72% of pupils excluded from this “digital school” were from the poorest households⁶⁰. This digital divide is hardly surprising when, according to the UN, 3.6 billion people had no access to the internet in 2019, and in 2022 this figure was still as high as 2.7 billion – a third of the world's population. Lack of access to equipment or even electricity remains one of the main sources of digital inequality. This is a key reason for **choosing the right infrastructures, rather than those dictated by trends or convenience.**

While online courses are open to all, they primarily benefit an educated public in developed countries and are often more accessible and relevant to English speakers. In this sense, the democratisation of access to knowledge promised by the internet is limited to access to information, but widens the gap further when it comes to education. Digital education is thus becoming a subject in its own right, in which the old methods of teaching do not disappear, but must coexist with specific methods. One is to ensure **complementarity, rather than making digital and AI the sole paradigm in education.**

d) Complementarity and subsidiarity

Generative AI is the next in a series of technologies that have been applied to education for at least forty years, each presented as having the potential to transform it. The key is to avoid the pitfalls of the all-digital approach and to use digital technology only where its added value outweighs its drawbacks, such as for individualised monitoring of student progress to identify optimal learning trajectories, without necessarily reconsidering the place of human transmission in the learning process.

The use of digital technology is legitimate as long as it brings an added value to the pupil or the student. In early childhood, for example, digital tools can be used to illustrate the second and third dimensions of geometry in a fun way. Above all, digital technology should be used as a tool and not presented as a dependence or an inevitability. For this, a few conditions are necessary.

Have the right infrastructure in place

As education becomes increasingly digitalised, a number of conditions need to be met to ensure its quality. The most important of these are the availability of adequate technological infrastructure in sufficient quantity;

⁵⁹ UNESCO. (2023). 2023 GEM report: Technology in education: a tool on whose terms?

⁶⁰ COVID-19: At least a third of the world's schoolchildren unable to access remote learning during school closures, new report says.

teachers trained in the use of these technologies, but also in their appropriate use, where and only where they add value; relevant content, with knowledge tests carried out at school; and an assessment of the impact on individual basic learning, at least in reading and mathematics.

The introduction of these digital technologies in education needs to be studied very seriously in advance, based on the specific needs of each teaching unit, and not according to the bureaucratic approach of contracts that cover all schools. There are direct costs involved, such as the IT investments themselves, but there are also indirect costs, in addition to the associated energy costs. These indirect costs include, for example, a reduction in the resources available to maintain and modernise classrooms, or to train and pay teachers. As a result, these posts become less attractive and more difficult to recruit, sometimes to a lower quality standard, at the very time when highly qualified profiles, fully competent both in their subject and in the new technology tools, are needed.

Recognise the added value humans bring

The fear of new digital technologies in education will disappear if we put learners in a position where these technologies are always at their service, but where they will have been pushed to cultivate the human contribution that cannot be imitated or avoided.

Rather than trying to match AI in terms of processes, until we are replaced by it, it seems more relevant to recognise that the added value humans bring lies in their human characteristics, including those that are commonly presented as weaknesses. It would be difficult, for example, to train an effective negotiator or diplomat without teaching them to cultivate their subjectivity, since this is what enables them to read the atmosphere, to identify the most appropriate argument, or even to step out of the negotiation process and make a witty remark that could potentially influence the outcome. None of this can be programmed, but it is now where the added value lies. To develop these 100% human skills, it will become increasingly important to interact with teachers and peers and to engage in complex social networks.

This begs the question: how can we combat “digital shrinkage” without human intervention? The internet tends to reduce the variety of exchanges and situations and to standardise them. This has a negative impact on young people's ability to read and write. The linguist Alain Bentolila has also noted this shrinking vocabulary in our increasingly digital society. He points out that, according to the PISA studies, young French people, despite coming from a country that has traditionally prided itself on the richness of its language, tend to perform worse in vocabulary tests than their foreign counterparts of the same age and level of education. And a link has been established between the radicalisation of behaviour and the inability to express nuance.

This observation of a shrinking range of vocabulary is all the more concerning as we are beginning to hear talk of the possible disappearance, in the not-too-distant future, of paper dictionaries, which some believe will be advantageously replaced by search engines. Who benefits from this? The value of the substitute is questionable: a search engine cannot be leafed through like a paper book. By definition, then, searchers will only find what they are looking for and are unlikely to stumble upon a new word that they will enjoy using again and again. From this point of view, the move to all-digital stifles a form of innovative thinking.

There is no denying that, in many cases, the technology tools purchased and deployed in the field of education are there to fill a gap that is not necessarily technological. Without considering the long-term costs, whether financial, educational or – and this is often forgotten – in terms of the exposure of children's data.

