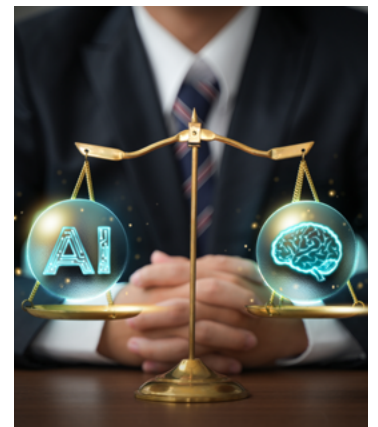TRENDS

TRENDS RESEARCH & ADVISORY

Future Trends Report

Future Trends Report, published in English and Arabic by TRENDS Virtual Office in Montreal, stands out as a distinctive publication dedicated to highlighting:

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2. the most important applied studies that explore the application of knowledge, scientific theories, and information to solve current problems and overcome future challenges.

3. the most important illustrative and graphic forms that visually summarize significant studies, helping readers understand the trends and challenges of the future world.

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1 Prospective research

"Only those who innovate responsibly will thrive" – mitigating the risks of the increasing use of Large Action Models

### Large Action Models – New types of risk? – July 2024 – Kamley et Vyakarnam – Dubai Future Foundation

"The imminent deployment of LAMs means that we are likely to see a blurring of jurisdictional boundaries, changing liabilities, and increased numbers of cross-border disputes."

Lidia Kamleh and Rajesh Vyakarnam, both affiliated with the Dubai Future Foundation, which is dedicated to exploring innovation and shaping the future of the Emirate of Dubai, discuss the use and mitigation of the risks implicated by the Large Action Models (LAM).
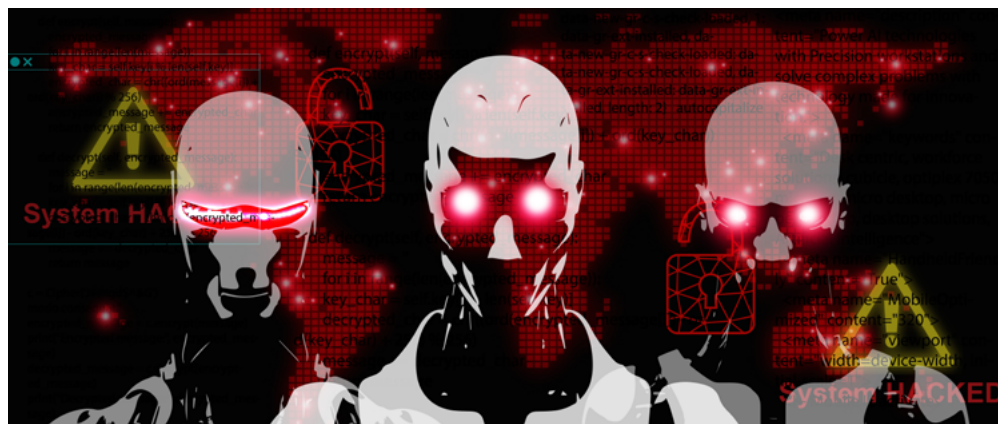
LAMs are AI models which have been designed to understand better the users' experiences and visions. They can execute physical actions, retrieve and manipulate data. Their use can be deployed wherever there is a customer assistance need. For example, if could process customer service from beginning to end, whether it be initial contact, customer returns, or actioning refunds. They allow nuanced and human-like interaction, which is what differs from AI systems, designed to work on a 2-dimensional rendering. LAMs can create dynamic environments, enabling autonomous decision-making.

The authors question the risks behind the increased use of LAMs. They list a variety of risks, such as data protection, data leakage, intellectual property, confidentiality, to name a few. These were risks discussed while 'traditional AI' technology has started to expand. LAMs, seen as a more "generative" form of AI, has complexified these risks. In many ways, the increasingly autonomous models, such as the 'My AI' chatbot used by

Snap Inc, could lead to a greater trust placed by the customer in the systems. The article imagines that, with the increasing use of LAMs will come a "blurring of jurisdictional boundaries, changing liabilities, and increased numbers of cross-border disputes" (p.15). The questions of liabilities, which are currently subject to little or no legal supervision, will become more and more crucial. The examples for liabilities-related risks are numerous. In the workplace, LAMs could amplify discriminatory treatment of individuals or groups, triggering liability under employment laws.

Kamleh and Vyakarnam remind that the "Navigating Megatrends Shaping Our Future in 2024" report published by the Dubai Future Foundation has already advised that specific uses of AI should be at the center of regulation, rather than the technology itself. The authors insist that it is becoming crucial to create regulatory frameworks, through "cross-sector collaboration, transparency and security" in order to safeguard innovation and its use.
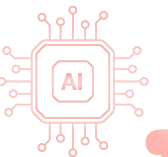
Only those who innovate responsibly will thrive.

"The imminent deployment of LAMs means that we are likely to see a blurring of jurisdictional boundaries, changing liabilities, and increased numbers of cross-border disputes."

"Arts & Foresight – Collaborative experiments for artists to explore the Future(s)"

Envisioning Futures Together – May 2024 – The Journal of Futures Studies. E. Christophilopoulos

Human beings cannot live without thinking about the future. The future is constantly present in our lives, and our consciousness is increasingly aware of the possibility of envisioning the future in different ways. We plan, schedule, envision, and constantly weigh the pros and cons of various situations to decide on our actions. Arts, in their various forms, are expressions of human creativity (Gillon, 2000) and therefore allow us to envisage the future in a very personal way. Arts give people opportunities to express their emotions uniquely, sometimes far from all forms of rationality.
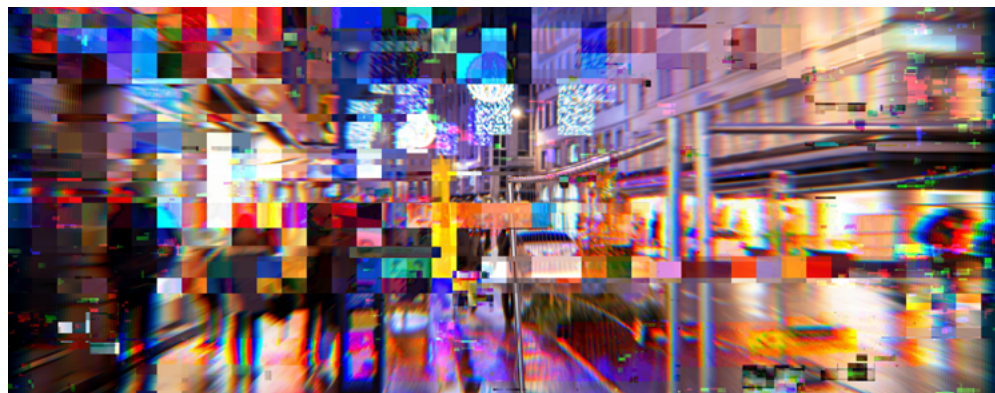
In this publication, the Journal of Futures Studies presents an innovative and collaborative initiative between foresight experts and a selection of artists, all guided by the same gleam: that of better envisioning the future, or rather futures. The MOMus-Museum of Contemporary Art, Thessaloniki (Greece), was at the heart of this project, in the form of workshops for young artists, led by recognized artists from all over Europe. INSPIRE 2023 aimed at offering a creative platform for young artists to explore the future(s) all together, while expressing their creativity through a collective framework for thinking and acting on many alternative future universes. This edition of the event was organized in collaboration with the UNESCO Chair on Futures Research and the Millennium Project. Two resident artists, Mikhail Karikis and Albert Barqué-Durant, led a series of workshop, culminating in an exhibition titled "Tension. Future scenarios and other stories" ran over a period of six months, which ran from April 7, 2023, to September 28, 2023, welcomed more than 9000 visitors in total, making it one of the most successful exhibition at MOMus for 2023. The prototype artworks were produced during various innovative activities, such as a simplified Polak game activity (Hayward & Candy, 2017), introducing the "images of the future" as a basic property of both cultures and individuals. Other activities, such as the infamous Cadavre Exquis, or tasks designed to ignite the creativity of artists to imagine objects belonging to different futures, allowed the participants to think broadly about future possibilities and to conceptualize diverse outcomes for humanity and the world.

