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Editorial

Innovation and artificial intelligence (AI) are changing the way we live, learn, and work. Over the past decade, AI has become increasingly present in our day-to-day lives. The upheaval and hype caused by the release of ChatGPT by OpenAI has highlighted this significant transition.

The potential applications for AI in the world of education are also becoming more apparent. From natural language processing to AI-supported grading, AI has the potential to revolutionize learning and teaching.

With the ESMT Master in Analytics and Artificial Intelligence, we prepare graduates to work at the intersection of analytics and management. In the newly launched program, which starts in September 2023, students learn to make the best use of their quantitative skills, leveraging them later in the workplace to create value through data-driven solutions. Graduates will be able to identify key opportunities of business analytics and machine learning for organizations.

The significance of AI at universities goes beyond a single master program. While preparing to write this editorial, I asked ChatGPT to "make a list of 10 advantages AI tools bring business school students." Its abridged answers were:

- 1. Personalized learning: Al-powered tools can analyze student performance and tailor content to their needs.
- 2. Improved engagement: Al tools, such as chatbots and virtual assistants, can provide 24/7 support and answer queries in real time.
- Enhanced collaboration: Al-powered tools can provide students with opportunities to work together on group projects.
- Enhanced feedback: AI-powered tools can provide immediate performance feedback, enabling students to adjust and improve their understanding of the subject matter.
- 5. Time-saving: Al-powered tools can automate routine tasks, such as grading and data analysis.
- 6. Personalized study plans: Al tools can analyze student performance data and create study plans that highlighting areas where students need to focus.
- Improved learning outcomes: AI-powered tools can identify areas of weakness and provide personalized support to address these gaps.

- 8. Accessible learning: Al-powered tools can provide real-time translation and transcription services, enabling students to learn in their preferred language.
- 9. Adaptability: By adapting to different learning styles, Al-powered tools can help students learn at their own pace and in their own preferred format.
- 10. Competitive edge: Al-powered tools can give business school students a competitive edge by providing them with advanced analytical and problem-solving skills, which are highly valued in today's job market.

Universities, and particularly business schools, are well positioned to capitalize on the potential of AI. By embracing AI, universities can provide students with the skills and knowledge to become successful in the ever-evolving digital economy. Faculty at ESMT Berlin agree: We cannot and should not try to prevent students from using AI. Instead, we must embrace technological advancement and support students in learning to harness the opportunities that come with innovative technology. At the same time, we recognize the potential dangers of AI. We must therefore also prepare students to determine fact from fiction and to use the new technology responsibly, as individuals and as leaders of organizations. Only so will we stay true to our mission to develop responsible leaders.

Please turn the page to find out more about our Master in Analytics and Artificial Intelligence. In this issue, you may also read about AI startups, their potential in healthcare and biotech, as well as their importance for the European startup ecosystem. You can also learn more about the challenges and potential opportunities of AI in cybersecurity. AI may be used to better security defense, but it also has the potential to be exploited for malicious intentions. And please take note, the artwork in this issue was also created using AI.

At ESMT, we look forward to navigating this exciting future with you!



JÖRG ROCHOLL President, ESMT Berlin

IN THIS ISSUE

Summer 2023

<mark>03</mark> EDITORIAL

FEATURES

05

Beyond ChatGPT: AI, startups, and future opportunities By Thorsten Lambertus

09

Mastering the future: Analytics and AI at ESMT By Catalina Stefanescu-Cuntze and Roland Siegers

12

Artificial intelligence: double agent in cybersecurity By Heli Tiirmaa-Klaar

20

Al and its importance for the startup ecosystem – a European perspective By Baris Efe





IN PICTURES

18

Meeting tomorrow's challenges: Is stakeholder capitalism the answer?

IN THE NEWS

16

To win with Al, focus on our humanity By Francis de Véricourt

25

How does digitalization affect the labor market? By Jörg Rocholl

The cover image was created by Jens Weinmann on March 7, 2023, with Google DeepDream's "Text 2 Dream" engine using the text prompt "robot climbs out of a brain of a manager" and the following modifiers: elegant, matte background, Picasso, and acrylic art.

Released to the public in 2015, Google's DeepDream Generator reinterprets images with a machine learning algorithm. Its "Text 2 Dream" functionality, which was added in 2022, can generate art and photorealistic images from a text prompt or a combination of a text prompt and a base image.

INSIDE ESMT

28

Of Note

29 Reading Room

30

In Profile with Lea Dänschel

33

ESMT Alumni Network Reimagined



Imprint

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Beyond ChatGPT: Al, startups, and future Dy THORSTEN LAMBERTUS opportunities

Just three years ago, AI was the #1 buzzword in the startup ecosystem and every investor chasing AI startups. Yet, as reported in the Financial Times in 2019, the London-based venture capital firm MMC Ventures found no evidence that AI was an important part of the products offered by 40 percent of Europe's 2,830 AI startups. A lot has happened since then. Al has emerged as one of the most promising and exciting fields in technology, with the potential to revolutionize the way businesses operate across industries. Al startups are at the forefront of this innovation, developing cutting-edge solutions that leverage machine learning, natural language processing, computer vision, and other Al techniques.

The state of AI startups today

In recent years, the AI startup ecosystem has experienced explosive growth and record levels of investment. According to the 2022 State of AI report by CB Insights, in 2021 alone, AI startups raised over \$70 billion in funding, a significant increase from the \$31 billion raised in 2019. Despite investments decreasing in 2022 to still \$45 billion, the long-term uptrend will presumably continue, as will the variety of applications.

While the growth of the AI startup ecosystem is exciting, there are also several challenges for startups looking to develop and deploy AI solutions. Perhaps the biggest challenge is the shortage of skilled AI talent, which has made it difficult for startups to find and hire the technical expertise they need to develop and scale their solutions. Besides talent shortages, AI startups also face other challenges, including data quality and availability, regulatory and ethical considerations, and the need to build and maintain customer trust. Many AI startups are working with sensitive data, such as personal information or financial data, which requires careful handling and compliance with data privacy laws and regulations.



Image generated by DALL-E 2 on March 27, 2023, with prompt: "digital art portrait of a female Asian medical doctor concentrating on an iPad she is holding in both of her hands."

With AI startups, we are realizing what we could only imagine in healthcare delivery.

Al potential in healthcare and biotech

Despite these challenges, we would rather look at the opportunities enabled by AI. Since there are too many to cover in an article like this and given that we at ESMT Berlin run a Creative Destruction Lab – a world-class mentoring program for young startups in health – we will put a focus on AI applications in healthcare.

Al has enormous potential in healthcare and biotech:

- Diagnosis and treatment: AI can analyze vast amounts of patient data, including medical records, imaging, and genomic information, to improve diagnosis and personalize treatment plans.
- Drug discovery: Al can accelerate the drug discovery process by predicting how molecules will interact with the body, identifying new targets for drug development, and designing new compounds with specific properties.
- Clinical trials: Al can optimize clinical trials by identifying eligible patients, predicting outcomes, and monitoring safety and efficacy in real time.
- Medical imaging: Al can improve the accuracy of medical imaging, such as X-rays, CT scans, and MRIs, and help doctors identify and classify abnormalities.
- Precision medicine: AI can match patients with treatments that are tailored to their specific genetic, environmental, and lifestyle factors.
- Remote monitoring: AI-powered wearable devices and sensors can collect real-time data on patient health, enabling early detection and intervention.
- Healthcare operations: AI can help streamline healthcare operations by optimizing staffing levels, scheduling appointments, and managing the supply chain.