3. DEVELOP CRITICAL THINKING SKILLS

With the onslaught of digital technology and AI, **the relationship to truth** is of central importance. Given the vast amount of information available online, we need to be able to question AI, contextualise, problematise and develop arguments, and not blindly believe the machine. Critical thinking and its corollary, discernment, need to be developed from early childhood through to higher education.

Knowledge transmission in the face of digital data

With the advent of technology, the first question we have to ask ourselves is what is essential to transmit. It is often said that any search engine can deliver data, diagnoses and even judgements faster and more accurately than any human brain. And therefore the transmission of knowledge is no longer very useful. We do not think so.

To be able to think critically, it is essential to have a personal knowledge base and at least a basic grounding in all disciplines. With this in mind, it would not be unwise to strengthen the study of philosophy, history and geography, disciplines which, in addition to the now indispensable computer and scientific skills, make it possible to put data into perspective, to contextualise it, to compare it and to detect even the vaguest of faint signals. Literature, too. Although it is often criticised, the written word allows us to capture all kinds of experiences that enrich our ability to analyse. To this can be added the development of creativity, artistic practice and of general knowledge, from childhood onwards. Last but not least, learning to apply scientific doubt, especially through experimentation, is essential because it teaches us a method: the search for proof.

These disciplines in and of themselves provide the basis for critical thinking. However, given their inadequacy in many systems, specific methods need to be developed that can be easily taught. First of all, what exactly do we mean by critical thinking?

How is critical thinking developed?

Doubt is the basis of critical thinking. Let us agree on doubt. While doubt is the basis of critical thinking and must be taught, it must be exercised within an argumentative framework. Methodic, scientific or Cartesian doubt is not about questioning without reason. This is a rigorous, controlled doubt, not a systemic doubt about everything, because the latter can be exploited to promote opinions that may be motivated by other interests. In the age of social media, there can be a very fine line between freedom of expression and disinformation! At the other end of the spectrum from systemic doubt, critical thinking should enable more secure access to knowledge, and should therefore be seen as a set of skills that lead to the enrichment of cognitive life, not to withdrawal into oneself.

The advent of the internet, search engines, and later generative AI, has created tremendous opportunities to access information, data and knowledge in all fields, often for free and from anywhere in the world. This is undeniable. However, true, false or biased data, information and misinformation coexist there, and it is not always easy to tell them apart. These confusions culminate on social media, where they are all the more pernicious because these platforms are widely used by young audiences, or audiences that make little use of other documentary sources, and are therefore ill-equipped to distinguish truth from falsehood, or simply ill-equipped to think about this distinction. According to SKEMA Publika's *EYES Report: Thoughts of International Youths*, young people today are wary of social media, traditional media and so-called fake news. They are calling for better individual training in evaluating information and thinking critically⁶¹.

Making the most of the data provided by the new digital tools at our disposal therefore depends to a large extent on our ability to sort through the information we receive and put it into perspective. In this sense, critical thinking is more important than ever, even though the social skills that generally enable it to develop are declining as complex human interactions become rarer. The need to educate people to develop and make full use of their critical thinking skills is therefore clear, and it seems reasonable to postulate that such learning should begin in primary school, so that it coincides with children's discovery of the internet, and is automatically associated with it.

Although the systematic implementation of concrete initiatives along these lines has so far been slow to materialise, the issue is being taken seriously by the authorities concerned: in 2021, the French Conseil Scientifique de l'Education Nationale, under the direction of Elena Pasquinelli and Gérald Bronner, produced a report entitled *Eduquer à l'esprit critique: bases théoriques et indications pratiques pour l'enseignement et*

⁶¹ Vallée, S. Revel, C. (2022, January 6). *EYES Report: Thoughts of International Youths* SKEMA Publika.

Information (Critical thinking education: theoretical foundations and practical guidelines for teaching and information). Grassroots initiatives are on the rise. It is worth noting that providing this education is a purely human skill; it seems inconceivable that it could be provided by digital tools: these can output data and cross-reference it, but cannot assess its relevance except by measuring its frequency of occurrence. Nor could it be provided by AI, which produces content based on the data it is fed and on (human) filters.

Misinformation is not necessarily driven by malicious intent. It can also be the result of a lack of analytical skills, for example, reading information and not checking its date to make sure it is still current. Of course, even though the date of information is a key factor in its reliability, it is not always clearly displayed online.

More complexly, appeals to open-mindedness can themselves lead to a blurring of the criteria that help to distinguish between mere opinion, reliable first-hand accounts and knowledge based on hard evidence. To illustrate this point, consider the large percentage of biology teachers in the United States who believe that they are being legitimately and commendably open-minded in presenting Darwin's theory of evolution and creationist theory to their students by placing both on an equal footing. In taking this approach, their aim is to let their students decide for themselves, so that science does not appear to be a dogmatic discipline. But in the end, this gives the scientifically supported theory the same legitimacy as the unsupported one. By the simple act of suspending their critical faculties, teachers prevent students from developing their own.

