

Ευκαιρίες, προκλήσεις και κίνδυνοι σε έναν κόσμο Δεδομένων και Τεχνητής Νοημοσύνης

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"The windmill gives you society with the feudal lord, the steam-mill society with the industrial capitalist"

"The automobile created suburbia"







INSEAD







Property Profile

223 AUBURN AVENUE, USA

BY PERIL	Distance to Vegetation	0 ft.	
ATTRIBUTES: Wildfire	Roof Covering	Shingle	
	Roof Tree Coverage	Yes	
PROPERTY CHARACTERISTICS	Roof Condition	Good	
	🔵 Zone 1 - 10 ft: 15%		
VEGETATION COVER	🔴 Zone 2 - 30 ft: 70%		
	🛑 Zone 3 - 100ft: 80%		

U.S. FOREST SERVICE WILDFIRE HAZARD POTENTIAL: MODERATE



Input Chest X-Ray Image T. Evgeniou, INSEAD

Output Pneumonia Positive



I am a tech optimist. My belief in technology as a force for good

Better medical diagnosis and treatment



 Secure remote access to personal health records for targeted and faster research, diagnosis and treatment.

Digitalised transport

 Better and safer mobility thanks to interactions
 between cars and with road infrastructures.

Lower climate impact and money saved

Individual energy production and storage and lower energy bills, thanks to intelligent heating and cooling and smart grids.



European Commission

FOR ME

WHAT'S IN IT

SHAPING EUROPE'S

DIGITAL FUTURE



More environmentally friendly agriculture • Better food with fewer pesticides fortilisors, fuel and water thanks t

• Better food with fewer pesticides, fertilisers, fuel and water thanks to AI, data and 5G.



Fight against online

Access to diverse and reliable media content.







WHAT THREATS DOES AI POSE?

- 1. Erosion of US Military Advantage Advantage ("competitors, led by China and Russia, to undermine US military superiority")
- 2. Strategic Stability and Risk (e.g., "targeting previously invulnerable military assets")
- 3. Disinformation and the threat to our democratic system
- 4. Erosion on individual privacy and civic liberties (e.g. "greater capabilities to monitor and track citizens")
- 5. Accelerated cyber attacks
- 6. Danger of accidents ("compounded by AI's brittleness in complex environments")





WHAT THREATS DOES AI POSE?

- 1. Erosion of US Military Advantage Your Competitive Advantage ("*competitors, led by China and Russia, to undermine US military superiority Your Strengths")*
- 2. Strategic Stability and Risk (e.g., "targeting previously invulnerable military markets and assets")
- 3. Disinformation and the threat to our reputation and sales democratic system
- 4. Erosion on individual employee/customer privacy and civic liberties (e.g. "greater capabilities to monitor and track employees/customers citizens")
- 5. Accelerated cyber attacks
- 6. Danger of accidents ("compounded by AI's brittleness in complex environments")

CHIP WAR



THE FIGHT FOR THE WORLD'S MOST CRITICAL TECHNOLOGY

CHRIS MILLER



A WALL STREET JOURNAL BESTSELLER

The Age of Al

Henry Kissinger x Eric Schmidt x Daniel Huttenlocher

"Should be read by anyone trying to make sense of geopolities today"

Human brain cells transplanted into baby rats' brains grow and form connections

When lab-grown clumps of human neurons are transplanted into newborn rats, they grow with the animals. The research raises some tricky ethical questions.

By Jessica Hamzelou

October 12, 2022

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A WALL STREET JOURNAL BESTSELLER



- With what objective function is AI operating?
- What do AI-enabled "best friends" look like, especially to children?
- What impact might AI have on social norms or institutions?
- What does AI "perceive"?
- Does Al perceive aspects of reality humans do not?
- What then will it mean to be human?

"This dark, exhilarating work is the most important book of its generation about the relationship between law, cyborspace and social organization."*

AND OTHER LAWS OF CYBERSPACE

"Different versions of cyberspace support different kinds of dreams. We choose, wisely or not."

INSEA

LAWRENCE LESSIG



Home shows you top Tweets first

You'll be switched back Home after you've been away for a while.

