

INTERNATIONAL STRATEGY AND INFLUENCE MAGAZINE

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FOREWORD

by Christophe Bisson, Ph.D., Scientific Director of MSc International Strategy & Influence



“COVID19 and the current war in Ukraine have marked the end of “fruitful” globalization. Thus, the strategic environment is highly volatile, uncertain, and the volume of data is booming as digital transformation accelerates which makes increasingly more difficult to detect threats/ opportunities.

To stand the test of such an upheaval, companies and governments need to revisit their strategies; it is more important than ever to anticipate and remain agile, and that requires new approaches and new tools. Therefore, a strong ecosystemic and dynamic approach needs to be implemented in public and private organizations in order to continuously gain insights, and remain fast and nimble. Business models must be sharpened constantly, and strategic grids require not only a consideration of direct market forces, but of all forces that can impact ecosystems, such as the ones that can influence all stakeholders. Thus, a 360° vision of strategy is required.

While AI is gaining ground, it is still in its infancy for strategy within organizations. In that vein, most AI research focuses on technological aspects and rarely on business, less frequently still on the strategic aspects of business. Hence, there is often a big gap between strategists and technologists.

Therefore, the MSc ISI aims to address these challenges with 3 pillars encompassing Strategy, Influence (Non-Market Strategy) and Economic Security (1 of the 2 tracks proposed in the spring semester, with Strategic Consulting). The whole is augmented by the power and intelligence of machines, as we co-created a comprehensive course and partnership with Digimind (leader for social listening platforms and market intelligence software) and designed an innovative Low code/No code AI course for strategy and competitive intelligence (using the Microsoft platform), during which our students are equipped with all AI fundamentals.

Students can use strategic grids that take into consideration all impacting market factors, evaluating and representing them through the use of the ‘Stratbrain’ platform; the same platform can be used to evaluate, using AI, the weights of some variables in bigdata and to solicit experts regarding other types of variables to thus be able to create the sharpest future projections, helping to cope with full strategic issues.

To cope with the great challenges of society, humans alone or machines alone cannot address the full spectrum of strategic issues. The “magic formula” lays in knowing how to intertwine machine and human intelligence in the best way to dive into the flows and interconnections in the ecosystem to deliver augmented strategies in a sustainable way.

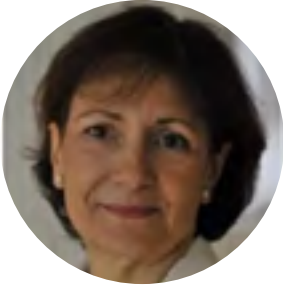
Therefore, we need to fully consider and integrate that pollution is not an “externality” and that resources on earth are not unlimited, as the recent IPCC report stressed once again.

Thus, the MSc IS&I offers a combination of robust theoretical knowledge with practical tools and methods within the same curriculum. To illustrate these topics, it is my pleasure to present the second magazine of the ISI program to you. Within, we’ve included several articles written by our students as well as interviews of actors in the field and alumni.

I wish you an enjoyable read.”

Christophe BISSON, PhD

Interviews



Interview of Mrs. Claude Revel:

by Mr. Ekansh Ghai, MSc "International Strategy & Influence" (ISI) student



Claude Revel manages Iris Action, her own consulting company, created at the end of 2003 and specializing in Business Diplomacy, Advocacy and international competitive intelligence.

She is a "French Foreign Trade Advisor" (a voluntary based function, appointed by the Prime Minister) and a member of various Institutes and professional associations. In 2004, she was rewarded "Chevalier de la Légion d'Honneur", a French State award.

After eight years in high civil service in the French ministries of Construction, External Trade and Foreign Affairs (1980-1988), Claude Revel became Director-General of OBSIC and SEFI, two associations created by major French general contractors and dedicated to international information and relations with multilateral institutions.

Her long experience in both public and private sectors, in France and in international circles, provides her with a deep knowledge of international institutions (United Nations agencies, World Bank, World Trade Organization, etc.) as well as a solid experience in relationships and negotiations with decision-makers of diverse cultures. She is also the director of SKEMA PUBLIKA.

► Q1. As we progress past Covid-19, we face a crucial question - Sustainability in business. What are your thoughts on it?