While it is clear that critical thinking must be exercised selectively, this selectivity can only be forged on the basis of individual experience. The only way to get the balance right, it seems, is to practise qualifying information, recognising the weak signals that might alert us to its reliability, and asking ourselves who benefits from it or whether it fits into a particular school of thought – all from an early age. How, then, can we trust wisely?

It must also be said that the knowledge we have and trust in today is the product of our cultural history and of the relative consensus reached around the notions of accuracy, reality and even truth.

A few methods that can be adapted to all ages

To know whether we can rightly trust a piece of information, we can look to the methods used in what is known as knowledge management, which is itself the basis of business intelligence. First and foremost, the trustworthiness of the information should be assessed by asking the following questions:

- Is the information supported by clear, structured and sound arguments?
- Is it consistent with established knowledge? (Some familiarity with the subject matter is required, even if it is only a basic understanding)
- If it is supported by evidence, is it good quality evidence, obtained using rigorous methods?
- What are the sources? (Multiple sources are preferable to a single source) Are any of the sources qualified in the field?
- Can it be reasonably excluded that the source has a conflict of interest in relation to the content, or is acting with a deliberate intention to mislead?
- Is the information being repeated too systematically? (Consider the possibility of chain-repetition of messages calibrated by spin doctors or as part of influence campaigns).

It seems reasonable to train schoolchildren from an early age to systematically adopt this approach of questioning trustworthiness, using critical thinking exercises based on articles and publications that are obviously adapted to their age and level of understanding. This can be done as early as primary school, as soon as they are deemed able to read and understand the texts in question. At the same time, they could be taught that partisan publications, an indispensable corollary of freedom of expression, cannot be banned, but that it is important to know how to distinguish a partisan statement from a factual article – which is not as easy as it seems, given that what is factual cannot be decided by consensus alone. Case in point: during the ten centuries of the Middle Ages, geocentrism was widely accepted, but this did not prevent the Earth from revolving around the Sun, and not vice versa. And, of course, the most respected moral and scientific authorities of the time would have confirmed, in good faith, the feelings of the people on the subject... The test of trustworthiness is therefore not an absolute guarantee, it simply limits the risk of naively adopting a false belief... depending on the state of knowledge at the time the information comes to our attention.

Students should therefore be taught to systematically apply a process aimed at adjusting their level of trust accordingly, based on their assessment of the quality of the supporting evidence and the reliability of the sources.

Distinguishing the true from the plausible and the relative

Finally, it is important to underscore how difficult it is to distinguish between what is true and what is plausible in a market teeming with information. There are several reasons for this. This information is presented to us in a seductive way to encourage us to "consume" more and more of it. On the other hand, false content, rumours and fake news are becoming so familiar that we are becoming accustomed to them and they can end up seeming more plausible than they should. However, this should not lead to a logic of censorship, where we are only allowed to quote the official truth, which is reductive by nature. Nor should we overlook the fact that the logic of official truth, when it is adopted, can sometimes prove to be flawed, either because it is unintentionally wrong or because interests steer it in a particular direction. One example that comes to mind is Lysenko's theories, which were presented as thoroughly scientific by the Stalinist authorities.

If we reject this censorship-based approach, we implicitly accept that information and disinformation coexist and are widely accessible via the new digital technologies, and therefore now more than ever we need to train all individuals in critical thinking – for their own good, but also because they are or will all one day be active citizens, likely to vote, and it is therefore preferable for society as a whole that their intimate convictions be forged on as factual a view of the world as possible. This training in critical thinking is absolutely essential, because while fake news is not a new phenomenon, the power of digital technology now makes it much more pernicious in terms of reach and immediacy. It can also be accompanied by more complex approaches to the search for the truth.

Long before the digital age, *The Protocols of the Elders of Zion*, a text completely fabricated by the Tsar's secret police and first published in Russia in 1903, presented a plan for world domination allegedly drawn up by Jews and Freemasons. Translated into several languages and distributed internationally immediately after its publication, it became a bestseller and was taken seriously by many of its readers. Without digital technology, however, this document reached only a small percentage of the population. With the digital tools at our disposal today, the scenario would be very different.

As early as 1941, philosophers such as Edward Glaser stressed the need for teachers of critical thinking to support the critical approach with a rigorous one based on respect for the rules of reasoning and ethics.

Today, the serious geopolitical tensions and the difficulties we face in listening and dialoguing with one another compel us to carefully analyse the impact of the widespread use of social media. In their book *Médias dits sociaux ou médias dissociants?*, Elisabeth Gardère and Philippe Viallon present an analysis of the social changes brought about by the digital world. They emphasise that while freedom of expression is vital for democratic societies, it will become fatal for them if it is used to undermine the very foundations of the social framework, to tear apart the social fabric. "Each individual constructs a reality for themselves that does not necessarily match the one others have constructed, and this is the source of many communication problems. (...) Click by click, web users construct a world that resembles them, that pleases them, with search engines memorising their interests and modulating their offers accordingly, (...) without realising that this mirror world is a world they have constructed for themselves⁶²." The more divergent the representations, the less aware individuals are of the reality of a common world.