Real-world examples in healthcare Al

Innovative startups and established companies alike are using AI to revolutionize medical research and to achieve better patient outcomes via healthcare delivery. To make this tangible, here are some real-life examples of how AI is being used in the medical sector, including BioNTech's acquisition of InstaDeep, Kheiron Medical Technologies' AI-powered breast cancer screening tool, and PeakProfiling's use of vocal biomarkers to detect adult ADHD.

Viruses, vaccines, and variants

BioNTech, the German biotech company behind the mRNA COVID-19 vaccine, recently made headlines with their acquisition of InstaDeep, an AI startup, for over \$680 million in cash and stock. InstaDeep, founded in 2015 and with offices in London and Tunis, has been dedicated to bringing state-of-the-art decision-making AI systems into enterprises. The company has worked with a diverse range of clients - from teams on the earlier side of AI deployment, such as Deutsche Bahn (Europe's largest rail operator), to companies with leading AI teams, such as Google and NVIDIA. According to Reuters, InstaDeep and BioNTech had already collaborated on projects, including those focused on evaluating the consequences of new coronavirus variants. With this acquisition of InstaDeep, BioNTech is doubling down on its commitment to integrating AI systems into all aspects of its biotech work.

Early detection in cancer treatment

Kheiron Medical Technologies is a UK-based medical imaging startup and an alumnus of the Creative Destruction Lab Toronto. The company's mission is to help healthcare professionals detect cancer earlier and more accurately, ultimately leading to better patient outcomes. Their flagship product, Mia (Mammography Intelligent Assessment), is an AI-powered breast cancer screening tool. Mia uses machine learning algorithms to analyze mammograms and assist radiologists in detecting breast cancer at an earlier stage, improving the accuracy of diagnoses, and reducing the need for unnecessary biopsies.

Detecting adult ADHD

PeakProfiling merges expertise in voice and sound analytics, derived from musicology, with the latest advancements in Al. The sound analytics startup was founded in Berlin as a spin-off from the mathematics and musicology faculties at Humboldt University. PeakProfiling has successfully developed algorithms to identify adult ADHD using vocal biomarkers, as part of a clinical study conducted in collaboration with Charité Berlin and Forschungszentrum Jülich. Despite the challenge of detecting ADHD in adults and the lack of objective biomarkers, the algorithms achieved high success rates comparable to those of single-rating doctors. This study, which involved over 1,000 recordings from nearly 700 participants, is one of the largest purely clinical studies in the field to date.

Outlook

Al has already changed the world and has the potential to improve many aspects of our lives. Beyond healthcare, industries as diverse as automation, education, and customer service have realized important gains in streamlined processes, error reduction, pattern identification, and customer relationship management.

However, it is important to ensure that the development and implementation of AI is done responsibly, ethically, and with consideration for potential negative consequences. Even in healthcare, the data used to train AI algorithms can be inaccurate or incomplete, such that data on diverse demographic groups are underrepresented or that the results are biased in a way that leads to poor patient outcomes.

In this respect, AI has also transformed governance and consumer advocacy. Regulatory and political bodies have used AI to analyze vast quantities of data in areas such as environmental sustainability and cybersecurity to detect threats and create policies that can improve system- and data security.

With AI startups in the healthcare ecosystem, we are realizing what we could only imagine in healthcare delivery. There are still many challenges that need to be addressed to ensure fair and ethical treatment for all, but, as these examples show, there are increasingly more opportunities to leverage AI to create medical products and services that can truly transform the healthcare industry for the better.



THORSTEN LAMBERTUS Managing Director DEEP – Institute for Deep Tech Innovation ESMT Berlin



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Mastering the future: Analytics and Al at ESMT

ESMT Berlin is offering a new Master in Analytics and AI degree program, guided by Professor Catalina Stefanescu-Cuntze and Roland Siegers, director of early career programs. In the article below, they explore the key skills and knowledge students can expect to gain from the program, as well as the career opportunities available. They also share how pursuing a degree in analytics and AI can equip students with the knowledge and tools to address critical social issues and create a meaningful impact on the world.

The greater good

In the face of significant social and environmental challenges, the need for skilled professionals who can leverage data and technology to drive social impact has never been greater. Thus, the investment in an advanced degree in analytics and AI can generate important social returns.

One, Al and analytics have the potential to revolutionize many fields, from healthcare and finance to transportation and energy. For example, by analyzing vast amounts of patient data, healthcare professionals can use predictive analytics to identify potential health risks, allowing for early intervention and tailored treatment plans. This not only improves the quality of care but can also reduce healthcare costs and improve access to care for underserved populations. Thus, by developing the skills necessary to analyze data and create Al systems, graduates can contribute to the development of new technologies that improve people's lives and business efficiencies.

Two, AI and analytics have the potential to help us solve or manage some of the world's most pressing problems, such as climate change, health crises, cyber threats, and natural disasters. With the right data and analytical tools, patterns and trends can be identified that can then be used to develop predictive models that help policymakers anticipate and respond to emerging issues



before they become full-blown crises. Furthermore, by adopting a quantitative approach to monitoring and managing social and environmental impact, businesses and organizations can prioritize sustainability and social responsibility across their operations. Finally, AI and analytics have the potential to help us make more informed decisions in our local communities. By analyzing data on everything from waste management to housing, we can make better decisions about how to allocate resources and improve public services. For example, data on traffic patterns and transportation usage can help cities optimize public transit routes, reduce traffic congestion, and improve overall transportation efficiency. Such data-driven learning can even improve the campus environment. Sensors and smart meters installed across a campus can collect data on energy consumption and thus identify areas where energy efficiency can be improved. This may lead to cost savings and a reduction in the environmental impact of the campus. (Read the <u>ESMT</u> Berlin Sustainability Strategy.)



A driving business need

Well-established companies are increasingly relying on data-driven decision making to respond quickly to changing market conditions and to gain a competitive edge in their sectors. Analytics and Al play a crucial role in harnessing the power of big data. Together, these fields offer a powerful toolkit for businesses as well as value-rich information that can be used to optimize operational processes, enhance customer experiences, and drive innovation in product and service creation.

Startups, too, can benefit from the insights provided by analytics and AI. With limited resources, entrepreneurs

need to be highly efficient and effective in their decision-making. Analytics and AI can help startups and their leaders to identify areas where they can optimize their operations, reduce costs, and improve customer experiences.

Whether traditional companies or startups, data has become an important asset for businesses across various industries. In the healthcare industry, for example, analytics can be used to identify patterns in patient data, leading to better treatment and disease prevention strategies. In finance, analytics can be used to detect fraud and manage risk. In technology, analytics can be used to optimize website and app performance. Consulting firms can use analytics to help clients make better decisions by providing them with data-driven insights and recommendations. For example, a consulting firm may use predictive analytics to help a client forecast future trends in their industry or identify potential risks to their business. They may also use machine learning algorithms to analyze large datasets and identify patterns that can help the client make more informed decisions.

As a result, professionals who are skilled in analytics and artificial intelligence are highly sought after across sectors.