Claude Revel (CR): Sustainability has many elements to it. Of course, everybody thinks about the environment, climate, ecosystem, etc., but it is also a question of human matter. It is a question of social responsibility and human responsibility alongside the environment. Inside the business world, we should pay more attention to the human side: human relations and human resources. It's a general weakness as many people don't address this question. Sustainability is a question of the environment, but also of social and human responsibility and not merely simply signing papers under the title of CSR.

Ekansh: By social responsibility here, we are not just talking about CSR for the public image of the company, but the actual value provided to the people, inside the company and outside.

CR: When their energy is focused, not just on business, but also on human responsibility and correct behaviors, only then can it be seen as a "good" company.

Ekansh: When there's great company culture and the people outside the business in society get acquainted with it, they are more interested in working with the company and give their best efforts at work. This also helps maintain a better work-life balance while simultaneously increasing efficiency.

► **Q2. Tell us about SKEMA PUBLIKA, of which you are the director**

CR: A think tank is designed for producing information, analyses, and at times opinions of certain measures. Secondly, it serves to spread and disseminate all this information and analyses to decision-makers, whether they are private or public. Sometimes also to participate in public debates. Skema Publika was created two years ago. It is supported by SKEMA Business School, but it is an independent organization in terms of opinions and the analyses. We rely on the analysis of SKEMA researchers and external experts and specialists if necessary. We focus on issues and concerns regarding public policies. Our purpose is to provide more ideas, upstream information and analysis, and weak signals to the key decision-makers to provide them with tools for making policies on an international level, because the issues are always addressed with a broad view by international researchers relying on our five campuses.

We intend to have partnerships with international organizations soon such as the United Nations. We have an international strategic committee in which we have representatives of international organizations such as OECD. The purpose is to work with international multi-lateral organizations that deal with business public issues.



► **Q3. Considering your diverse experience working with the French government and various institutions in different sectors, what do you think the students should focus on when they go into the field of strategy?**

CR: What is the most lacking in people when it comes to business is a good knowledge of international relations, geopolitics and international competition. Generally, they are very well trained in economics, accounting and other technical skills, but miss out when it comes to having an international overview. It is indispensable when you are to do business abroad; you have to know the international environment in a specific context, in terms of competition, intercultural relations, soft skills, and soft knowledge. Besides the technical forte, one should have soft knowledge of the environment – human and cultural – internationally.

Ekansh: Certainly, we can't ignore how essential it is to have an understanding of the soft power of different countries. The courses provided by MSc "International Strategy and Influence" here at Skema Business School in the Grand Paris Campus touch on the subjects of multi-cultural knowledge and international negotiation and offer a full course schedule around economic security, all of which serves to prepare students for the upcoming challenges in the business sector internationally.



Interview of Mr. Mikel Mangold
Author of the book *Today's Superpower:
Building Networks*

by Ms. Cécilia Guerin, MSc ISI student



► **Q1. Mikel, you are currently an Innovation Project Manager at Venture Lab NGK SPARK PLUG GO. Can you give us more insights into what your company does and what your role entails? What are your main responsibilities?**

Mikel: NGK SPARK PLUG CO is a company that sells hardware and ceramic components for combustion engines; however, today combustion engines are on the decline. The company has to keep up with a changing world and find solutions. Therefore, the company opened an Innovation division in 2020 called "The Venture Lab", which is detached from the company and is made of 300+ people focusing on creating new businesses. We focus on processes or product improvements, which can take many forms:

- *Venture Building*: build products from scratch, using Design Thinking, methodologies, and Agile Sprint Methods, from ideation to minimum viable products, to product launch on the market. It is the latest trend in approaches used by corporations. This was my mission for many months in 2021; I was what you could call a 'Venture Builder' or 'Incubation Manager', requiring me to identify great ideas and transform them into products that would be both profitable and aligned with the strategy of the company.
- *Collaborating with Start-Ups and SMEs*: I now purely focus on Open Innovation - how to build partnerships with start-ups and SMEs. It is the second way in which we generate revenue for the company. I establish contracts with these entities either to share revenues or for future investment in shares. Within my team, I create the ecosystem, define sourcing, identify start-ups to fill up our investment funnel, and then put them in contact with the investment team, where we have \$100M in funds.
- *Doing pure M&A*: This one is about acquiring all assets of a company and integrating them into our company; it is the most effective way to transform a company. This is mainly carried out by an external VC firm we collaborate with, Pegasus Tech Ventures, located in Silicon Valley.