Relativism sets in "All opinions are equal because everyone can have their own view of the world. Even scientific knowledge is seen as a social construct resulting from interactions between researchers." That is why, today, we must take the measure of the extent to which our society is weakened when the truth is sacrificed on the altar of opinion. And yet, it is the social consensus on the concept of truth that determines the possibility of a social order, of living together in a society in which each member benefits from the security of that social order and

⁶² translated into English by the authors.

must do their part to defend it. Freedom of expression is never so well defended as when it is supported by a critical body and the will to assess fairly what is worth sharing or, on the contrary, what is worth refuting.

In fact, it seems that the French legislator has some doubts about the ability of our fellow citizens to use their critical faculties properly, since, among many other measures that are perfectly understandable and intended to protect viewers, Law no. 2023-451 of 9 June 2023, aimed at regulating influencer marketing and addressing potential misconduct by influencers on social media platforms, stipulates that the statement “*Communication à caractère commercial*”, to denote advertising or a commercial collaboration, must appear clearly throughout the sponsored part of any video, and not just in its introduction, which might have seemed sufficient if consumers were considered to be informed. This excess of precaution is clearly intended to avoid any ambiguity, but it amounts to bringing out the heavy artillery without any proven need for it, unless one believes that viewers are likely to forget this fact and take everything at face value if the warning disappears for a few seconds. In practice, this poses a number of problems for content creators: if they make a video about the history of a town with the support of the local council, the new rules require them to include the statement “*Communication commerciale*” throughout the video, even though no one is selling anything!

It would be much better to train citizens and future citizens from an early age to use their critical faculties, rather than feel the overwhelming need to protect them from a lack of them. It would be both more effective and less patronising, even if the rules are well-intentioned. Ethical considerations should also be introduced at the design and development stage of algorithms or their filtering.

4. PRACTISE ETHICS BY DESIGN

Ethics by design is another solution to digital technology and AI dependences. The by-design approach links general ethical considerations and operational ethical considerations, from the technical design stage through to the deployment of the digital solutions. It is about adopting ethical principles to guide the design of algorithms. But ethics by design is also about considering the moral implications of algorithm design. According to Claude Revel and David Fayon, ethics by design should not be “left to the sole judgement of those who write the algorithms but should meet standards that are sufficiently broad not to become rigid imperatives”⁶³. This opinion, published in 2023, mentions a number of studies carried out by European researchers and committees on the subject. Thinking about how to make digital technology ethical is something that concerns us all.

As mentioned earlier, one good practice that could be implemented is to require advertisers to systematically include a statement indicating that the content was generated by AI. Incorporating such habits into the design of algorithms is a concrete example of ethics by design.

At this stage, we must emphasise the importance of **establishing a set of common standards that are approved by governments and professionals, and not left to the discretion of individual companies.** Google is a prime example: in September 2023, the company looked at the influence of digital technology on our democratic processes⁶⁴, in order to introduce some new policies. We are not talking about the elections themselves here, but about the political and election advertising campaigns broadcast online, as these are taking on increasingly diverse forms and are therefore more likely to mislead citizens/web users. As a result of this work, the platform has now introduced some new rules on political advertising that will apply to all future elections, including the 2024 US presidential election. This is because, given the pace of recent technological developments, many electoral laws around the world do not cover all aspects of online political campaigning. To comply with Google’s new policies, advertisers wishing to run AI-generated political ads will now have to include an explicit disclosure statement. This is the case, for example, when an ad (content, video, images or audio) inauthentically depicts real or realistic-looking people or events. Examples include ads with content that makes it appear as if a person is saying or doing something they did not say or do, or ads with content showing a realistic portrayal of an event to depict scenes that did not actually take place. In such cases, the advertiser must include an explicit statement such as “This audio content was computer generated” or “Altered or synthetic content”. What is particularly

⁶³ Fayon, C. R. & D. (2023, September 25). Artificial Intelligence and Algorithms: Ethics and Fair Cooperation between AI and Human Intelligence. SKEMA Publika.

⁶⁴ *Political content - Advertising Policies Help*.

interesting, and raises some questions, is the fact that the platform has been more proactive in setting rules for these campaign practices than the actual governments that are primarily concerned, but many of which seem to view the entire electoral process, including campaigns, as an immutable process that technological developments bypass without reaching.

So Google is regulating election campaigns, because it is the multinational that approves the publication of political ads on its platforms in the "**Election Advertising Verification**" section. This practice is a dangerous slippery slope, as elections are considered to be in the public interest. As such, they must be regulated by public authorities. This example of Google illustrates the point made earlier in this report about Big Tech's capacity for political influence.