This multidisciplinary project has, without a doubt, been a real success, and is paving the way to the creation and imagination of innovative activities that will initiate exploration of the future(s), an example of creativity through collaboration between arts and foresight.

"The future is a safe, sterile laboratory for trying out ideas in, a means of thinking about reality, a method" (Gunn, 2014).

An innovative and collaborative initiative between foresight experts and a selection of artists.

References:

Gillon R. (2000). Welcome to medical humanities–and why. Journal of medical ethics, 26(3), 155–156. https://doi.org/10.1136/jme.26.3.155

Gunn, E. (2014). How America's Leading Science Fiction Authors Are Shaping Your Future. Smithsonian Magazine. https://www.smithsonianmag.com/arts-culture/how-americas-leading-science-fiction-authors-are-shaping-your-future-180951169/

Hayward, Peter & Candy, Stuart. (2017). The Polak Game, or: Where do you stand?. Journal of Futures Studies. 22. 510.6531 .14-/JFS.2017.22(2).A5.

What will the digital world do to the environment? – a prospective analysis for 2030 - 2050 in France

"While digital technology is a vector for improvement and progress, it must not be a source of negative environmental impact". (p.65)

This study entitled "Assessment of the environmental impact of digital technology in France and prospective analysis" has been published in 2022, as a result of a collaboration between the French Agency for the Ecological Transition (ADEME) and the Electronic Communications, Postal and Print media distribution Regulatory Authority (ARCEP). It answers the needs shaped by a study published by the ADEME which suggested four scenarios for achieving carbon neutrality by 2050.

Using the "Life Cycle Assessment" (LCA) methodology, focusing on the three thirds of the digital world – user terminals, networks ans data centers – the report explores through 3 tasks the medium- and long-term courses of action on the matter.
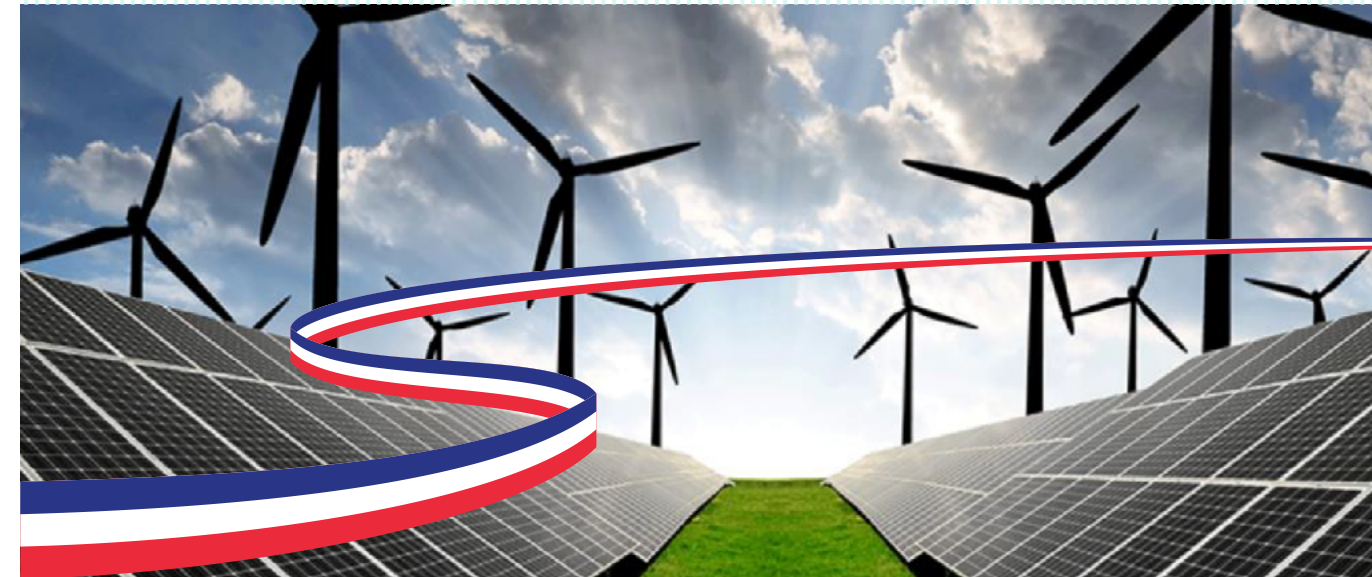
The first task evaluates the current situation and avenues for action following the initial study. The second task then evaluates the environmental impact of digital services in France. The third task finally plans this impact of the digital sector in prevision for the 2030 to 2050 period, according to a trend scenario and makes various projections for the mitigation of this impact.

The findings of the 2030 - 2050 trend scenario are the consequences of a digital consumption pattern that does not really challenge the ways in which digital goods and services are produced and consumed. This situation is therefore unable to meet the challenges of, among others, energy control, carbon impact reduction in line with the guidelines set by the IPCC, or the consumption of natural resources (p.65). ADEME and ARCEP predict a change in consumption habits of digital equipment, in particular with the increase in connected objects, which will have an ever-increasing impact on CO2 emissions.

The report suggests three scenarios to respond to the prospective analysis for 2030: 1- digital sobriety; 2- eco-design of installations, equipment and systems; and 3- generalized eco-design. The study then proposes four scenarios for achieving carbon neutrality for the entire French economy by 2050, each distinguished by its ambition. The "Génération frugale" scenario (scenario 1) is broadly similar to digital sobriety, proposing far-reaching transformations in the way we rethink the use of digital technology. Scenario 2, entitled "Territorial Cooperations", would re-establish shared governance, linking the principles of digital sobriety and eco-responsibility, by engaging society in a search for solutions for responsible digital use. Scenario 3, "Green Technologies", would see the development of technologies that respond to environmental challenges, making the most of natural capital to preserve nature, recalling the widespread eco-design scenario proposed for 2030. Finally, the fourth scenario, "Pari réparateur", is based on a principle of "digital headlong rush", the paroxysm of the digital revolution, a radical vision that implies the need to master other energy production and storage technologies.

> **While digital technology is a vector for improvement and progress, it must not be a source of negative environmental impact.**
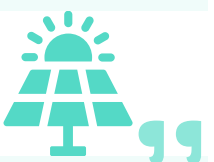
> **Focusing on the three thirds of the digital world – user terminals, networks and data centers – the report explores through 3 tasks the medium- and long-term courses of action.**

References:

Transition(s) 2050. Choisir maintenant, agir pour le climat, ADEME (Agence de la transition éco - logique), 2021. URL: https://librairie.ademe.fr/cadic/6531/transitions2050-rapport-compresse.pdf?modal=false

Podcast «La Boussole des Futurs» (The Compass of Futurs): What will the training of the future look like? – July 2023

This podcast, part of the series entitled "La Boussole des Futurs" (The Compass of Futurs), looks at the trends redefining the world of vocational training, the shapes it could take, and the transformations that the global approach to learning itself could undergo.