The future-proofed career

Pursuing an MAAI provides students with practical experience, international exposure, and academic training in the use of cutting-edge technologies. What the graduates have learned of data analytics, machine learning, and artificial intelligence applications will provide them with the skills and knowledge that will give them a competitive advantage when seeking careers. Since data and insights are essential across various sectors, the career prospects are diverse, and the earning potential is high.

Programs focused on data analytics and Al are particularly relevant to future-oriented businesses and startups. According to the World Economic Forum's Future of Jobs report, analytics and Al will continue to have a tremendous impact on career opportunities. Besides already contracting the white-collar workforce, technology integration has changed what employers expect and demand of prospective employees. The report lists analytical thinking, innovation, and complex problem-solving as the top three skills that will be in demand in the next five years.

These findings were recently underscored by a global study conducted by Gallup and Amazon. According to Lighthouse, on which the study's data was based, of over 100 million job postings in 19 countries, those posts requiring significant digital skills were compensated at around 40 percent higher than those without. These statistics demonstrate the growing demand for professionals with skills in analytics and AI, as well as the potential for high compensation and job growth in this field.

The especially interactive learning atmosphere of the ESMT program helps graduates transition into their careers with at least seven months of practical experience. This mix of academic knowledge and practical experience is vital, and an interactive learning atmosphere is important for students pursuing the MAAI for several reasons:

Collaboration: Teamwork is a driver in the analytics and Al field. By fostering an interactive learning atmosphere, students can work in groups, exchange ideas, and learn from one another. This type of collaboration mimics real-world situations and prepares students for their future careers.

Hands-on experience: Learning by doing is optimal. The MAAI provides interactive learning environments whereby students can experiment with various tools, software, and techniques. These direct, hands-on experiences are crucial in developing the skills necessary to succeed in the field.

Feedback: Interactive learning allows for immediate feedback. This then helps learners to understand better and faster the concepts and analytical techniques and to improve their skills.

Engagement: Interactive learning environments are engaging and motivating for students, because they are actively participating in their learning process. This leads to a deeper understanding of the material and better long-term retention of the concepts.

In the second year of the program, students define their career paths based on their experience and ESMT's extensive network. ESMT degree programs also place great emphasis on the social impact of a business career. For the MAAI, there is a focus on "AI and society," addressing the ethical and social implications of AI and analytics, including issues such as privacy, bias, and transparency. This is an important aspect of the field, as it ensures that the development of AI and analytics – including the training of business leaders – is achieved in a way that is responsible and beneficial for society as a whole.

Overall, a degree in analytics and AI can equip students with the skills and knowledge to address pressing societal issues and business concerns. By leveraging data and technology, graduates can make a positive impact on their communities and the world. The investment in an advanced degree in analytics and AI can generate important social returns.



CATALINA STEFANESCU-CUNTZE Professor of Management Science Faculty Lead, Master in Analytics and Artificial Intelligence Program ESMT Berlin



ROLAND SIEGERS Director, Early Career Programs ESMT Berlin

Images generated by DALL-E 2 on March 27, 2023 with prompt and variables: "create [three] [colorful and detailed] illustrations of [female, African] business school students using AI to design their future and careers."

Artificial intelligence: double agent in cybersecurity

By HELI TIIRMAA-KLAAR

Artificial intelligence (AI) poses many potential opportunities and challenges in cybersecurity. While AI can enhance security defenses, it also has the potential to be used by cyber criminals for malicious purposes. Thus, regulations and safeguards are needed to ensure its responsible development and deployment.



With several months passed since large language model (LLM) algorithms were released by leading tech companies, discussions on opportunities and challenges in AI technology dominate the public debate. Tech experts know these LLMs have not yet reached the level of artificial general intelligence (AGI), but they offer a glimpse of an Al-powered future. Governments have reacted to the current testing phase of the LLMs with varying degrees of caution. The Italian government has banned the use of OpenAl's ChatGPT, the Al chatbot built on the GPT-3 LLM, because of data protection and privacy concerns. The US-based nonprofit Future of Life Institute and leading tech experts, including many AI pioneers, have called for a six-month suspension of research in AI more powerful than GPT-4, to allow time for setting safety standards for AI design.

In an interview with the magazine Wired in 1996, Steve Jobs famously said, "Technology is nothing. What's important is that you have a faith in people, that they're basically good and smart, and if you give them tools, they'll do wonderful things with them." This quote very much characterizes developments around emerging Al tools and their implications in cybersecurity. In cybersecurity, Al is a double-edged sword. In the right hands, it can provide a significant advantage to its users by enhancing their defenses against cyber threats. In the wrong hands, it can create havoc by helping cyber criminals to develop more sophisticated attack strategies or by assisting malicious actors to manipulate the public through disinformation and other malicious tactics.

Starting with the positives, powerful machine learning tools have greatly advanced the ability of cybersecurity teams to understand security threats and assess cyber risk. While cyberattacks grow in volume and complexity, Al-based tools are helping security teams to protect critical infrastructure and other companies to stay ahead of threats. Al finds threats faster by analyzing large volumes of network data for threats like malicious files, suspicious IP addresses, or invaders in company systems. Al tools can collect threat intelligence from vast data sources including computer security research

papers, blogs, security alerts, and other open data – and aggregate this in a matter of seconds.

Al tools can also enhance an organization's cybersecurity posture by facilitating advanced threat detection. By leveraging behavior analysis and historical data, AI can strengthen the threat detection process. Additionally, AI can improve vulnerability management. Faced with growing and increasingly sophisticated threats, companies are finding it harder to manage vulnerabilities and respond faster to cyber threats. Importantly, AI can help to develop network security by regularly adapting to new threats and refining the monitoring process.

Companies are also using AI tools to optimize cybersecurity-related decision making. With the help of AI, the time spent on risk analysis and threat assessments shortens. This helps to make critical decisions faster, allowing a better response to security threats.

With the use of powerful Al tools, security experts can combine the strengths of Al and human intelligence. Advanced cybersecurity teams can leverage various forms

AI is a double-edged sword. In the right hands, it can provide a significant advantage to its users by enhancing their defenses against cyber threats. In the wrong hands, it can create havoc by helping cyber criminals.



of AI, including machine-learning algorithms and deep-learning networks, which are self-educating and adapting. By providing timely risk assessment, AI can significantly help to reduce cyber threats.

On the negative side, criminal hackers and malicious actors are also using AI in their efforts. LLMs can effectively imitate text that could be used for phishing or reproduce language patterns that could impersonate a speech of an individual. Law enforcement authorities fear that these can aid in fraud and social engineering, misleading potential victims into placing their trust and data in the hands of malicious actors. Al can also generate code in various programming languages, a feature particularly feared by law enforcement. Criminal groups could use Al-generated code to produce malware, which already is a significant contributor to cybercrime globally.

Additionally, security experts fear that using generative AI will allow malicious actors to produce misinformation more easily and cheaply and to distribute it more broadly than ever before. Experts fear that personalized chatbots could share conspiracy theories in a persuasive manner, far beyond easily detected copy-paste jobs. As of now, there are no efficient mitigation tactics available to address these challenges.