Although Google's initiative is intended to be prudent and virtuous, it is nonetheless a form of **dispossession of a state prerogative**, since legislators in a large number of countries have failed to address the issue. This is a crucial point, because it points in the direction – desired by some, but probably unnoticed by others – of stripping the state of its prerogatives in favour of multinationals far more powerful than most of them. Private companies with no democratic legitimacy are being entrusted with the implementation and control of rules that are, in principle, in the general interest. In broad terms, this reflects the societal choice between the general interest defended by citizens' representatives with the support of the state, and the general interest "guaranteed" by the free market.

In France, the question of ethics is already widely addressed by the authorities. A report by the French Council of State in March 2022 stresses the need for the administration to use AI, and particularly its most advanced versions, only in the interests of the human community, while guaranteeing accessibility for all. It underlines the importance of long-term impact analysis as early as the drafting stage of legislation. Also in France, Cédric Villani, in his report "IA for Good", proposes the creation of ethical standards accepted by all, which would naturally regulate the market. Villani suggests the creation of an independent body to which public and private stakeholders could turn to make recommendations on what is and is not acceptable in the field of AI⁶⁵.

These issues have not escaped the attention of international regulators, particularly multilateral ones.

⁶⁵ *Rapport de Cédric Villani : donner un sens à l'intelligence artificielle (IA)*. (2018). French Ministry of Higher Education and Research

IV. BUILDING NEW APPROACHES

1. DEVELOP FLEXIBLE GLOBAL RULES FOR THE DIGITAL WORLD

a) A competitive geopolitical environment

Today, a global race for the governance of AI is emerging. Countries have recognised the political and geopolitical importance of this new technology. This is evidenced by the inaugural AI Safety Summit, hosted by the UK in November 2023 with the aim of promoting a shared understanding of technological risks and developing international cooperation in the field of AI. By hosting this AI summit, London reaffirmed its desire to make the UK the geographical home of global AI regulation. On the other side of the Channel, France is similarly keen to establish itself as a global player in AI regulation. In fact, the next international AI summit will be held in Paris. President Emmanuel Macron has tasked Anne Bouverot with organising the summit around five pillars: public interest AI, future of work, innovation and culture, trust in AI, and global AI governance⁶⁶.

An article by analyst Laure Pallez⁶⁷ distinguishes three different models when it comes to AI: the liberal American model, in which AI must serve innovation via private interests; the authoritarian Chinese model, in which AI is an instrument of control but also a source of trade; the regulation-focused European, in which AI serves the population and not just economic interests. In the United States, the Executive Order promulgated by President Joe Biden on 9 November 2023 was a precursor in terms of regulation. It aims to provide a very clear and comprehensive framework for the use of AI, whether for its national security applications within the intelligence community or for everyday concerns such as ensuring the confidentiality of citizens' email addresses and telephone contact details in the context of their use.

The issues raised above all point to one question: who will be able to ensure a minimum of public interest or concern for the common good in the use of digital technologies and AI? Should there be international standards? If so, what should they be? How should they be developed? International organisations are all taking a stand on this issue.

b) The positions of international organisations

The World Health Organization (WHO) proposes six core principles for the use of generative AI, including the protection of human autonomy and the promotion of human well-being, human safety, and the public interest. Data must be managed with protective laws to prevent misuse and predation. Looking beyond the differences in wording, there seems to be a convergence of concerns, with a consensus that it is crucial to adopt an ethical approach from the outset in the design and deployment phases of digital technologies.

UNESCO issued a recommendation on the ethics of generative AI in November 2021, which was adopted by 193 member states, and the International Organization for Standardization (ISO) is working to create an ethical AI society. On the French side, the opinion issued by the French National Committee for Digital Ethics (CNPEN), created in December 2019, sets out a series of recommendations to regulate the development of generative AI and ensure a common code of ethics in the design of algorithms.

The OECD is also considering how to set up a governance system for AI. This international organisation's position is that AI actors must promote and implement certain principles for responsible stewardship of trustworthy AI. In concrete terms, this means promoting inclusive growth, sustainable development and well-being. But also respecting the rule of law, human rights and democratic values, including fairness and privacy. It also means committing to transparency, explainability, robustness, security and safety. As AI is a global phenomenon, the OECD believes it is necessary to establish a system of global AI governance by fostering an inclusive AI-enabling ecosystem, investing in research and development, shaping an interoperable governance, building human

⁶⁶ CB News. (2024, April 1). *Anne Bouverot est chargée de préparer le sommet de l'IA à Paris « fin 2024 début 2025 »* - Image. CB News.

⁶⁷ Pallez, L. (2024, April 26). *Régulation de l'IA : quelles conséquences pour la productivité de nos entreprises ?* Le Figaro.

capacity and preparing for labour market transformation, and encouraging international cooperation for trustworthy AI⁶⁸.