The guest speaker, Gregory Gallic, Manager Offer & Expertise at Cegos, a major player in professional training in France, brings his expertise to bear on the issues surrounding training, in particular through the results of research conducted as part of his work. Together, the speakers attempt to answer the crucial question: should we repair the future?

Gallic discusses new trends in education, developments in training such as immersive learning, the increasingly widespread use of virtual reality, and the importance of artificial intelligence. The latter is particularly important when it comes to creating adaptive learning models, through content generation for example. The speakers stressed the importance of behavioral anchors. This applies not only to learning methods, but also to the application of acquired knowledge in the workplace. Herein lies the key to this discussion: how can training be better adapted to the needs of the workplace, from both the employee's and the company's points of view? Today, it seems that it makes more and more sense to train only when you need it, so that the learning process takes less time, autonomy is increased, and there is a major, positive link between employment and training.

Technological innovation is everywhere, all the time. In France, in 2021, more than 500 start-ups were created, with 17 of the top 20 focusing on training. Using digital technology to improve training services would give users a greater sense of agency and independence. The individualization of training, while questionable in terms of equality, is, for the speakers, a major challenge for the future.

While Gallic mentions the growing appetite for vocational training, he also states that France remains a victim of cultural passivity when it comes to acquiring new skills and competencies. Participants are sometimes in a wait-and-see posture, with no clear objectives or pro-activity. Learners should set up their targets and have the hand on their training. In addition, teachers, who are still indispensable, need to show openness and accept that they are no longer the sole owners of content. The co-creation of knowledge must become the key to the training of the future.

For Gallic, we need to focus on skills that make us more human, as they will make us more capable of meeting the challenges of the future and learning how to work with artificial intelligence. In his view, the three skills that should form the basis of training are: 1- critical thinking and transdisciplinarity, 2- ethics and responsibility, 3- creativity.

Without a doubt, this podcast opens up the discussion on the approach that training should take in the future and gives concrete food for thought on how to improve learning and its methods to make the process more relevant, useful and effective for all.

How can training be better adapted to the needs of the workplace, from both the employee's and the company's points of view?

In France, in 2021, more than 500 start-ups were created, with 17 of the top 20 focusing on training.

How to make a future scenario as immersive and explorable as a videogame – June 2024 – McGonigal – APF Compass June 2024

Jane McGonigal, Ph.D, researcher at the Institute for the Future (IFTF), wonders how to make hypothetical scenarios feel as realistic, immersive and explorable as popular video games. She reminds the agency provided by video games, where the user feels powerful, completely in charge, and confident. Using her knowledge of positive psychology of games and the art of designing immersive virtual experiences, McGonigal tries to apply the same gameful creative agency to the imagination of the future.

The author explains that her ambition was initiated above all by the desire to give people the opportunity to feel as involved in their potential future as they do when they launch a video game. In particular, she refers to the game "Portal", in which the player wakes up in a strange room, unsure of how he got there, and just has to act, explore and figure out for himself how to move forward. With this in mind, McGonigal wanted to approach her work in a format she calls "the first-person future". This image is borrowed from the world of video games, where the player doesn't take on the traits of a fictional character, but instead finds himself moving around, from his own body and point of view.

McGonigal gives the example of one of the IFTF projects, entitled "The Road to Zerophoria", a world where zero waste is the new normal. The scenarios proposed always take the form of an initial story-telling, with suggestions for action. This is one of the keys the author is talking about: giving people the opportunity to make decisions, guided by their values, hopes, fears or personal experiences. This gives people a sense of personal agency. McGonigal mentions one of the obsessions of video game designers that inspired part of "The Road to Zerophoria": the emphasis on creating positive emotions: "How do we want players to feel when they play?" Curiosity, excitement, joy, hope, satisfaction and love are all examples of positive emotions that can guide the creation of scenarios. In "The Road to Zerophoria", Zerophoria refers to the sense of joy and pride initiated by the new normal of "zero waste", in short, an avenue to combat climate change anxiety.

The author concludes with some advice and food for thought for those wishing to embark on scenario creation: make it personal, relatable and accessible; add a ‹moment of choice› that gives a feeling of agency to the player and invent ways of reaching new positive emotions.

The player wakes up in a strange room, unsure of how he got there, and just has to act, explore and figure out for himself.

Scenario creation: make it personal, relatable and accessible.

2 Applied research

Humor & propaganda or how videographers convey their extremism

Vey, V., & Perrier, Z. (2022). L'humour antiféministe du Raptor et de Papacito: analyse d'une stratégie énonciative de l'extrême-droite en ligne. Cahiers de recherche en politique appliquée, 64- 81.

In this paper, Vey and Perrier, both students at the École Normale Supérieure in Lyon, France, examine the use of humor in the production and dissemination of right-wing extremist and anti-feminist content online. While humor has long remained on the periphery of social science studies, it is becoming increasingly important when it comes to studying new mediums such as YouTube. To answer their questions, the authors have based their work on 39 videos published by two French far-right video artists: Raptor and Papacito. The former has been active on YouTube for several years, commenting on current affairs with violence and vulgarity. The latter, initially a blogger and writer, made a name for himself with two viral videos that racked up over 10.5 million views.

For the authors, antifeminism in fact serves as an ideological basis for the deployment of fascist-masculinist content. The links between masculinism and the far right have been demonstrated before, but the aim here is to understand how discourses on the crisis of masculinity are shaped by antifeminism. The authors highlight three aspects of this so-called crisis: an alarmist diagnosis of the state of the Masculine (p.68), an indictment of feminism (p.70) and a call for the mobilization of men (p.72). Using electrifying quotes from the videos posted by the two video producers, the authors illustrate the extreme ideas they promote, such as the idea of a gendered version of the "great replacement" theory, a racist and sexist idea that the nation, overly feminized, would be at the mercy of the violence of overly virile non-white masculinities (p.70). Positive references to far-right men such as the politician Jean-Marie Le Pen are also evidence of the explicitly extremist orientation of the content studied here.

More specifically, the authors examine the two content creators' use of humor as an effective political tool in their far-right propaganda. By using humor, the video makers blur the boundary between speech and reality. They blend the lines between sincere and clumsy speech, and between political position and humorous discourse. In their stylistic analysis, the authors identify two recurring humorous tools in Raptor and Papacito: the "punchline" and the "portrait".

The punchline evokes physical violence, the kind that strikes with its force, bringing the target back to order. With punchlines, laughter is provoked by a game of repetition/variation, coupled with excessive violence of expression, in search of originality. Through a precise analysis of syntactic structures, the authors explain how punchlines materialize the bicategorization and hierarchization of the extreme right-wing social world (p. 77). The portrait, a caricatured description of individuals or groups, at times meliorative or pejorative, maintains a tension in the content between fidelity and exaggeration, while claiming to "tell the truth". Once again, precise syntactic and semantic analysis enables the authors to demonstrate that videographers make a genuine ideological polarization using these portraits, such as when Papacito refers to Saddam Hussein as an example of masculinity.

Antifeminism in fact serves as an ideological basis for the deployment of fascist-masculinist content.

Certain habits, such as the use of humor, allow extreme ideas to be transmitted without appearing to be propaganda.

Applied research at the service of design

Neuman, M., Perrone, C., & Mossa, A. (2021). Applied research by design: an experimental collaborative and interdisciplinary design charrette. European Planning Studies, 30(6), 1013–1033.

The authors, all three affiliated with university architecture departments (London, UK & Florence, Italy), report on a case of collaborative design charrette aimed at creating more healthy and sustainable cities. The project was a two-week long interdisciplinary urban design charrette, where participants examined urban and regional issues and opportunities for the Metropolitan Area of Florence, Italy. The charrette, which could be described as short, collaborative meeting, tried to respond to the research question: "To which extent is it possible to simulate in a multi-disciplinary design and planning studio the context, conditions and principles for the preparation for a spatial / general / master / comprehensive plan that addresses sustainability in the built environment with a holistic, multi-factor and multi-scalar approach?" (p.1014).