Finally, AI tools are also being developed for military use by all major world powers. The US government has recently released general guidelines on AI development by the military. It states that military use of AI should be ethical, responsible, and enhance international security. There are several international discussions taking place on how to use AI in armed conflicts, stressing that its application should respect international humanitarian law and be accountable, including ensuring a responsible human chain of command and control in military operations.

The public should know the potential misuse of LLMs and understand the dark side of the coming era of Al. Criminal misuse of LLMs calls for building safeguards and promoting trustworthy Al systems in the future. With further Al technology evolution, Images generated by Google DeepDream Text 2 Dream on May 2, 2023, with prompts "a robot in police uniform hunts another robot who is a thief" and "a robot in conversation with a female manager in the Metaverse" as well as the modifiers: Picasso and acrylic art.

it will become increasingly important that law enforcement authorities can stay at the forefront of these developments to anticipate and prevent criminal misuse of AI tools. All states should take measures to ensure the responsible development, deployment, and use of their military AI capabilities, including those enabling autonomous systems.

The European Union has recently proposed AI regulation that aims to increase trustworthy AI that could solve societal challenges and avoid undesirable outcomes. The proposed EU AI rules call for identifying a list of high-risk applications and setting clear requirements for AI systems for high-risk applications. The EU regulations will also define specific obligations for AI users and providers of high-risk applications as well as propose a conformity assessment before an AI system is put into service or placed on the market. Finally, the EU will develop an enforcement mechanism to oversee AI systems in the market and propose AI governance structures at European and national levels.



HELI TIIRMAA-KLAAR Director Digital Society Institute (DSI), ESMT Berlin





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To win with Al, focus on our humanity By FRANCIS DE VÉRICOURT

Each year, more than 700,000 people around the world die from infections that antibiotics once cured but no longer do. The bacteria have developed resistance and the number of deaths is on track to hit ten million a year, making the tragedy of COVID-19 pale by comparison. Scientists have tried for decades to find a solution without much success. All this changed in 2020.

A team of scientists from MIT trained a machine-learning algorithm on more than 2,300 compounds with antimicrobial properties, which they then applied to thousands of molecules to predict which might work. And one molecule stood out. They named it "halicin" (after HAL, the renegade computer in 2001: A Space Odyssey). Halicin was a surprising antibiotic, one that no human had imagined. Not only did it kill 35 superbugs, but it did it by preventing bacteria from storing energy, a mechanism never seen in antibiotics.

Image generated by DALL-E 2 on March 28, 2023, with prompt: "photorealistic portrait of a smiling African man who is looking directly into the camera through the opening of a large picture frame that he is holding up in front of his face".



Technology disruptions are not novel and have enabled humanity to evolve and progress. This one is different, though. For the first time in the history of our species, technology seems to take over the very domains where we thought humans excelled: innovation, strategic planning, and coordination. So troubling is the situation that some want to rely exclusively on data and algorithms to solve our myriad problems and make day-to-day decisions.

But this is wrong. We humans have a unique cognitive ability that no machine can match – we think in mental models and can frame or even reframe problems. Mental models are representations that make the world comprehensible through the lens of cause and effect. And this cognitive ability allows us to generalize and make abstractions that apply to other situations. Machines, however, notoriously struggle with causality and can't generalize far beyond the data on which they are trained. That's precisely why they require a lot of data to work, and why business executives must continue to provide the frame in which AI can perform.

In our book "Framers: Human Advantage in an Age of Technology and Turmoil," Kenneth Cukier (The Economist), Viktor Mayer-Schönberger (Oxford Internet Institute), and I look at the human minds behind the world's AI successes. We assert that sensational headlines – like the Financial Times headline "AI Discovers Antibiotics to Treat Drug-Resistant Diseases" on the halicin case – miss the real story. Namely, that these achievements are not the victories of artificial intelligence but a success of human framing: the ability to rise up to a critical challenge by conceiving of it in a certain way, altering aspects of it and opening up new paths to a solution. Credit does not go to a new technology but to the unique human ability to think in mental models.

In 2019, OpenAl stunned the gaming world by building a five-bot system that crushed the best human players of Dota 2, a multiplayer online battle arena video game. On the surface, it seemed that the system could divine causation, generalize from experience, and, with those abstractions, apply causal frames to new circumstances. But a closer look reveals human mental models under the hood. Through the trial and error of plays repeated millions of times, it identifies the best sets of actions and gives itself a statistical "reward" to reinforce the behavior. Yet in its most critical areas, what constituted a reward wasn't learned by the system itself: it needed to be coded manually. The AI system performed well, but people had to peck at a keyboard to input the right causal frames for it to work.

Leaders are increasingly turning to AI to help their organizations perform well on tasks that were previously considered the sole domain of humans. After all, AI seems to create novel solutions that have long eluded us. But this is too great a generalization. Beyond AI, there is always a unique human cognitive capacity – an ability to think with mental models. And without fostering this ability to frame problems, organizations will not properly leverage the power of AI.

So how can executives leverage the power of framing? Consider what could be, not what is. Mental models let us imagine alternatives in a way Al can't. This counterfactual thinking is an essential precursor for action, an element of our preparation to make decisions. Successful leaders often develop a culture where people ask whatif questions and encourage them to envision what does not exist, to understand the world and conceive of how things might be different. These imaginings need not be meaningless daydreams; the right mental models help us to adjust our imagination so that our counterfactuals remain actionable, showing us actions that are actually possible. With his SpaceX mission, Elon Musk is imagining alternative realities on Mars. But these counterfactuals are actionable: Where there was formerly reliance on wings for landings, SpaceX removed the wings and pioneered reusable rockets.

Select the right frame. Learning which mental models to apply to which situations is another crucial element to becoming better framers. How we frame a problem determines what we see, and what we see determines how we act. Take for example the work of the World Health Organization and Doctors Without Borders (Médicins Sans Frontières, MSF, an international aid group) during the 2014 Ebola outbreak in West Africa. Both organizations were working on a response using the same data, but they frame the problem differently. As a result, WHO advised for a limited response, while MSF predicted an epidemic of a magnitude never seen before. WHO won the argument, but the MSF prediction came to be true – the local outbreak turned into a global pandemic. Same data, different frames and opposite conclusions.

Expand your reach. We do not always have our own mental models to draw from for every situation. We sometimes need to tap into new reservoirs of approaches - what Charlie Munger, the business partner of famed investor Warren Buffett, refers to as a "latticework of mental models." The business world doesn't have a good track record of nurturing outsider perspectives. In Framers, we draw the reader back to the Greek myth of Cassandra, who was both gifted by Apollo with the power of prophesy and cursed to never have her visions believed. When Cassandra warned the city of Troy it would fall, people considered her mad and did not pay attention. The story does not end well - Troy is indeed sacked. But Ed Catmull, the cofounder and president of the animated-movie studio Pixar, interprets the myth differently. "Why, I always wonder, do we think of Cassandra as the one who's cursed?" he asks. "The real curse, it seems to me, afflicts everyone else - all of those who are unable to perceive the truth she speaks." If they want their organizations to develop the dexterity to entertain many different models, leaders need to create room for their "corporate Cassandras."