View content preferences

🖤 Timeline

Show me the best Tweets first

Tweets you are likely to care about most will show up first in your timeline. Learn more

The echo chamber effect on social media

Matteo Cinelli^a, Gianmarco De Francisci Morales^b, Alessandro Galeazzi^c, Walter Quattrociocchi^{d,1}, and Michele Starnini^b

Media	Dataset	$ au_0$	Т	С	N	n _c
Twitter	Gun control	June 2016	14 d	19 million	3,963	0.93
	Obamacare	June 2016	7 d	39 million	8,703	0.90
	Abortion	June 2016	7 d	34 million	7,401	0.95
Facebook	Sci/Cons	January 2010	5 y	75,172	183,378	1.00
	Vaccines	January 2010	7у	94,776	221,758	1.00
	News	January 2010	6 y	15,540	38,663	1.00
Reddit	Politics	January 2017	1 y	353,864	240,455	0.15
	the₋donald	January 2017	1 y	1.234 million	138,617	0.16
	News	January 2017	1 y	723,235	179,549	0.20
Gab	Gab	November 2017	1 y	13 million	165,162	0.13

For each dataset, we report the starting date of collection T_0 , time span T expressed in days (d) or years (y), number of unique contents C, number of users N, and coverage n_c (fraction of users with classified leaning). For Twitter, T represents the window to sample active users, of which we retrieve all of the tweets related to the topic via the Application Programming Interface (API) (more information in *SI Appendix*). Sci/Cons, Scientific and Conspiracy content.



The echo chamber effect on social media

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"A clear- cut distinction emerges between social media having a feed algorithm tweakable by the users (e.g., Reddit) and social media that don't provide such an option (e.g., Facebook and Twitter)."

INSEAL





unicef 🚱 | for every child

Some 80% of children in 25 countries report feeling in danger of sexual abuse or exploitation online.

More than a third of young people in 30 countries report being cyberbullied, with 1 in 5 skipping school because of it.

THE WALL STREET JOURNAL.

Boys Have Eating Disorders, Too. Doctors Think Social Media Is Making It Worse. Multiplication of regulations, with many more to come...

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COMPLEX NEW OBLIGATIONS

Due diligence & risk management requirements



HEAVY PENALTIES

Up to 6% of annual global turnover



Technological Innovations for Business: Examples



- Early/Mid 1990s: Enterprise Resource Planning (e.g., SAP, Oracle, etc.) Business Process Re-engineering, process automation and support
- 2. Mid/Late 1990s: Internet networks, global connectivity, information capturing/sharing, increased "richness and reach", virtual teams, etc.
- 3. Early 2000s: **Knowledge Management** capture, share, reuse, connect internal knowledge, experts, best practices, etc.
- 4. Early/Mid 2000s: Customer/Supplier/etc. Relationship Management acquire, manage, understand, cross/up-sell, retain customers/suppliers/etc.
- 5. Late 2000s/Early 2010s: Big Data + Cloud

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Lessons from the past...



The Fundamental Law of Tech in Organizations







- Understand the <u>new</u> businesses challenges to adopt and leverage data and AI
- Understand the data and AI maturity journey of organizations
- The <u>Value</u> and <u>Risks</u> of Data and AI



What makes AI adoption/innovation challenging?

You Already Use Al (maybe not the software)

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Decision Tree for Loan Approval





"New" AI: Machine Learns/Writes the Rules/Program





What makes AI adoption/innovation challenging?



What are the principal reasons acting as constraints on the introduction of AI into your organization



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- F.A.T. (Fairness, Accountability, Transparency)



Introduction to



A strong portfolio for the new energy world

Energy Networks

Energy Networks play a crucial role in making the transition of the energy system work. With our pan-European network, we will connect renewable energy sources with customers. By digitizing our networks, we will create the "Internet of Energy" opening-up new horizons.



1 networks operator in Europe



1.6m km energy networks

500k assets connected

Shared by e.on



Customer Solutions

Customer Solutions enable customers to take an active role in the energy transition. We design, build and operate sustainable and connected energy solutions for cities, industrial and commercial customers as well as millions of private households.

Leading European Energy Retail with ~50m customers



>32k industrial sites under management



INSE

E.ON is the partner for energy solutions

Consumers and small businesses Affordable and sustainable energy solutions

Business and industrial customers Affordable, sustainable and secure. Improving customers' core business.

Cities and municipalities Efficiently achieving ambitious CO₂targets

Shared by e.on





What are the main steps that E.ON took to achieve the transformation?