18 architecture students took part in the international workshop, focusing on how to improve the environment, health and well-being of the chosen area. The project was built around lectures, site explorations, discussions, data analysis as well as design, to interrogate practices of sustainable urbanism and rethink the concept of sustainability.

The chosen area, situated at the outskirts or northwest Florence, is not urban yet not properly rural. The students were asked to simultaneously address issues of development, ecology, economy, agriculture, transport and infrastructure by "developing integrative analyses and solutions that were intended to improve health and wellbeing of humans, other species, ecological habitats and the overall metropolitan area" (p.1021). Climate change, globalization and urban growth, and the way they interact with each other, were at the center of the projects. Many stakeholders were engaged in the project, such as municipalities or NOGs.

After a detailed description of the project, including the day-to-day activities carried out by the group, the authors review the challenges posed by such a project. First, an educational challenge arose when groups from two different traditions had to work together: the UK and Italy. The organization of the charrette was able to

explore these differences, putting them at the service of the project's initial objective: to find avenues for collaboration where they seem laborious. That being said, the language was sometimes a challenge, and may have limited certain exchanges. Then, the interdisciplinary variety of the working groups, seen at first as a challenge, enabled fruitful dialogue between participants, work on finding connections and mutual acquisition of skills. The experimental nature of the project sometimes challenged participants, who may have found it difficult to implement innovative techniques that were less structured than traditional processes.

Finally, the authors conclude with implications for applied research. For them, these implications can be summed up as: the acquisition of relevant data, the use of critical and analytical skills to tackle problems, coherent and revealing exchanges and argumentations between participants, the communication of results and their originality.

The interest of this article resides in the fact that it details a methodology and initial assessment on the process employed, as well as learning outcomes and opportunities for improvement for similar projects. The project is extremely valuable in that it uses applied research as a means of discovering and creating new knowledge.

18 architecture students took part in the international workshop.

Develop integrative analyses and solutions intended to improve health and wellbeing of humans.

Sustainable development in academia

Koivunen, T., Konst, T. and Friman, M. (2024), "Building a sustainable future: ideas and perceptions of university staff", Foresight, Vol. 26 No. 2, pp. 241- 252.

This article looks at the importance of applied research in academia. To understand its ins and outs, the authors conducted qualitative research with employees of universities of applied sciences (UASs) in Finland, asking them about how their institutions could play a role in sustainable development.

The authors first remind us of the importance of education and higher education institutions (HEI) in "providing the platform and mechanisms needed for all human beings to be active agents of change" (p.242).

According to other authors, sustainable development implies the implementation of "cross-cutting, multidisciplinary, interdisciplinary and multisectoral collaboration, reorganization and rethinking" (Agbedahin, 2019). Among the key players in the transition to sustainable development are the staff and members of HEI. Their role in this transformation is unquestionable.

Their "perception of sustainability will influence if and how they teach it and, in turn, influence the quality of their students' understanding and potential practice of the concept" (p.244). As such, this study naturally turned to them, to understand their ideas and perceptions of the UASs' work towards sustainable development. Following a presentation of the theoretical framework concerning sustainability in higher education, and in particular the objectives set out in the United Nations Agenda for Sustainable Development 2030, the authors point out that a sustainable future requires UASs to be able to anticipate as well as possible, by promoting distinct and effective scenarios. The aim of the survey was to compile clear perspectives and proposals from UASs' members concerning their responsibility in terms of sustainable development in the years ahead. The data was collected through an anonymous survey, sent to 24 UASs in Finland in January 2021. 1791 responses were compiled, covering a variety of employee categories (45% in education, 32% in administration, 24% in research and development). The data collected was analyzed using qualitative content analysis, with a deductive approach framed by

sustainability themes in HEIs drawn from the literature.

The responses collected were categorized as follows: education & curricula, societal impact and research, development and innovation, management and staff competence, campus activities, comprehensiveness and the importance of setting an example. The main elements of response concern the need to integrate SD into the strategies implemented by the UASs, as well as into "dynamic and holistic" RDI and campus life activities. The importance of staff collaboration, support and encouragement is also one of the key elements identified by the study. Likewise, the promotion of SD objectives and the importance of setting an example would enable better communication, understanding and opportunities for sharing best practices.

The authors conclude on a positive note, namely that the responses obtained suggest that the promotion of SD in HEIs is very encouraging, and that, while their role is undeniable, it is vital that progress and management support are provided by the relevant bodies, in order to achieve a sustainable future.

> **Provide the platform and mechanisms needed for all human beings to be active agents of change.**

24

UASs in Finland in January 2021

> **1791 responses were compiled, covering a variety of employee categories (45% in education, 32% in administration, 24% in research and development).**

References:

Agbedahin, A.V. (2019), "Sustainable development, education for sustainable development, and the 2030 agenda for sustainable development: emergence, efficacy, eminence, and future", Sustainable Development, Vol. 27 No. 4, pp. 669 - 680.

Collaboration between industry & academia – a case study

In this paper, the authors investigate a large-scale, 4-year Industry-Academia Collaboration (IAC) and Research, Development and Innovation (RDI) program case, called Need for Speed (N4S) from a knowledge creation and learning perspectives. All the authors participated in the program, with the second and third authors leading it while representing respectively the industrial and academic perspectives. They present and evaluate a knowledge repository they called "Treasure Chest" compiled during the case program.

The authors start by presenting the challenges and successes factors of effective collaboration between industry and academia. Collaborative learning capabilities will be more and more required in the future, as "no innovation can be done in isolation" (p.2). The Need for Speed (N4S) program, which took place from 2014 to 2017, gathered 11 large industrial organizations, 14 SMEs, and 10 research institutes or universities.

The goal of the program was as stated: "N4S will create the foundation for the Finnish software intensive businesses in the new digital economy" (p.2). Business cases (x49) were compiled in addition to the strategic research goals.

Initially called a "toolbox", the Treasure Chest was compiled then disseminated through a website, available to the public, and consisted of six sections: 1- Main strategic themes, 2- Guiding and triggering questions to explore each theme from typical angles, 3- Solutions for the different research focus areas in each theme, 4- Narratives from industrial and academic partners, 5- Book publications, 6- Keyword selectors to explore the research publications. Attractive visuals help you visualize the repository through the paper (p.4, 5, 7 & 8), as well as example of "Gold Nuggets", tangible benefits of the research. For instance, the website compiles scientific conference papers co-authored by academic researchers and industrial company partners.

In the discussion, the authors detail the ins-and-outs of the Treasure Chest, mentioning for instance that one of its goals was to "produce actionable knowledge for industrial use" (p.9). All the papers published were co-authored by both academia and industry representatives. One of the results of the program was the publications of more than 15 theses, for which the students worked with both industrial and academic partners, illustrating the collaborative work of this research. The authors mention that the N4S program responds to one of the priorities set by the Finnish government to build "internationally attractive knowledge clusters, networks, and innovation systems with leveraging the skills in higher education institution to accelerate RDI for supporting and revitalizing businesses by 2030" (p.10).

The paper suggests practical pointers for further research, such as "coaching and uniting leadership", "supporting ICT and communication infrastructures, competences and resources", "alternating between exploration and exploitation", "balancing between theory and practice". The authors also draw attention to points that could prove detrimental, such as the uncertainty of the funds allocated to projects, which could lead to a loss of competitiveness. They remind that setting specific agenda for the projects are key to their success. Finally, they advise that, in the future, large-scale IAC projects should become more and more common, as they will lead to innovative work, and contribute to setting beneficial, energizing and long-term fruitful collaborations.