Ultimately, an AI system cannot conceive of anything. It cannot concoct mental models nor think in counterfactuals. It can neither generalize nor explain. For that, it relies on our ability to frame problems, to think causally and in counterfactuals and with constraints. In fact, we can only leverage AI systems to their fullest potential by becoming better at what we're already good at: being framers. \blacklozenge



FRANCIS DE VÉRICOURT Professor, Joachim Faber Chair in Business and Technology Academic Director, Institute for Deep Tech Innovation (DEEP) Director, Center for Decisions, Models and Data (DMD-Center) ESMT Berlin

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Meeting tomorrow's challenges: Is stakeholder capitalism the answer?





Organized in cooperation with Robert Bosch GmbH, the evening's workshop with students and subsequent panel discussion gathered over 150 policymakers, business leaders, advocates, and students to explore how stakeholder capitalism can be achieved and what kind of economic system we need for a sustainable future. Join us for our next discussion, "What about the 'S' in ESG? Stakeholder management and social accountability" on October 5, 2023, at ESMT Berlin.

Panelists (opposite page)

- Monika Jones, Moderator and Journalist, Deutsche Welle
- Stefan Hartung, Chair of the Board of Management, Robert Bosch GmbH
- Katharina Beck, Parliamentary Member, German Bundestag
- Christian Felber, Founder, Economy for the Common Good
- Saori Dubourg, then Member of the Executive Board, BASF
- Frank Engels, Member of the Executive Board, Union Asset Management Holding





This page (top left, right)

Q&A with members of the audience

This page (bottom)

Rasmus Rees (MIM 2023) presents an illustration of the case of Golza Breweries

Al and its importance for the startup ecosystem – a European perspective

Founding an artificial intelligence (AI) startup in Europe could pose a competitive disadvantage as the region lacks AI foundation models developed by European companies. This article analyzes the significance of AI foundation models for Europe's AI startup ecosystem and highlights the possibility that Europe might once again miss its chance to achieve digital sovereignty. Will Europe's AI capabilities catch up or fall behind?

Al has gained increasing prominence in recent years, driven by advancements in machine learning, natural language processing, as well as an increasing availability of processing power, and data. The launch of OpenAl's ChatGPT in late 2022 demonstrated Al's disruptive potential. It is the fastest app to reach 1 million users, achieving this feat in just five days and reaching 100 million users in just two months.

Even though ChatGPT has garnered unprecedented attention for AI within society, the technology has been used in the startup ecosystem for quite some time. B2B software-as-a-service (SaaS) startups already leverage AI to optimize processes, enhance predictions, and automate decisions in various industries and functions, including healthcare, autonomous driving, and supply chain. Al startups and its underlying models are expected to have a transformative impact, with generative AI startups attracting \$10 billion and Microsoft investing another \$10 billion in OpenAI since its launch.

The challenge that all companies must confront today is determining which decisions are left to AI, which to humans, and which require collaboration. Moreover, it will be important to identify which capabilities of both AI systems and humans will be employed to increase value creation, while also considering societal consequences of technological progress. Regardless of the specific answer to this question, building AI-related capabilities and infrastructure will help AI startups and their ecosystems to flourish.



What model is behind ChatGPT and why will it be so important for Europe to build its own one?

ChatGPT and foundation models

ChatGPT initial launch was based on the large language model GPT-3, an abbreviation for Generative Pre-Trained Transformer 3. GPT-3 is trained on vast amounts of data and uses enormous processing power to generate human-like responses. It has already a deep understanding of almost all human knowledge and language to predict the next word in a passage. However, the strength of ChatGPT lies in incorporating human feedback after its initial pre-training. This deep reinforcement learning was the key to creating responses that became astonishingly real or – perhaps – "human."

Just six months later, OpenAl launched a new version of its underlying foundation model, GPT-4, which is trained on 500 times more parameters and is multimodal. Its text and image multimodality is a technological breakthrough and enables new interactions with the Al.

What are the implications of foundation models for startups?

The foundation models behind ChatGPT serve as a catalyst for novel AI applications by startups. Instead of building algorithms and datasets from scratch, startups can connect via an API to these foundation models and build on functionalities, such as reasoning or code generation. This leads to a massive reduction in the costs of implementing AI and establishing an AI company, thus accelerating the creation of new AI use cases and companies. For example, Microsoft implemented OpenAI into various applications, including search (Bing) and Microsoft Office (Excel, Word, etc.). Moreover, non-technical founders may build a business model around basic AI without having to develop AI systems themselves, for example, a chatbot



Images generated by Stable Diffusion XL on May 2, 2023, with prompt and variables: "brilliant photorealistic graphic art of Berlin artificial intelligence startup scene with urban graffiti on Berlin Alexanderplatz and robots posing as tourists."

for salespeople or drug classification in pharma. An increasing number of resources are flowing into developing new business models, leading to faster progress of the technology and adoption of Al into society. On the other hand, foundation models reduce entry barriers, thus increasing the competition in the Al startup ecosystem. If foundation models become exponentially better, it will make it more difficult for startups to differentiate and build a competitive advantage.

Challenges of developing European AI capabilities

LEAM, an initiative of the German AI Association and leading representatives from industry and research, analyzed the importance of foundation models for the digital sovereignty of Europe. Its recent research shows that 73 percent of foundation models are developed in the US and 15 percent in China. Despite Europe's significant scientific progress in AI, several challenges hinder the region's ability to compete with the US and China. According to LEAM, key challenges include:

Insufficient tech transfer and retention of AI talent

European universities educate some of the best AI experts in the world. However, many of these talents work afterward in the US or for US companies. In most cases, development opportunities, resources, and salaries in the US are much better than in Europe. The German AI Association estimates that approximately €350 to €400 million are needed in public and private investment for

22

an AI research center. Moreover, while Europe has made significant scientific progress in AI, it lacks in commercializing and transferring its IP into the economy. There is no easy answer to this question. However, easier IP transfer as well as a joint AI research center would likely improve the scientific progress, its commercialization, and retention of post-graduate AI talent in the EU.

Data, processing power, and computational infrastructure

Collecting large data sets will remain a tremendous challenge for European startups. More than 50 percent of startups consider data protection laws an international competitive disadvantage. Similarly, processing power is important for an algorithm's effectiveness, which requires expensive computational infrastructure. Furthermore, Germany is famous for its Mittelstand, which has skilled engineers but often lags in digitalization efforts. Many still use Excel and poorly document data, which cannot be used for AI applications easily. For European AI startups to flourish, we need to invest heavily in computational infrastructure and, thus, enable processing power needed to train AI algorithms and better use data.

Lack of funding and dependence on foreign capital

Even though the European VC industry – especially in generative AI – is emerging, there is still significant dependence on foreign investors and a massive lack of funding compared to the US. Around 42 percent of the money that went into startups came from Asian or American investors. Hence, to enable startups to invest in technology – for example, to hire scientists or finance processing power – we need much more European funding to invest in the development of LLMs and fund the next generation of AI startups.

Missing big players with "Al-first" strategies

Currently, most foundation models are developed by businesses rather than academic labs, as training these algorithms requires enormous investment in hiring scientists and engineers, building expensive AI computational infrastructure, and financing the processing power. In addition to Microsoft's investment in OpenAI, other Big Tech companies are developing foundation models, too. For example, Google announced its foundation model, Bard, in early 2023. In Europe, we need large players with AI-first strategies. With the resources and the ability to take great risk to develop, train, and improve foundation models, they are crucial for the development of AI and AI capabilities. And, of course, they have massive data sets that are needed to give AI its predictive power.