Global regulation of the digital world and AI is an issue that has captured the attention not only of public organisations, but also of private players. In an article in the Wall Street Journal, Japanese telecommunications company NTT and newspaper Yomiuri Shimbun warn of the risk of social order collapsing as a result of AI, and the urgent need to regulate its development⁶⁹.

Generative AI and its regulation have well and truly become major political concerns, both nationally and internationally. Further evidence of this can be seen in the move by the UN Secretary-General Antonio Guterres, who on 26 October 2023 unveiled an advisory body “aimed at fostering global agreement on how to govern the rapidly developing field of artificial intelligence”. In an effort to accelerate this regulation, he convened a multi-stakeholder panel of 39 experts, including academics, business leaders and government officials from 33 countries across all continents, to examine issues related to the global regulation of AI. “The profound positive impact of AI is challenging to fully comprehend. [...] Without delving into a series of apocalyptic scenarios, it is already clear that the malicious use of AI could undermine trust in institutions, weaken social cohesion, and threaten democracy,” said the UN Secretary-General. Early in the second half of 2024, this United Nations-affiliated committee is expected to publish final recommendations on this plan to regulate generative AI on a global scale.

For our part, we believe that a non-coercive international convention establishing principles for the governance of digital technologies, and AI in particular, is the solution to managing and mitigating dependences. AI is a global phenomenon. As such, global cooperation is needed to address the major challenges posed by this innovation. We are in favour of global governance in the form of soft law. In other words, basic principles that apply worldwide, then recommendations or even non-binding standards that emerge from the cooperation between the stakeholders.

We must be wary of any tendency towards coercive regulation, as the power to regulate would ultimately fall to the strongest state or lobbying influences, with all the enormous risks that would entail. We have to accept the gradual establishment of negotiated principles, which brings us back to the question of sovereignty. Indeed, countries that believe in their model of society will have to put forward the necessary arguments to defend it in a global forum. The principles of global regulation will only make countries better and push them towards more virtuous practices if these are what they are defending! But they differ greatly between the West and the so-called Global South. We firmly believe that introducing bans and binding regulations is ineffective, because such measures need to be enforced and there is no supranational body in place with the capacity to do so.

As noted previously, although the visions of the various countries are very different, many of them have begun to agree to discuss the issue at recent or upcoming summits.

2. AVOID CRISES BY MAINTAINING ALTERNATIVES

To support the idea of subsidiarity developed earlier, it is essential to have alternative plans in place in advance as new uses of digital technologies and AI are deployed.

As we saw recently with the global outage that affected Microsoft users, new digital technologies are now an integral part of our daily lives. **Public and private stakeholders must therefore make the impact of disruptions and outages a central concern in this transformation.**

Before even considering the potential for failures or outright attacks, **the issue of memory**, linked to the preservation of documents and records, must be addressed. Because this will soon become a pressing issue for archivists, historians, governments, companies, and individuals... How will we be able to access public or private documents twenty years from now? Without even going into the crises that can lead to data destruction, storage methods change regularly. Data stored on a floppy disk, CD or USB key ten years ago is no longer easily readable, because devices have changed. Will data continue to be stored in the cloud in the future? How can we be sure? What devices will we have to access it? This issue can affect many aspects of everyday life, from pay slips to

⁶⁸ OECD *Legal Instruments*.

⁶⁹ Landers, P. (2024, April 7). ‘Social Order Could Collapse’ in AI Era, Two Top Japan Companies Say. The Wall Street Journal.

property deeds and access to warranties... How will public documents be stored? Which will be destroyed, even if unintentionally? On both an individual and a collective level, it is urgent that we find non-digital solutions to mitigate these risks, even if some promise that the problem will not arise because these accesses will be internalised in microscopic devices in our bodies. However for the time being, the only non-digital solution in existence is paper and that is the target of environment-related criticism. But it is imperative that our authorities get to grips with this issue. A society without memory would be unbearable. It is all a question of risk prioritisation. This issue of memory illustrates the immediate need for alternative solutions to the digital medium.

This need for non-digital alternatives is also crucial for **anticipating crises linked to our dependence on digital technology**.

Given the prominent place of the internet and new technologies in our daily lives, we must remain individually and collectively aware of the fact that these technologies are fallible and may fail us for more or less prolonged periods, whether as a result of malicious acts, natural disasters or any other event causing a disruption in data networks or power supply. In order to develop practical solutions for everyday life, we must first understand how dependent we are on digital technology and develop the skills and knowledge to overcome our dependence if necessary. The storm that hit France over the long weekend of 1 November in 2023 was a stark reminder of our unpreparedness for an unplanned network outage. In this case, it affected more than 450,000 people for two days: not only were they logically unable to use their electrical appliances, internet connections or telephones, including landlines as these are now digital, but all businesses in the area remained closed during this period as the outage affected lighting, security and card payment systems, all of which now run on electricity. During this time, communication systems were down, it was impossible to get supplies into the area, and no information could get through from the authorities, including the town councils, which are usually the first point of contact in emergency situations. This shows that while vital structures such as hospitals are equipped with generators, there is no plan B in place for the population. And it underscores the fact that routine tasks we used to perform ourselves decades ago can no longer be done without digital technology.