> **The challenges and successes factors of effective collaboration between industry and academia.**

> **Setting specific agenda for projects are key to their success.**

Where will climate change hit hardest?

Aldhous, P. (2024), "Where will climate change hit hardest? These interactive maps offer a tellgate glimpse", Proceedings of the National Academy of Science (PNAS)

"What we remember is the drought, the flood, the heatwave, the storm. That's how we can help to connect these targets with people's lives." (K.Hayhoe, climate scientist, Texas Tech University)

Peter Aldhous, a data journalist, presents in this article a series of interactive maps created by PNAS (Proceedings of the National Academy of Sciences of the United States of America) using projections compiled by Probable Futures, a non-profit climate literacy initiative that makes tools, stories and resources to understand the climate challenges ahead. The maps illustrate that many countries are likely to face multiple climate stressors in the future, which will have dreadful consequences on populations. Life-threatening heat and disastrous floods are only examples of these challenges.

Aldhous first focuses on the potentially fatal dangers of heat and humidity. In hot weather, the body cools itself mainly by evaporating sweat. However, this natural cooling process is not possible in periods of high heat and humidity. The author refers to the "wet bulb temperature", or when wrapping a thermometer bulb in moist muslin, as a means of assessing humidity. Until recently, experts "considered a wet bulb temperature of 35°C as the limit of survivability". This has been questioned by researchers such as Jennifer Vanos and her colleagues of Arizona State University, who have highlighted much higher, life-threatening risks related to the limits of people's ability to sweat due to humidity levels.

The section on devastating droughts doesn't give any better hope, since it is estimated that these will increase drastically as temperatures rise. For example, the Cairo region in Egypt, where the current probability of experiencing a prolonged drought over a year is 25%, would increase to 75% with a warming of 3°C.

The increasing risks of destructive floods mentioned in the article are hardly more encouraging. According to research, severe precipitation is set to become increasingly frequent. As Aldhous mentions: "it's a simple consequence of atmospheric physics: Warmer air is capable of carrying more water vapor, which ultimately gets deposited as rain".

To conclude, the data journalist mentions that these projections are not inevitable. He reminds us that the predispositions countries take will have a real impact on the path global warming takes. Today, policies are not meeting the targets set out in the 2015 Paris Agreements (1.5°C), however, nations could manage to limit the average global warming and its consequences. A final point is made about the importance of changing the conversations focus, from a global perspective to a local one if we want decisions to be fully efficient.

> **"What we remember is the drought, the flood, the heatwave, the storm. That's how we can help to connect these targets with people's lives."**
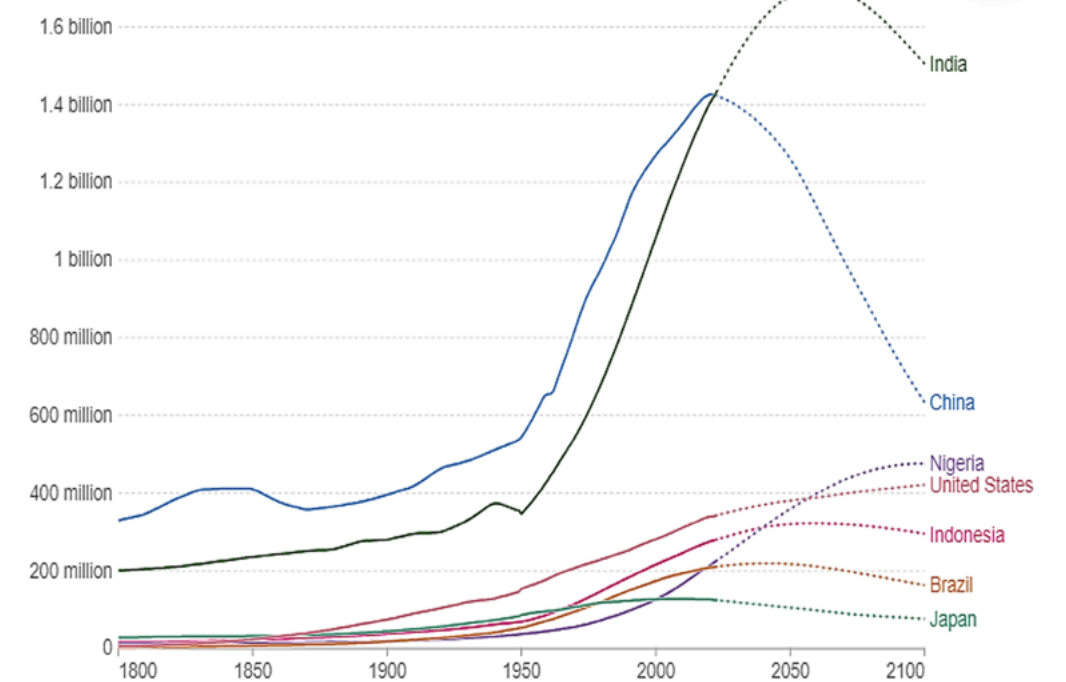
> **The probability of experiencing a prolonged drought over a year is 25%, would increase to 75% with a warming of 3°C.**
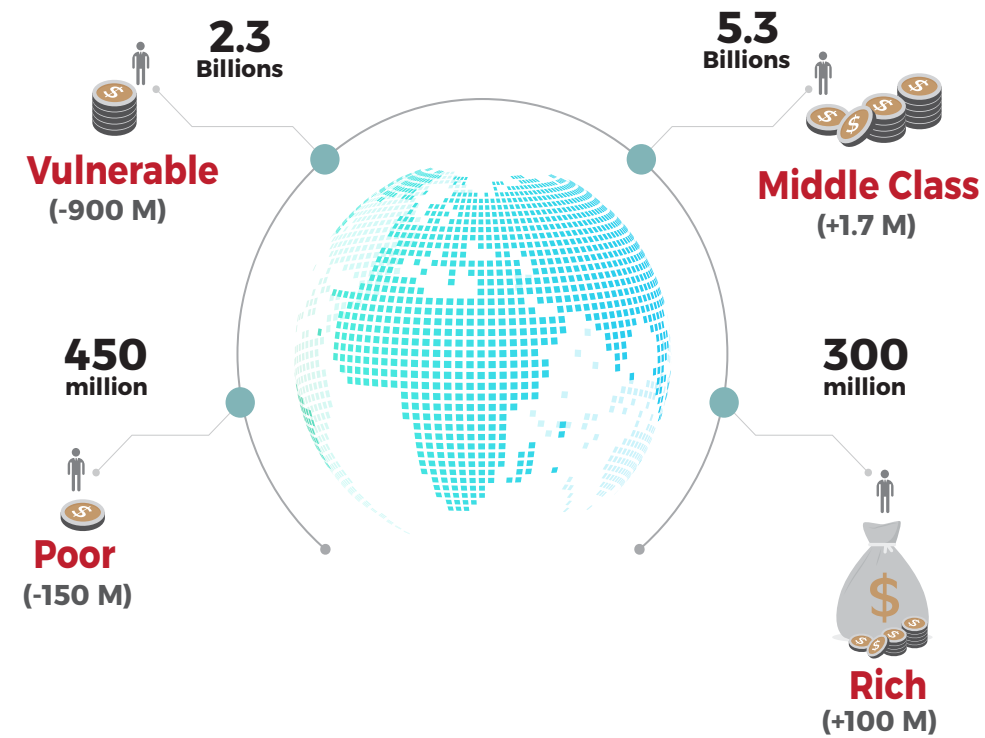
3- The future in numbers

Population, 1800 to 2100

Future projection are based on the UN medium-fertlity scenario.