Some points to consider:

- 1. Sponsorship, support, and protection from the top (the Board)
- 2. Hired talent at all levels and developed training throughout the organization
- 3. Quick wins: succeed fast with high business impact, low data challenges project(s)
- 4. Data Evangelization: "Show the Value of Data and AI!"
- 5. Created central Data.On initiative and organization, with local Data.On hubs and with active Data.On community
- 6. Data Governance: Ensure data quality and data quality processes, roles, accountability, etc.
- 7. Develop AI investments processes and prioritization

E.ON Data Evangelization: Sample Events



Event	Location	Торіс	
AI Expo	London, April 2018	How AI is reshaping the energy world	
Tech days	Munich, July 2018	How Artificial Intelligence is making our energy more human	
Design IT	Munich, August 2018	How AI is transforming our energy world	
Brain Bar Festival	Budapest, June 2018	Can data change our energy and save the Earth?	
SOMET 2018	Granada, September 2018	How to successfully implement AI in the industry: from hype to value	
Data Leaders Day	Berlin, November 2018	Ethics in data science	
E.ON Lectures Behavioural Change	Milan, November 2018	Behavioural mapping using smart meter data	
Munich Data Geeks	Munich, December 2018	A deep learning approach to data scientist capability model	
Big-Data.Al Summit	Berlin, 11 April 2019	Energy.AI - This is how AI is Reshaping Today the Energy World of Tomorrow	
Data Festival	Munich, 20 March 2019	Panel: Ethics in Al	
#AlSummit2019	London, 12th - 13th June 2019	AI, ML, Smart Data: New Technologies, New Opportunities for Energy	
© T. Evgeniou, INSEAD		https://www.eon.com/content/dam/eon/eon-com/Documents/en/new- energy/20191202-1022-in150-25039-yearbook-artinelli-170x240-online-5.pdf	

E.ON Data.On Program



https://www.eon.com/content/dam/eon/eon-com/Documents/en/newenergy/20191202-1022-in150-25039-yearbook-artinelli-170x240-online-5.pdf

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How did E.ON approach the data quality and data availability challenges?



https://www.eon.com/content/dam/eon/eon-com/Documents/en/newenergy/20191202-1022-in150-25039-yearbook-artinelli-170x240-online-5.pdf



What was E.ON's approach to making investments in AI?





1. What do you find most critical in what E.On did? Why?

2. What would you do more/less/different in your organization?

Some Lessons

- 1. [Data transformation = cultural change] The data transformation is not just adding new technology skills and experts. It needs to be approached as a fundamental change in the way of working, etc
- 2. [Quantify the impact] Investing time in defining metrics and KPIs to measure the momentum of the data transformation and the actual business impact pays off
- 3. [Balance the impact vs. capability] While it is critical to embed data and AI to solve particular business problems, relying on standards is a prerequisite for scaling. Otherwise, "mushrooms" –low-scale silo solutions- are likely to spread
- 4. [Funding model for data and Al capabilities] The commercial model defines the Al roadmap, the embedding success of the Al initiatives but also the ability to scale. The maturity of the organization determines which funding model is the most appropriate (e.g.: centrally funded –vs- hybrid –vs- inhouse consulting).
- 5. [Data evangelization and data upskilling is a must do] Employees needs to answer the "what's in for me" question and for that both upskilling (data literacy) and community building are proven essential
- 6. [Top down support brings momentum... Bottom-Up sustains it] Having a board sponsor is gold... having the entire board sponsoring it is priceless but to make the transformation last, it has to reach each and every key employee
- 7. [Architecture and standardization is essential] Without sticking to the proper standards, all business embedding might create fragmentation
- 8. [Tailor-made data strategy] It's really critical to assess the maturity of the organization and tailor the data transformation accordingly (there is no panacea strategy)

By Juan Bernabe Moreno

INSEA







Empowering Al Leadership: Al C-Suite Toolkit

JANUARY 2022







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- Understand the data and AI maturity journey of organizations
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- Responsible Al
- F.A.T. (Fairness, Accountability, Transparency)

Key Skill: Asking the Right Business Questions

Value vs. Feasibility

+ Stakeholder Engagement

+ Clear Scope and Scale

How to assess value and feasibility?





Resources

- Data (Quality, Relevance, Volume, Availability, Costs, etc.)
- Available skills and tools (costs, training, etc.)

Predictability

- Stable patterns (predictability, stability)
- Minimum Viable Accuracy (MVA)

Quantifying the Value of Al



MicroLoansCorp considers investing in a new AI credit scoring system from DeepAIcorp to use for the "toughest" (most marginal applicants) market for them. Currently they experience a 20% default rate in this market, with an average loss of \$5000 per default client – they make on average \$1500 for the "good" clients.

DeepAlcorp provides AI that predicts client defaults. Early tests indicate that the AI classifies 80% of the applicants as "good". It turns out that only 10% of these "good" applicants are wrongly classified (hence they turn out to default). Moreover, for the remaining 20% that the AI recommends not to approve, about 40% of them were actually "good" clients (based on historical data)

Is it worth investing in DeepAlcorp's AI? How much should MicroLoansCorp pay (at most) for such an AI system?