Changing the European regulatory landscape

To address the aforementioned challenges, the EU is planning to launch the Al Act. This act is a set of regulations designed to ensure that Al technologies are developed and used in a safe, transparent, and ethical way. The act's key provisions include:

- a ban on certain types of AI technologies that are high risk, such as those that are used for mass surveillance or social scoring
- requirements for transparency in AI systems, so users understand how systems make decisions
- rules for data protection and privacy to ensure that personal data is not misused or abused
- guidelines for AI developers and users to help them understand how to comply with regulations

The EU AI Act seeks to regulate AI and control its risks, potentially affecting the ability of startups to innovate. While the act has been praised for its focus on ethical and transparent AI development, some critics argue it may disproportionately benefit large corporations, which can more easily fulfill compliance requirements. A study by the state of Bavaria and appliedAI estimates that up to 50 percent of AI algorithms might be classified as high risk, which leads to high compliance requirements for AI startups.

In contrast to startups, large tech companies like Microsoft and Google have enough money to afford to meet regulatory requirements. For example, Aleph Alpha is a promising deep-tech AI company from Germany that develops an AI foundation model called Luminous. Even though it has only 1 percent of the funding of OpenAI, a recent test shows that its model is almost as good as the models from OpenAI, Meta, and others. Nevertheless, in addition to a lack of funding, Aleph Alpha still suffers from the mentioned challenges including processing power, computational infrastructure, data, and retention of AI talent.

Conclusion

Humans usually overestimate how fast a disruptive technology affects society. However, probably no technology has spread over the world as fast as AI. As AI develops into a general-purpose technology, it opens a new world of value creation and opportunities, but also risks for our society and economy. Foundation models accelerate the adoption of AI, becoming a platform for AI startups to emerge, identify use cases, and build business models faster. Hence, to ensure that European AI startups have no competitive disadvantage, it will be crucial to develop Al foundation models. The existence of companies such as Aleph Alpha show that it is possible. However, the aforementioned challenges - such as lack of funding, poor retention of talent, and the lack of computational infrastructure, data, and processing power - will make it even more difficult in the long run.

In a global context, leveraging AI and its opportunities, while mitigating risks, will require bold policy action as well as collaboration between business leaders, startups, technologists, and other relevant stakeholders, such as policymakers. To find the right balance between the two will become the major challenge to build up European AI capabilities and ensure future digital sovereignty in Europe.



BARIS EFE Manager & Co-founder Vali Berlin – Entrepreneurship Hub at ESMT



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EUROPEAN BUSINESS SCHOOL RANKING 2022



How does digitalization affect the labor market?

The importance of innovation and technological progress for sustainable economic prosperity is widely accepted by companies and governments. However, the fact that these developments may not benefit every individual or group is often overlooked. Innovation can lead to the destruction of old structures and the creation of better ones what the Austrian economist Joseph Schumpeter addressed in his theory of "creative destruction" - which can provoke skepticism and criticism from workers, especially those in traditional industries. This has been seen in the past with the Luddites of the 19th century and the introduction of the assembly line in the 20th century. Digitalization and artificial intelligence (AI) are expected to have a similar, transformative impact on the labor market, making it crucial to consider the challenges they pose and how to respond to them.

Polanyi's Paradox

Despite concerns, innovation and technical progress have not led to a systematic increase in unemployment. In fact, economic prosperity has risen massively in recent centuries, and today's workers have purchasing power that was unthinkable for their predecessors. This contrasts with popular beliefs that automation will make existing jobs redundant and increase unemployment.

Polanyi's Paradox, which refers to the principle of implicit knowledge (i.e., "we know more than we can tell"), is the main reason why automation does not lead to an increase in unemployment. MIT economist David Autor has identified this paradox as the reason why we do not fully understand how automation affects the labor market, as many tasks require tacit knowledge that cannot be easily explained. He argues that tasks requiring flexibility, judgment, and common sense are the ones that are hardest to automate. These skills are tacit, and while they cannot be computerized, they are often complemented by automation. He emphasizes that most work processes require a multifaceted set of inputs, including labor and capital, creativity, intuition, and adherence to rules. Improvements in productivity in one set of tasks do not obviate the need for the other. Moreover, automating

one input factor in a work process can increase the economic value of the other input factors. For instance, the introduction of the assembly line production of cars led to increased efficiency and affordability, which created new employment opportunities in areas such as design, development, sales, and financing.

Special challenges due to digitalization and artificial intelligence

Is this time different? The current economic policy debate revolves around whether digitalization and Al can dissolve Polanyi's Paradox by automating previously unautomatable processes. While concerns about automation eliminating jobs in industries and services have been around since the 1960s, the fact that administrative jobs have not been heavily affected so far is insufficient evidence that they will remain unaffected. Many qualified occupational fields are now seen as particularly susceptible to automation, such as accounting, auditing, or contract preparation. In March, media outlets widely proclaimed that 300 million full-time jobs in the EU and the US



were likely to be replaced by Al-driven automation, citing analysis by Goldman Sachs. The main question is whether machines can learn independently to understand processes that humans have not been able to teach them so far.

Autor suggests that machine learning can potentially enable machines to autonomously learn how to accomplish tasks that were previously challenging to codify with explicit, step-by-step procedures. By studying successful examples of non-routine tasks being carried out by others, machine learning algorithms can infer how to accomplish such tasks through exposure, training, and reinforcement. Similarly, a 2018 executive briefing by McKinsey Global Institute argues, "...these technologies will transform the nature of work and the workplace itself. Machines will be able to carry out more of the tasks done by humans, complement the work that humans do, and even perform some tasks that go beyond what humans can do."

The ongoing debate on the impact of AI on job losses continues, especially with the release of OpenAI's ChatGPT. Even Autor has weighed in, questioning in an interview with The Guardian, "Will AI reduce the value of a lot of skill sets and make labor more commodified?". While some

assessments, like Autor's, suggest that automation will not lead to job losses, others are more pessimistic. Ben Y. Zhao, the renowned professor of computer scientist at the University of Chicago, argues that AI is fundamentally different from machinery or other analogies commonly made when answering this question. Al's growing breadth, geographic and economic scope, and power to address increasingly complex tasks, according to Zhao, make it a more fitting analogy for machinery in an automobile plant that not only makes the parts but also learns how to assemble them and design cars. In a conversation with the Big Brains podcast in 2018, Zhao equated this learning adaption to the famed Arnold Schwarzenegger cyborg character. "This is that Terminator thing that keeps coming after you, and you find a vulnerability and – bam – it learns. No more vulnerability." Stephen Hawking, the renowned theoretical physicist, had a similarly grim outlook on AI, "The development of full artificial intelligence could spell the end of the human race."

While there is no consensus on the evolution of aggregate labor demand, a 2016 Oxford Report identifies three developments that distinguish this technological change from previous developments. First, the speed of technological change has increased significantly and is more disruptive. Second, the scope of technological change has expanded to many areas of the economy and society. Third, digital business models often follow the principle of "the winner takes it all," which raises new questions about the distribution of economic wealth. These developments have significant implications for the future of work and the distribution of economic benefits.