Data source: HYDE (2023); Gapminder (2022); UN WPP (2024)
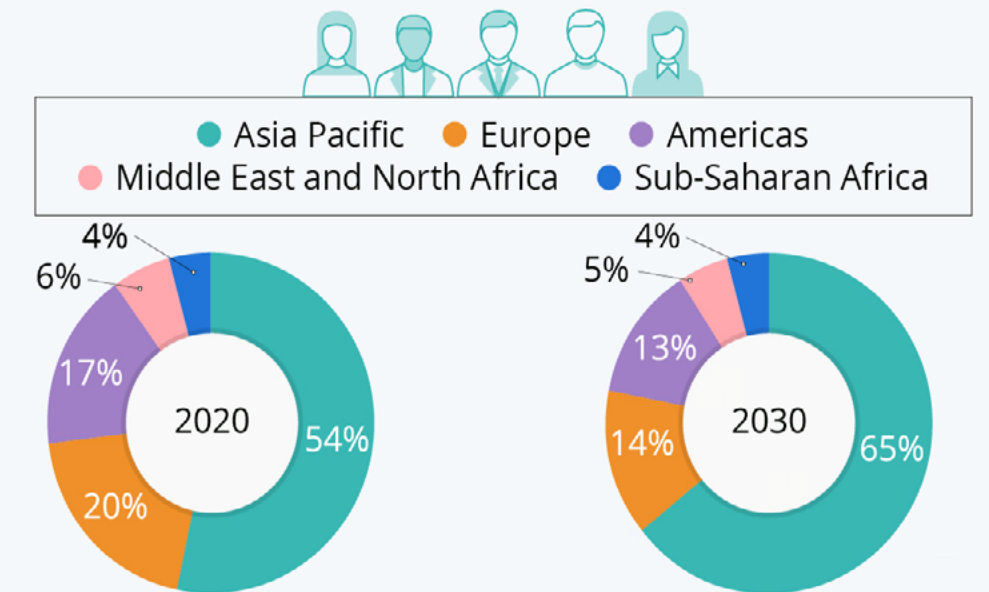
Middle Class Dominance in 2030

2.3 Billions

Vulnerable (-900 M)

5.3 Billions

Middle Class (+1.7 M)

450 million

Poor (-150 M)

300 million

Rich (+100 M)

European Strategy and Policy Analysis SystemTHE MEGA-TRENDS, WELCOME TO 2030,

https://ec.europa.eu/assets/epsc/pages/espas/chapter1.html

The Rise of the Asian Middle Class

Share of the global middle class by region (in percent)

- ● Asia Pacific ● Europe ● Americas
- ● Middle East and North Africa ● Sub-Saharan Africa

2020

4%
6%
17%
20%
54%

2030

4%
5%
13%
14%
65%

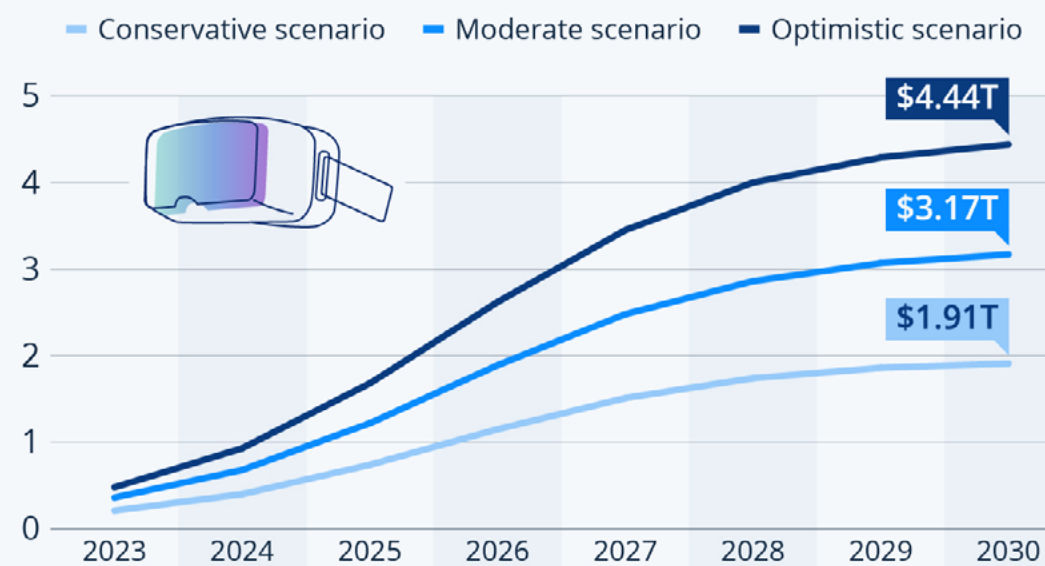Middle class = household with incomes between $11-$110 per person/day (PPP) in 2011
Source: Brookings Institution

World Economic Forum With the collaboration of Statista. This chart shows the rise of the Asian Middle Class

https://www.weforum.org/agenda/202007//the-rise-of-the-asian-middle-class/

Metaverse: The Land of Opportunity?

Forecast total addressable metaverse market, by scenario*

- Conservative scenario
- Moderate scenario
- Optimistic scenario

$4.44T
$3.17T
$1.91T

2023 2024 2025 2026 2027 2028 2029 2030

* Scenarios represent specific shares of the digital economy shifting to the metaverse: conservative (15%), moderate (25%), optimistic (35%).
Source: Statista Advertising & Media Markets Insights

Martin Armstrong, Metaverse: The Land of Opportunity? Feb 3, 2023

https://www.statista.com/chart/29239/forecast-total-addressable-metaverse-market/