Quantifying the Value of AI



Quantifying the Value of Al

Consider a pool of 1.000 prospects

Expected Value without AI 0.8x1000x1500 - 0.2x1000x5000 = \$200.000

Expected Value with AI? 0.9x800x1500 - 0.1x800x5000 = \$680.000

Expected Value of AI = 680.000 - 200.000 = \$480.000

What if the AI could classify everyone 100% accurately?

Expected Value of Perfect AI = 0.8x1000x1500 - 200.000 = \$1.000.000



How about AI Project/Product Dev?

Al Lifecycle Management



INSEAD

modeler/SaaS?topic=dm-crisp-help-overview

Components of ML Systems/Processes



INSEAD

MLops (a hot space)



Figure adopted from "MLOps: Continuous delivery and automation pipelines in machine learning" INSEAD

Multiplication of regulations, with many more to come...

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COMPLEX NEW OBLIGATIONS

Due diligence & risk management requirements



HEAVY PENALTIES

Up to 6% of annual global turnover





What can go wrong? What makes AI Risky?



What can go wrong? What makes AI Risky?

1. FAIRNESS AND BIASES

- Will our algorithms treat different subpopulations "unfairly"?
- Is AI perpetuating any biases we had in the past?
- Do we run any legal or reputation risks?

3. TRUST AND TRANSPARENCY

- Do we understand how AI makes decsiions?
- Do stakeholders trust our algorithms?
- Do we have in place clear processes to manage issues?
- Can we identify and imrpove weaknesses of our systems?

2. SAFETY AND SECURITY

- Is the performance of our algorithm well understood and acceptable?
- Are there any new security risks (e.g., adversarial attacks)
- What are the costs of different types of errors our algorithms male?
- How do we manage the risks of an evolving AI or a changing environment?

4. REGULATORY RISKS

- Do we understand and comply with regulations in the markets we operate in?
- Do we have any high risk AI applications?
- Do we need to audit, certify, and/or monitor our systems to ensure continuous compliance?

Figure 6: Six Categories of AI Risks (Source: PwC Analysis)



AI Regulations: The EU AI Act





Home > OECD AI Principles overview

OECD AI Principles overview



Inclusive growth, sustainable development \rightarrow and well-being



Human-centred values and fairness $\ensuremath{\succ}$



Transparency and explainability



Robustness, security and safety



Accountability

'Tech for Good' Needs a 'Good Tech' Approach

T. Evgeniou, L. Van der Hayden

INSEAD

1. Good Tech is inclusive, value-based, and future-proof

2. Good Tech must be governed by "Fair Process"

3. Good Tech requires good leadership and oversight T. Evgeniou, INSEAD

Online Trust & Safety: EU Digital Services Act

Example obligations (as of 2023)

- Notice and action mechanism
- Information to notice providers and content providers
- Internal complaint handling system
- Out of court dispute settlement
- Enhanced transparency reporting
- > Advertising transparency and **bans** on certain targeted ads
- Transparency of recommender systems

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INSEAD

- 1. Auditing of AI Systems
- 2. Certification of AI Systems
- 3. Monitoring over the AI Lifecycle
- 4. Software and Documentation Toolkits
- 5. Al Governance



Working Paper 2021/04/DSC/TOM

Implementing AI Principles: Frameworks, Processes, and Tools

> Pal Boza INSEAD, <u>pal.boza@insead.edu</u>

Theodoros Evgeniou INSEAD, <u>theodoros.evgeniou@insead.edu</u>



Table 1: Key Software Toolkits and Frameworks for Implementing AI Principles

Toolkit	Developer	
Fairness Tool ⁷¹	Accenture	
Foolbox ⁷²	Bethge Lab	
CleverHans ⁷³	CleverHans Lab	
Model Guardian ⁷⁴	Deloitte	
	Digital Civil Society Lab,	
Digital Impact Toolkit ⁷⁵	Stanford Center on Philanthropy and Civil	
	Society	
Deon ⁷⁶	Driven Data	
Fairness Flow	Facebook	
What-If Tool ⁷⁸	Google	
Ethics & Algorithms	GovEx, the City and County of San Francisco,	
Toolkit ⁷⁹	Harvard DataSmart, and Data Community DC	
AI Fairness 360 ^{80,81}	IBM	
AI Explainability 360 ⁸²	IBM	
Adversarial Robustness	IBM	
Toolbox ⁸³ (ART)		
LinkedIn Fairness Toolkit ⁸⁴	LinkedIn	
(LiFT)	Linkedin	
Fairlearn ⁸⁵	Microsoft	
InterpretML ⁸⁶	Microsoft	
Harms Modelling ⁸⁷	Microsoft	
Community Jury ⁸⁸	Microsoft	
Skater ⁸⁹	Oracle	
REVISE: REvealing VIsual	Princeton University	
biaSEs ⁹⁰	Thecton oniversity	
Responsible AI Toolkit ⁹¹	PwC	
audit-AI ⁹²	Pymetrics	
FAT Forensics ⁹³	University of Bristol	
A equitas ⁹⁴	University of Chicago Center for	
	Data Science and Public Policy	
Lime	University of Washington	



AI Fairness 360

Join our AIF360 Slack

This extensible open source toolkit can help you examine, report, and mitigate discrimination and bias in machine learning models throughout the AI application lifecycle. We invite you to use and improve it.