Possible solutions

The effects of new technologies on employment raise the question of how to exploit opportunities and cushion negative consequences. One solution that has been proposed is the creation of an unconditional basic income, which would provide every citizen of a state with income without requiring anything in return. However, this proposal has been met with criticism, including concerns about reduced labor supply and social integration, deadweight effects, and adverse selection in migration. While the financial viability of an unconditional basic income is a fundamental question, it is an in-

The ongoing debate on the impact of AI on job losses continues, especially with the release of OpenAI's ChatGPT.

adequate substitute for work, which has a significant impact on the social inclusion of individuals and the coherence of societies.

An alternative solution to the challenge of technological change and its impact on employment is to reform education and training systems. This includes making coding a mandatory part of school and university curricula, alongside writing, reading, and arithmetic, and expanding the understanding of information technologies.

Additionally, creating opportunities for employees to take time off for qualification and further training during their working lives could help them adapt to new developments. With life expectancy increasing and the speed of technological change accelerating, employees will need to continuously acquire new skills to remain competitive in the job market.

Conclusion

While the impact of digitalization and Al on employment is not yet fully understood, it is important to exploit the opportunities they present and make them accessible to as many people as possible. Here at ESMT, for example, we now offer a Master in Analytics and Al degree program. We also teach executive education programs such as "Leading Digital Transformation" and "Bringing Technology to Market" to provide leaders from various industries with a toolkit to use in the increasingly digitized working environment. Such initiatives to improve educational opportunities and life-long learning will promote the common good in the long term, more so than an unconditional basic income, allowing individuals to truly participate in economic progress and social exchange. However, it remains challenging to predict which professions and sectors will be most affected by technological change, and the market will play a crucial role in discovering this. Admitting this uncertainty is essential for promoting the vital role of the market in the process.



JÖRG ROCHOLL President, ESMT Berlin

Of Note

ESMT Berlin events, faculty, and research announcements



Appointment of Prof. Francis de Véricourt as the holder of Joachim Faber Chair in Business and Technology, February 14, 2023, at ESMT Berlin

European business schools launch student competition INNOVA Europe

EDHEC, ESMT Berlin, and Polimi Graduate School of Management have jointly launched INNOVA Europe – Student Challenge for Sustainable Development Impact. The 2022 competition called on students to develop innovative and technology-driven solutions based on the UN Sustainable Development Goals. (September 27)

Frankfurt Declaration: together for biological diversity

One week before the start of the 15th Conference of the Parties to the Convention of Biological Diversity (CBD COP15) in Montreal, an alliance of German science and NGOs called for an end to economic activity against nature in its "Frankfurt Declaration." In their position paper, they urge the German government and the European Union to ensure the success of the World Summit on Nature. They offer concrete proposals for making a nature-friendly economy the standard. (November 29)

Jörg Rocholl to lead ESMT for another term

Following the recommendation of the nomination committee, the supervisory board of ESMT has extended the contract of ESMT President Rocholl for five more years. He has also been named chair of the steering committee of the Global Network for Advanced Management (GNAM), a network of 32 renowned business schools spanning six continents and founded ten years ago by Yale School of Management. (July 4)

Per Olsson appointed Deutsche Post DHL Group Professor in Sustainable Accounting

The professorship will focus on the measuring and reporting of ESG components within accounting. (July 1)

ESMT expands deep tech research

Francis de Véricourt has been appointed the holder of the new Joachim Faber Chair in Business and Technology and academic director of the newly founded Institute for Deep Tech Innovation (DEEP) at ESMT. The chair focuses on the innovations and startups based on cutting-edge technologies, such as artificial intelligence, new materials, and biotechnology. (September 1)

Jörg Rocholl holds new Deutsche Bank Professorship in Sustainable Finance

The professorship focuses on the importance of the financial sector for a sustainable and green transformation and aims to provide evidence for the impact mechanisms of this change. (September 15)

Scholarships granted to female students who have fled Ukraine

With the joint program "BMW Group Fellowships for Ukraine," the BMW Group and ESMT offered ten female refugees from Ukraine the opportunity to participate in the ESMT Global Online MBA at no cost. The MBA program opens up global perspectives and opportunities for action, by strengthening the fundamental role that women in management positions play in business and enabling participants to realize their potential, despite having to flee their country. (May 13)

ESMT publishes first venture report

More than 230 ESMT alumni and students have founded over 200 companies in over 15 countries in Europe, Africa, North and South America, and Asia. According to the venture report by Vali Berlin, the entrepreneurship hub at ESMT, these newly founded companies have raised over €190 million in capital and have also created over 1,500 jobs. (March 15)

Raji Jayaraman named academic director of FUTURE Institute for Sustainable Transformation

As the institute's academic director, Jayaraman promotes research with an emphasis on finding the balance between economic prosperity on the one hand and environmental preservation and social equity on the other. (June 29)

ESMT Annual Forum 2022: leaders discuss sustainable transformation

CEOs of leading global companies came together with academics and politicians at the Annual Forum 2022 at ESMT to discuss the topic "Sustainable transformation – leading change for business and society." The goal of the event was to engage in an in-depth exchange with international leaders on how to make sustainable transformation possible. (June 23)

Creative Destruction Lab launched at ESMT

The site at ESMT is the first CDL in Germany. It launched with a health program stream, which aims to improve personal and planetary health by engaging founders working at the leading edge of life sciences. (June 23)

Three new master's programs at ESMT

Starting in September 2023, ESMT will offer three new master's programs: Master in Global Management, Master in Innovation and Entrepreneurship, and Master in Analytics and Artificial Intelligence. Each program lasts 24 months at ESMT's campus in Berlin. (May 16)

Reading Room

Selected reading from published and forthcoming ESMT research on artificial intelligence and machine learning

Breaking the lightweight secure PUF: Understanding the relation of input transformations and machine learning resistance

Lecture Notes in Computer Science (LNCS) 11833: 40–54 Nils Wisiol, Georg T. Becker, Marian Margraf, Tudor A. A. Soroceanu, Johannes Tobisch, Benjamin Zengin (2020)

Contracting, pricing, and data collection under the Al flywheel effect Management Science 68 (12): 8791–8808 Huseyin Gurkan, Francis de Véricourt (2022)

DeepMind's AlphaGo: The age of the machine?

ESMT Case Study No. ESMT-918-0180-1 Francis de Véricourt (2018)

Getting AI implementation right: Insights on challenges and solutions from a global survey

California Management Review (forthcoming) Rebecka C. Ångström, Michael Björn, Magnus Mähring, Linus Dahlander, Martin W. Wallin

Human and machine: The impact of machine input on decisionmaking under cognitive limitations

Management Science, forthcoming Tamer Boyaci, Caner Canyakmaz, Francis de Véricourt

Is your machine better than you? You may never know.

Management Science, forthcoming Francis de Véricourt, Huseyin Gurkan

Machines vs humans: How can we adapt organizations to Al?

Academy of Management Proceedings 2019 (1) Christina Fang, Chengwei Liu, Bo Cowgill, Jerker C. Denrell, Phanish Puranam, Zur Shapira, Sidney G. Winter (2019)

In Profile

Conversations with alumni of ESMT Berlin

In this edition, Jovana Panić, senior alumni relations manager, speaks with Lea Dänschel, who earned her master in management degree from ESMT in 2017. Lea shares her career journey – from ESMT to working in different product roles in AI to pursuing her own AI startup – and what it means to be a responsible leader in the field of AI.