Projected number of people in extreme poverty, 2031

Number of people projected to be living in extreme poverty through to 2030. Extreme poverty is defined by the international poverty line of $1.90 per day (2011, PPP-adjusted). These projections are based on a business-as-usual scenario of recent socioeconomic trends and medium future population scenarios.
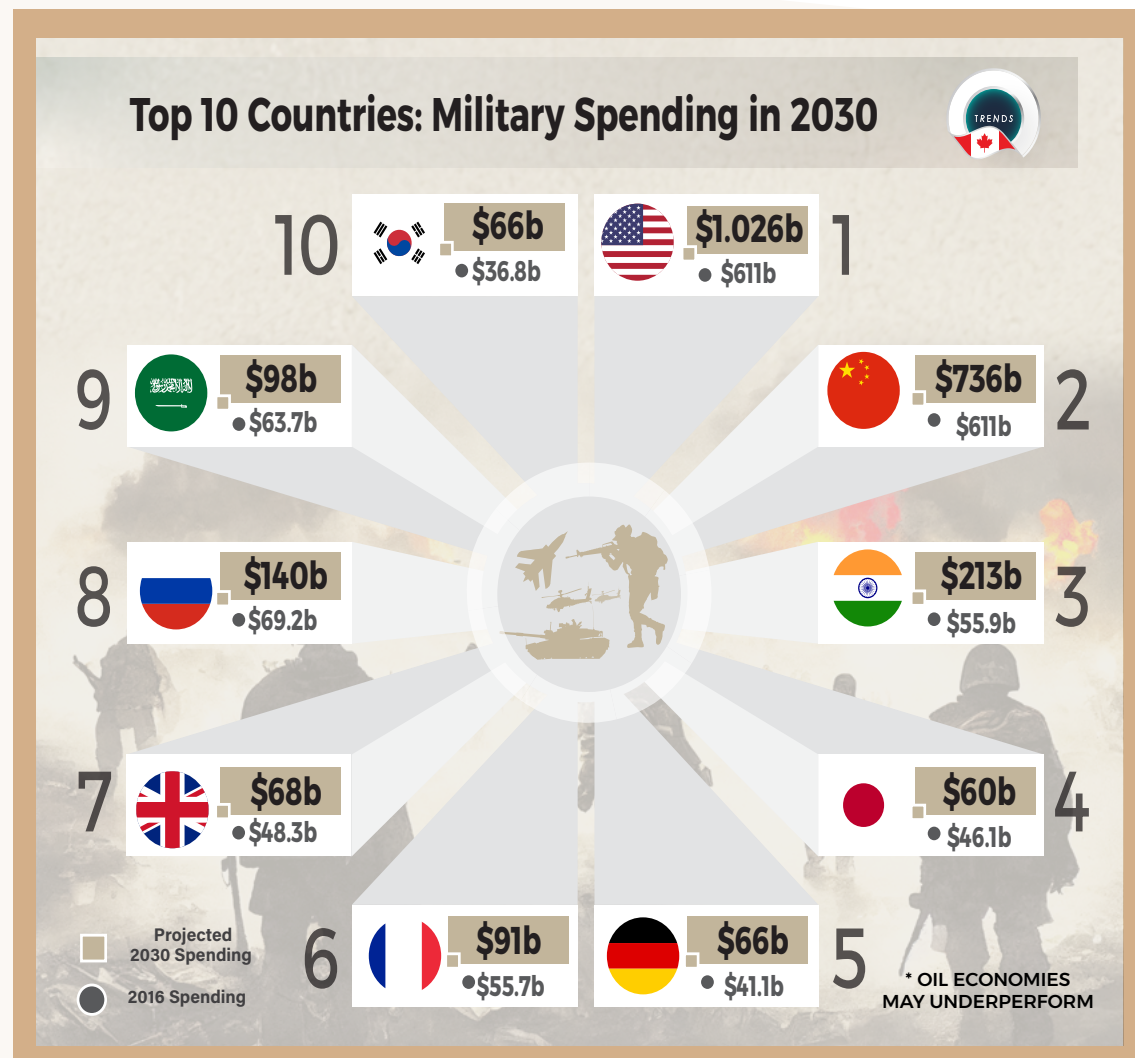
0   1 million   2 million   5 million   10 million   20 million   50 million
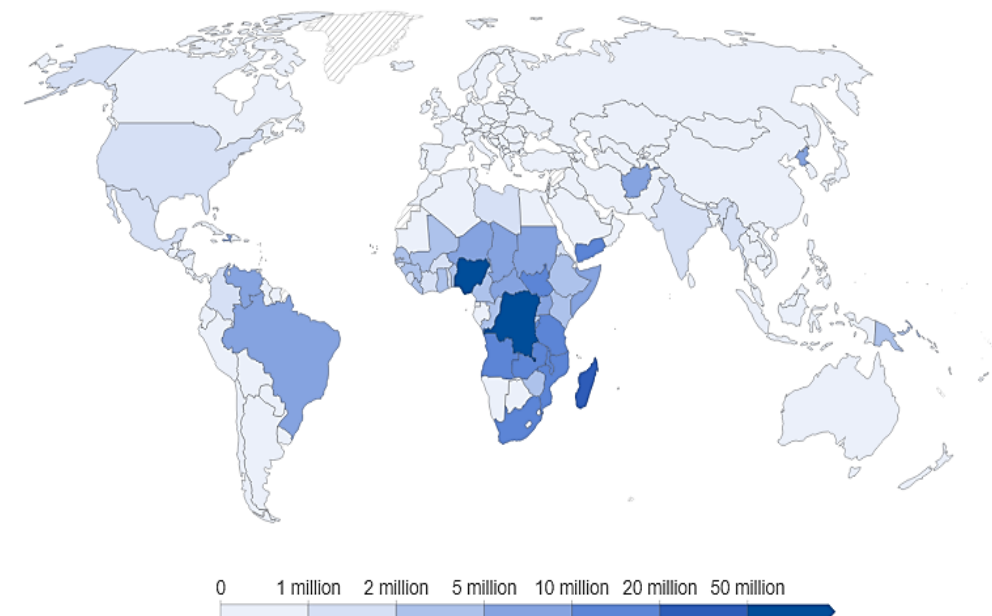
Data source: Crespo-Cuaresma et al. (2018)   OurWorldInData.org/leaving-no-one-behind | CC BY

Our World in Data, Projected number of people in extreme poverty, 2031

https://ourworldindata.org/grapher/extreme-poverty-country-2030

Top 10 Countries: Military Spending in 2030

Rank	Country	Projected 2030 Spending	2016 Spending
10	South Korea	$66b	$36.8b
1	United States	$1.026b	$611b
9	Saudi Arabia	$98b	$63.7b
2	China	$736b	$611b
8	Russia	$140b	$69.2b
3	India	$213b	$55.9b
7	United Kingdom	$68b	$48.3b
4	Japan	$60b	$46.1b
6	France	$91b	$55.7b
5	Germany	$66b	$41.1b

Projected 2030 Spending
2016 Spending

* OIL ECONOMIES MAY UNDERPERFORM

European Commission, VISUALISATION, Top 10 Countries: Military Spending in 2030 04 SEP 2018

https://knowledge4policy.ec.europa.eu/visualisation/top-10-countries-military-spending-2030_en

Continental Shift: The World's Biggest Economies Over Time

Countries with the highest GDP on Earth in 1992, 2010 and 2028

Legend: Asia | Europe | Americas | Russia

1992	2010	2028*
U.S.	U.S.	China
Japan	China	U.S.
Germany	India	India
Russia	Japan	Japan
China	Germany	Germany
Italy	Russia	Indonesia
France	Brazil	Russia
India	France	Brazil
Brazil	UK	France
UK	Italy	UK

Based on purchasing power parity, intl. dollars
* projection

Katharina Buchholz, BIGGEST ECONOMIES Continental Shift: The World's Biggest Economies Over Time, Statista, Apr 20, 2023

https://www.statista.com/chart/22256/biggest-economies-in-the-world-timeline/

Quantum Leap for Quantum Computing

Projected worldwide market size of quantum computing 2020- 2030 (in million U.S. dollars)