As for businesses, many now have completely paperless processes in place, whether internally, where email has replaced memos, videoconferencing has replaced meetings, and electronic signatures have replaced initialling, or externally, when dealing with customers and paying suppliers. Some have even got rid of most, if not all, of their paper archives, forgetting that a prolonged internet outage would not only bring their business to a standstill, but also leave them with no trace of contracts, procedures or ongoing projects that would enable them to resume operations using more traditional methods if necessary. Therein lies the danger. Digital technologies are undoubtedly powerful tools, and they open up previously unimaginable possibilities... as long as they work. But despite their vulnerability to cyberattacks, climate change or even an invasion of mischievous rodents, there is no alternative if we have to do without them. And yet, over the past fifteen years, incidents of varying degrees of severity have provided ample evidence of the importance of **ensuring that our societies' reliance on digital solutions is reversible**, even if only temporarily, in the event this technology fails.

In this respect, the example of Estonia is rather emblematic. As the world's most advanced country in terms of digitalised services at the start of the 21st century, Estonia was the country most likely to have every aspect of its citizens' daily lives affected in the event of a cyberattack. And indeed, in 2007, a series of online attacks targeted the websites of Estonian organisations, including the Estonian Parliament, banks, ministries, newspapers and broadcasters. This cyberattack led to the establishment of the NATO Cooperative Cyber Defence Centre of Excellence in Tallinn in May 2008, making Estonia, already a veritable laboratory of digital innovation, a champion in digital security. But none of this prevented this highly sophisticated digital network from collapsing for several hours in November 2019, effectively paralysing the country for that time: no one had anticipated the need for a degraded mode of operation. The cause of the outage? Rats had severely damaged underground telecommunications cables, cutting off most of the country's public and private websites from their databases. This serves to illustrate that becoming an expert in IT security does not guarantee protection against the unpredictability of energy, technical failures, terrorist attacks, or even less foreseeable causes such as rodents.

This suggests that while digital technologies offer greater convenience, speed and reliability, there is still a need for non-digital solutions that can be deployed quickly and at short notice, and for people capable of using them

effectively. Indeed, **while the use of digital technology leads to the acquisition of certain skills, it also leads to the loss of many others, both basic and complex, due to them not being used.**

However, it seems that the Estonian lesson has not been fully absorbed. This is illustrated by the *Assistance Publique Hôpitaux de Paris* (AH-HP) server outage on 30 August 2023, which left 38 hospitals without access to their Orbis software for more than seven hours, preventing them from identifying patients and prescribing tests and medicines. Although AP-HP reassured the public that the incident caused by the failure of this network component had no impact on patient care, some of the healthcare professionals who were on the front line during this event highlighted the significant practical difficulties and delays that resulted, and stressed the need for a back-up solution that could be deployed immediately in the event of an IT failure. Almost more worrying than the incident itself is the denial of a potential impact, and therefore the failure to find a solution to operate more smoothly in degraded mode.

Crises aside, there is now a real dependence on technology for all tasks, from the most extraordinary to the most mundane. This is true for individuals, but also for government agencies, which cannot, for example, register a birth, pay a school canteen bill, or process an application for an identity card and issue said card without going through a process that relies on a network and involves other agencies. When solutions for continuity in the event of a crisis are envisaged, it is with the help of technology, but **the possibility of the crisis being the result of a longer or shorter absence of access to technology seems to be a largely underestimated risk.**

What would we do, tomorrow, if a disruption in the provision of computing services were to last longer or affect a large number of sectors of society at the same time? The world got its first taste of this on 19 July 2024, with an outage caused by a bug in the update of the CrowdStrike antivirus, a program integrated into Microsoft's Windows operating system. Thousands of flights were cancelled, while many hospitals, government offices, factories, television stations and others were disrupted, with a series of cascading effects affecting millions of users. There has always been a question around the merits of technical progress, which is only valuable if it liberates more than it alienates, and that has never been more true than in this situation. Digital technologies are powerful tools in many fields, but virtually all of society has now become dependent on them. **Yet resilience is possible, especially if it is designed at the same time as the technology whose failure it is meant to compensate for.** This is the case in Japan, for example, where digital locks are the norm at the entrance to every home, but a traditional manual opening solution using a key is systematically integrated in a hidden way.