Tell us more about your ESMT journey and your career path.

I joined ESMT in 2015 as part of the second cohort of the newly established master in management (MIM) program. At the time, this degree was also called the mini-MBA and wasn't as well-known as its larger counterpart. Coming to ESMT was a bit of a leap of faith, but it felt like the right fit for me. Previously, I had completed a highly quantitative economics program with little practical teaching. In my first week, I was impressed by my ambitious classmates and the intensity of the program. Time management, prioritization, and efficient teamwork were essential. It was a challenging learning experience that required a lot of personal growth for many participants, myself included.

Although the alumni network was relatively young at the time, I could fully leverage it with the help of the very dedicated career services team. When the internship semester came around, I was accepted for a highly competitive international internship in Japan, offered by an MBA alum. This experience was a great honor, a learning opportunity, and a CV booster.

After graduating, I joined an international management consulting firm in the digital strategy unit. However, only a year later, I left the traditional career path to join Xayn, a small but recently well-funded AI startup in Berlin. There I progressed through different levels, from business development manager to product manager to head of conversion. As of 2023, I am embarking on another journey by pursuing my own AI startup.

How has ESMT prepared you for a career in AI?

The Al industry is relatively young, and most Al companies are early-stage startups. These offer a vastly different career proposition than late-stage companies such as Zalando and Delivery Hero, which are considered digital corporations by now. The founders and CXOs are typically from technical fields, with little business experience. Early employees who join their commercial teams require a much more holistic view of the commercial side and the entire value chain, as opposed to being highly specialized. You need to be a good generalist, willing to apply yourself and think independently – a supervisor will not give all the answers. This is where a comprehensive degree that covers all business components, such as the ESMT MIM program, becomes very useful.

At ESMT we educate future generations of responsible leaders. How do you see responsible leadership when it comes to AI?

While the technology is extremely promising, it comes with many societal and technological challenges that we can only vaguely foresee today. Every AI company faces privacy concerns for the training data, unwanted biases, and false information that could hide in it and make the AI biased. Because of these flawed components, making money and scaling the business fast cannot and should not be the only objectives for AI endeavors. Instead, leaders should embrace these ethical questions as part of their unique selling proposition (and employer branding!).

The AI industry is relatively young, and most AI companies are early-stage startups. These offer a vastly different career proposition than latestage companies.





Images generated by DALL·E 2 on March 28, 2023, with prompt: "digital art concept of a technology AI value chain using the colors #0E2349, #F0F0F0, and #FB614E."



Xayn has gathered much attention from both press and buyers based on screening criteria that focus exactly on these bigger questions. It has also put a big focus on strong values for recruitment and employee retention. I believe that Europe, particularly Germany, has a competitive advantage in that regard. At this point, I am unsure if an ethical AI will ever originate in Silicon Valley.

What advice would you give to our students who want to pursue a career in AI?

A genuine curiosity in the technology is crucial. You must take an interest in how the technology works and the types of machine learning available. This will help you understand what the technology can and cannot do, and why building functioning AI may take longer than the average fast-paced e-commerce scale-up. These substantially different time-to-markets usually come with completely different cultures and work environments, which can be frustrating for conventional investors.

Second, be prepared for attention to certain AI use cases to run cyclically, which can affect investment interest tremendously. Right now, generative AI is all the hype, thanks to the mainstream buzz around OpenAI's ChatGPT, their virtual assistant powered by the GPT-3 natural language processing model. However, years before that, investments were mainly made in visual AI, which had promising use cases in autonomous driving, for example.

Lastly, I encourage everyone, particularly women and LGBTQ+ graduates, to take a leap of faith with lesser-known and younger AI companies that don't have big names yet. On the business side of things, you will have a much bigger impact. Your contributions can go as far as either making or breaking these startups. Your learning curve will be infinitely higher than in a traditional corporate career, and the impact you've had in making the startup succeed will make your future CV shine incredibly bright. You will likely not find many places that offer such an exciting career journey again. \blacklozenge

Since graduating from ESMT in 2017, Lea Dänschel has worked for four years in several product roles for privacy-focused Al company Xayn. The 31-year-old Berliner has also completed a second master's degree in computer science. As of 2023, she is founding her own Al startup. Reach out to Lea on LinkedIn with your questions about Al or pursuing an Al career.

ESMT Alumni Network reimagined

Connect, learn, grow, and create an impact with like-minded responsible leaders from around the globe with the ESMT Alumni Network.

The ESMT Alumni Network is an ever-growing, vibrant community of responsible leaders. It is diverse, inclusive, enriching, and transformative. In order to offer a more valuable experience, where belonging to our alumni network grants professional advantage to all its members, we launched a new value proposition in the spring.

The new alumni program services are sorted into four pillars of engagement that summarize the alumni journey: connect, learn, grow, and impact.

Connect

Nothing great was ever achieved alone. The ESMT Alumni Network is a diverse global community that can provide the support and human connection to help quide your passion into the pursuit of purpose. By investing your time, sharing your expertise, and offering professional assistance, you're not only making a meaningful investment in yourself and others you're helping to shape a brighter future for us all.

Learn

Learning is a lifelong journey. As a member of our alumni network, you have access to resources and opportunities to help you stay on top of your game. Keep your knowledge current by taking advantage of exclusive alumni discounts on executive education programs, attending conferences and events, and sharing your expertise with the community through teaching and presentation opportunities.

Grow

Your career is only limited by your ability to unlock your potential. Whether you are looking to find the people ahead of you on the journey, grow your team or business, or access the collective experience and knowledge of over 9,000 diverse peers, the ESMT Alumni Network offers exciting opportunities to facilitate rewarding professional experiences.

Impact

The world is changing and whether it changes for the better is up to us. The ESMT Alumni Network supports unique programs which provide a oncein-a-lifetime opportunity for leaders to apply their knowledge and skills to drive positive social change throughout their communities and the world.

Welcome to a community of responsible leaders!

ESMT COMMUNITY

Our activities are coordinated through our platform – ESMT Community. On this platform, alumni can join their local chapter, connect with fellow alumni, share job posts, and find interesting events.

Visit esmtcommunity.org!

Alumni numbers:

13

alumni chapters (and counting)

+9,000 alumni

22%

of our alumni network are degree alumni, 78% come from executive education programs

MBA (37%) EMBA (31%) MIM (26%) PTMBA (3%) TMBA (2%) DOHA (1%)

Degree alumni share:



ESMT BERLIN

DEEP powers ESMT's mission to fuse business and technology. We connect researchers, entrepreneurs, corporate leaders, and policy makers to drive Europe's next innovation waves. We collaborate with top research institutions, pioneering corporates, and startups to define industry verticals and make deep tech innovation a reality.

DEEP operates:

The Creative Destruction Lab: a world class mentoring program for deep tech startups, a global network of innovators and an unprecedented learning opportunity for business students

The roneers program: an unprecedented format that provides true entrepreneurs access to spin-off-projects and new technologies from major universities

The academy: entrepreneurship education for scientists from all sectors in a truly interdisciplinary setup

The Joachim Faber Chair in Business and Technology: our think and action tank on deep tech innovation across all sectors



With our help, you can make deep tech innovation happen and create a better future together.

esmt.berlin/deep



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