2020-2030 CAGR* **+43%**

9,066

260

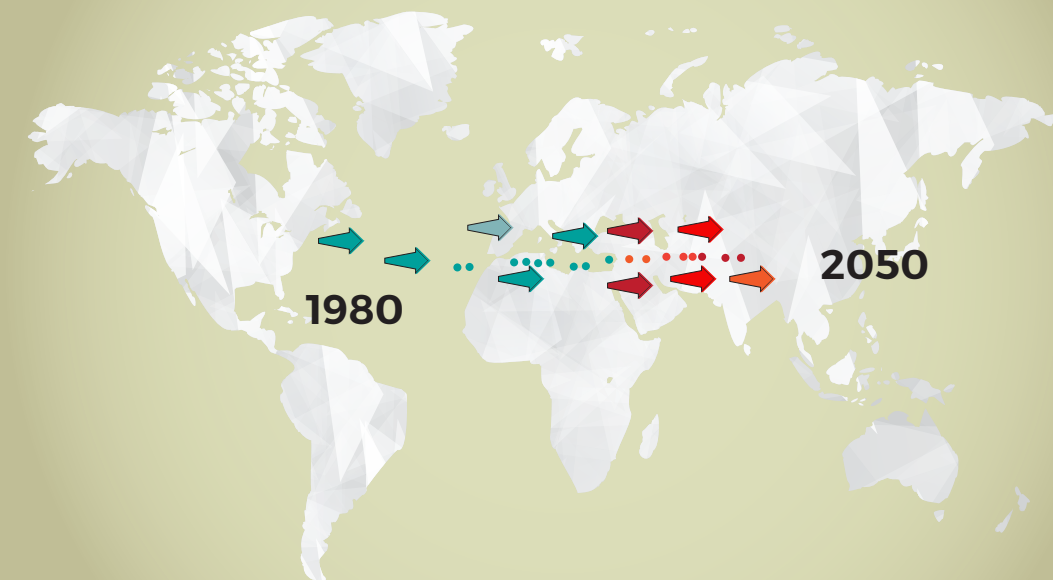2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030
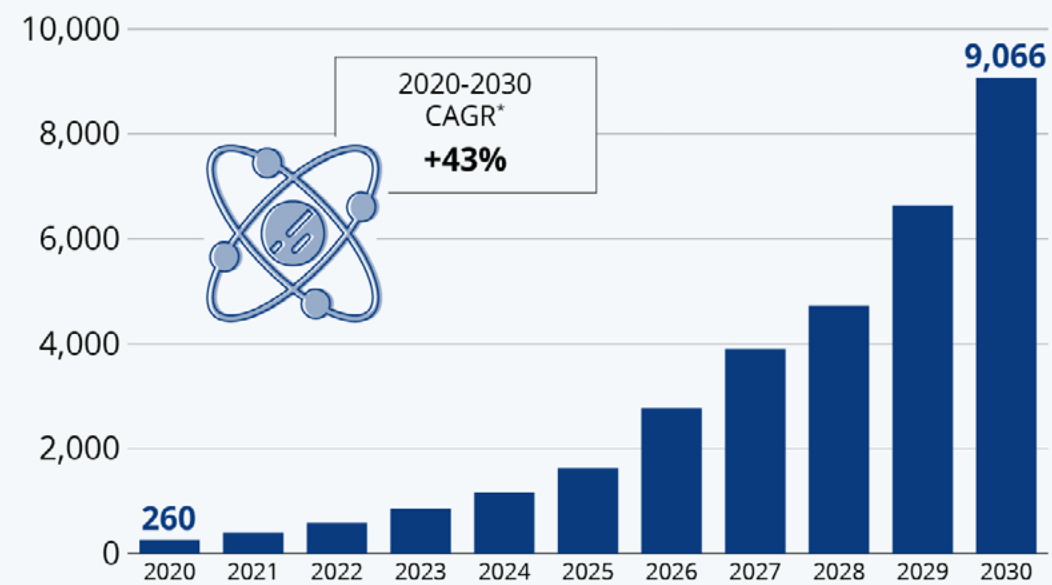
* Compound (average annual) growth rate
Source: Statista Digital Economy Compass 2021

Statista, Katharina Buchholz, Quantum Leap for Quantum Computing, Dec 2, 2021

https://www.statista.com/chart/26317/quantum-computing-market-value/

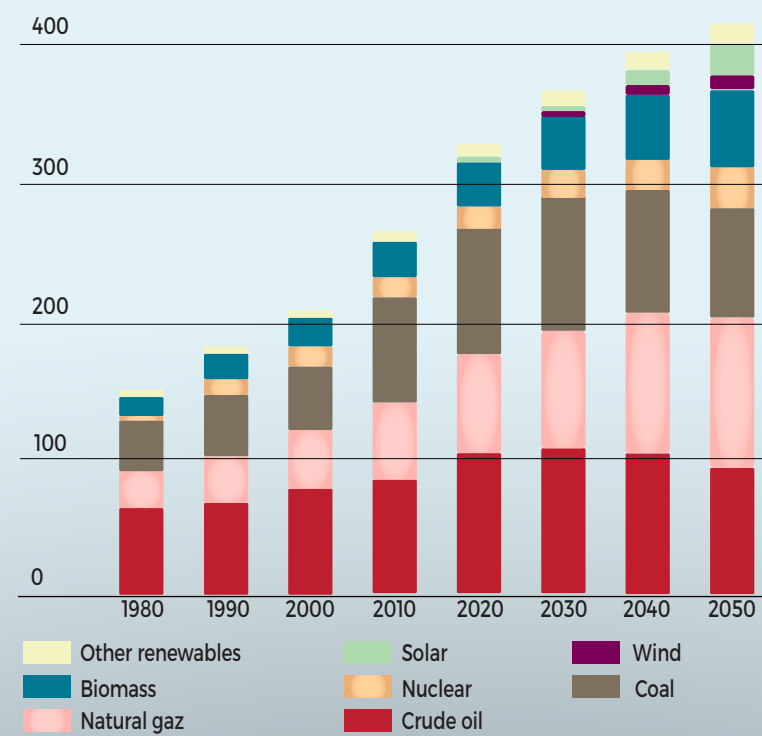**Economic Situation**

1980   2050

Global economic center of gravity moving from west to east

Unece. The World in 2050, Some ideas,

https://unece.org/fileadmin/DAM/timber/meetings/201820180123//The_World_in_2050.pdf
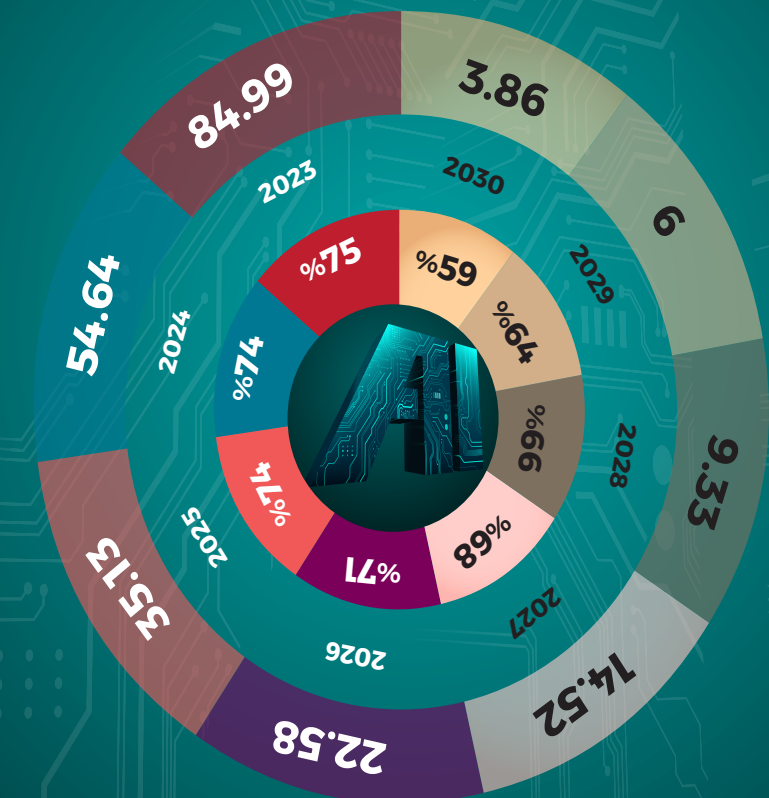
European Commission, VISUALISATION, Top 10 Countries: Military Spending in 2030 04 SEP 2018

https://unece.org/fileadmin/DAM/timber/meetings/201820180123//The_World_in_2050.pdf

Estimated value of the banking sector›s generative artificial intelligence (AI) spending worldwide in 2023, with forecasts from2025 to 2030 European Strategy and Policy Analysis System (ESPAS), WELCOME TO 2030: THE MEGA-TRENDS,

https://www.statista.com/statistics/1457711/banking-sector-estimated-gen-ai-spending-forecast/