This resilience approach also implies that not all financial and human resources should be allocated to digital solutions, but that a significant proportion should be allocated to viable alternatives, even in degraded mode. The great danger is that we could end up trapped in a logic where simple problems can no longer be solved without the use of complex technical means. If digital technology is to remain a source of progress and opportunity, it must remain a societal choice – one that can be reconsidered and reversed if necessary, not an inevitability.

V. SUMMARY OF PROPOSALS TO ADDRESS DIGITAL AND AI DEPENDENCES

1. For organisations, ensure full awareness of the obsolescence and constant competition of technology components and applications, and **integrate the identification and management of lifespans into continuity plans.**
2. **Design algorithms that are more energy and resource efficient from the outset.** By encouraging the digital transition while at the same time urging energy conservation, our societies face a paradox. “We can live with less AI, but not necessarily with less water.”
3. Support the radical structural changes taking place in the labour market by **introducing appropriate public policies to provide the keys to understanding AI from an early age and as part of professional development.** This should be done in close cooperation with the education system, so that learners and teachers are trained both in technical aspects and in best practices. Given the rapid evolution of the tools available, this training will need to be updated regularly – this is not a “one and done” exercise.
4. One reality of the transition to digital technology and AI is the erosion and casualisation of jobs. Experts have warned about the situation of “click-workers”, particularly those based in countries with cheap labour and low levels of regulation. New ways of working have emerged with the advent of digital platforms that connect supply and demand for goods or services. Notwithstanding, with the emergence of click-workers or digital platforms, it is clear that there is a risk of casualisation of the labour market and that it is imperative to address this issue in countries committed to labour standards.
5. **Make changes to the legal framework governing intellectual property rights, perhaps by taking the rules governing the use of copies of books or articles as a model.** The innovation of AI lies in its ability to create new computer-generated content from existing data. Who owns AI-generated content? In the age of AI, how can we ensure that intellectual property rights are protected? Could an AI creation be considered plagiarism? **We note that there is a legal vacuum on this subject.**
6. **Avoid a dogmatic approach to digital technology by using it when it adds value to human work.** Now that all aspects of human life are being digitalised, it is imperative to ensure complementarity, avoid succumbing to a single paradigm of digital technology and AI, and know how to identify situations in which the human mind is irreplaceable. To begin with, simple measures can be taken to avoid a 100% digital world: for example, limiting the use of smartphones by installing jammers in classrooms. This would avoid the need to ban the device, while making it impossible to use on school premises.
7. **Work on teaching individuals to distinguish between the true, the plausible and the relative. The aim is for citizens to learn how to qualify information by developing their critical thinking skills. Above all, this is not about questioning without reason.** Methodological, scientific or Cartesian doubt should be instilled in citizens from an early age, rather than feeling the irrepressible need to “protect” them from a lack of it. There are methods that can be adapted to all ages. Furthermore, given the influence of AI on digital communication methods and the risk of intellectual standardisation, it would be worthwhile to **introduce algorithms that present a certain number of random results in order to maintain intellectual curiosity and innovation.** Finally, to avoid altering the relationship with truth, **one solution to consider would be for any content generated by AI to systematically include a statement to that effect.** This practice already exists, but should be extended to all platforms, especially - but not only - during election periods, in order to combat misinformation.

8. **Implement ethics by design upstream, when algorithms are being developed by their creators.** In other words, build best practices in from the start. Algorithm creators need to ask themselves the following questions: Who writes the algorithms? Where are the engineers who write the algorithms located? What are the general standards that should be implemented? What moral, human or ethical considerations should be adopted?
9. **Minimise our dependence on digital services governed by foreign law.** In terms of sovereignty, Europe missed the internet boat, leaving the leadership of this technological revolution to American and Chinese multinationals. In order to guarantee European digital sovereignty, a **national and European public procurement strategy must be put in place, whether for services or for the creation of a French and/or European cloud.**
10. **Encourage French digital professionals to pursue their careers in France. Increasing domestic attractiveness and limiting brain drain are key elements in the battle for AI sovereignty in France.** This means, among other things, increasing the remuneration of researchers, but also making it easier for them to carry out their projects, funding them, helping companies to start up and grow, and cutting red tape at all levels of business and government.
11. **Lay the groundwork for a non-coercive international convention establishing principles for the governance of digital technology, and AI in particular.** Given the different political models that exist, there are obvious risks associated with global digital and AI governance. It could therefore be **envisaged as a cooperation based on principles (the lowest common denominator), drawing on texts already produced by various international organisations, and gradually supplemented by recommendations and non-binding technical standards.**
12. **Develop a principle of subsidiarity to avoid dependence, by systematically providing an alternative to ensure continuity of operations and maintenance of skills.** There are two key aspects to consider: preserving the memory of documents and anticipating crises. Digital and AI systems are not immune to unforeseen events that could alter their operation, hence the need for non-digital 'Plan Bs'. **This mode of resilience must be designed at the same time as the technology it is intended to replace in the event of a failure.**

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