Open a directory of Jupyter

Not sure what to do first? Start here!

Read More	Try a Web Demo	Watch Videos	Read a paper	Use Tutorials
Learn more about fairness and bias mitigation concepts, terminology, and tools before you begin.	Step through the process of checking and remediating bias in an interactive web demo that shows a sample of capabilities available in this toolkit.	Watch videos to learn more about AI Fairness 360.	Read a paper describing how we designed AI Fairness 360.	Step through a set of in- depth examples that introduces developers to code that checks and mitigates bias in different industry and application domains.
\rightarrow	\rightarrow	\rightarrow	\rightarrow	\rightarrow
Ask a Question	View Notebooks	Contribute		

You can add new metrics and

\leftarrow \rightarrow C \cong aifs360.mybluemix.net/examples/hmda

IBM Research AI FactSheets 360

🖈 😨 🚺 🗯 🕕 Upda

SEAD

Data Transform	
Dataset	2018_public_lar_csv_TRAIN.csv.bz2
Selecting relevant records	Selecting records which meet the following conditions:
~	1.loan_purpose is Home purchase
	<pre>3. derived_dwelling_category is Single Family (1-4 Units):Site- Built</pre>
	 Covered loan or application is not for an open-end line Covered loan or application is not primarily for a business or commercial purpose
	6. Covered loan or application is not reverse mortage
	7. The occupancy_type is a primary residence
	cause the covered loan to be a negative amortization loan
	9. The contractual terms do not include, or would not have included, interest-only
	payments
n	11. The contractual terms do not include, or would not have included balloon payments
Selecting records based on action	Select the records where the action taken for a loan is either Loan originated o
taken for a loan	Application_denied
Creating new field	 Records with Race as White and Ethnicity as Non-Hispanic are determined
'derived_race_ethnicity_combination'	as White
(based on race and ethnicity)	 Records with Race as Black and Ethnicity as Non-Hispanic are determined as Black
	Other records are dropped
Creating new field 'loan_approved'	loan_approved is computed as:
	 1 if the loan was originated or if the application was approved but not accepted 0 if otherwise
	The value of loan_approved was converted to an integer therefater.
Selecting records based on	Select the records if the loan, term (number of months after which the legal

T. Evg





Responsible AI Dashboard Model Debugging



T. Evgeniou, INSEAD

- Microsoft

Responsible AI

Implementing Responsible AI – for business

- ✓ Successful trustworthy AI adoption depends on strong AI governance
- Ensure structures are in place to secure wider organizational buy-in for the development and deployment of trustworthy AI
- ✓ Upskill teams by providing appropriate training in both technical and non-technical aspects of AI
- ✓ Use of responsible AI tools can have multiple second order effects (culture, debate, etc)
- ✓ Balance between standardization and customization depending on the AI system's specific context
- ✓ Transparency does not automatically equate to explainability
- ✓ Ensure continuous improvement

Business at OECD (BIAC) Report on Implementing the OECD AI Principles: Challenges and Best Practices

July 5, 2022

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5 April, 1955.

41, Queen's Road, Richmond, Surrey. ISEAD

Dear Einstein,

I have been turning over in my mind, and discussing with various people, the best steps for giving effect to the feeling against war among the great majority of men of science. I think the first step should be a statement by

you mentioned. Scientists have, and feel that they have, a special responsibility, since their work has unintentionally caused our present dangers. Moreover, widening the field would make it very much more difficult to steer clear of politics.

un your your Sours sincerely,

Bertrand Russall

Sheaded--Areas equipment a water control of exact and inclusions--and-induced--analysis.
CHIEF CONTROL AND A CONTROL OF THE CONTROL



THE FIGHT FOR THE WORLD'S MOST CRITICAL TECHNOLOGY

CHRIS MILLER





T. Evgeniou, INSEAD

If you take the typical great man of our historic epoch, and suppose that I had to rise here

Video link



Theos Evgeniou

Professor Decision Sciences and Technology Management, INSEAD

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Europe

Asia

Middle East