► **Q2. Nowadays, we are living in extraordinary times where the pace of disruptive technologies is accelerating - what advice would you give companies when it comes to an innovation strategy?**

Mikel: Companies have needed to innovate for a long time. Before, products remained the same for years, but that time is now over: no products or businesses can stay the same or refuse to evolve. We notice that with the cloud and digital technologies constantly evolving, the environment becomes very unpredictable, and it is therefore challenging for a company to find the right strategy. A company finding great ideas is a significant highlight, but the most important traits are implementation and execution. Hence, the best way to execute a strategy is to hire people that can execute a strategy. People are the asset and hiring the wrong people could lead a company to nowhere. Daniel, F. Prosser's book (2015), 'Thirteeners: Why Only 13 Percent of Companies Successfully Execute Their Strategy--and How Yours Can Be One of Them', states that there are only 13% of people that can execute a strategy.

► **Q3. You are also the author of the book 'Today's Superpower: Building Networks'. Can you tell us more about the purpose and story of this book? What motivated you to write it?**

Mikel: This book is the result of 15 years of thinking and reflecting on 'What is life all about?' and 'Where am I heading?'. It started with an experience where I became conscious of how people can find their purpose and impact the world; indeed, there is a worrying statistic saying that only 13% of people are passionate and engaged at work. Regarding innovation, how can you make it work if you are not engaged at work and your only goal is money for living? Nowadays, one of the most significant changes society is experiencing is that we are moving into start-ups and multi-stakeholder models. Before, companies were isolated and internally focused with little to no collaboration incentives. Today, collaboration is essential as companies need many skills that they do not always have. For instance, when building tech-products, there is the marketing, science, and attaining patents, labels, or financing – in all cases the common need is talent, and it does not always make sense to hire them all. All companies need to collaborate – not just to survive but to solve the world's biggest problems. In 2020, the Davos conference was about the 'Great Reset', it highlighted the purpose of long-term goals, not only making money or profits to return to shareholders. Purpose-driven companies working in ecosystems with different partnerships will be able to overcome systemic problems, such as climate change.

I wrote this book to share my vision on the importance of building a network to change the world, and this can be done by collaborating with entrepreneurs and start-ups as they are the best set to get things done in today's world. Some companies struggle to unite, and the most prominent issue is the mindset. People stuck in the past don't want to share knowledge or ideas, they avoid diversity, and try to control. My book explains **7 Mindset Principles for collaboration** success and talks about using **Networks** for ideas and knowledge, for recourse (capital, infrastructure, databases) and people (to join and work with you).



► **Q4. How does collaboration bring differentiating value for the business, customers, and stakeholders?**

Mikel: The ability to collaborate is very crucial to gaining a competitive advantage. Corporations are usually slower in implementing when compared to existing start-ups. Hence, doing Joint Venture or doing a licensing agreement with an existing product and existing team saves you time from building everything from scratch. Apple and Microsoft are doing Merger & Acquisition weekly – Bayer Pharmaceuticals is also a great example, as they are reinventing themselves; they were a purely chemical company, and now they are doing biotechnology. Still,

they did not know about it, and they had to collaborate, invest and do many M&As to complete the transformation. Every company should understand the importance of business. Collaborating with universities, start-ups, and other Venture Capitalists is needed to keep up with market's needs.

► **Q5. How can collaboration accelerate an innovation's go-to-market?**

Mikel: Collaboration helps speed up the process and your time-to-market compared to your competitors. You can ride the wave of change when you collaborate, monitoring the latest trends, and are more aware of the environment through communication within the Ecosystem. It also helps you to propose new strategy insights for your company. In addition, closing a deal with your partner allows you to have new technology in months that, otherwise, could need 15 years of development, and the same goes for regulatory approval. The Covid-19 vaccine is a perfect example of collaboration, where universities partnered with companies, companies partnered with the government, and companies collaborated to scale and manufacture the vaccine. And this happened during a time of crisis. A crisis is often a spark to ignite such collaborations.

► **Q6. What are the barriers to having sustainable collaboration in a corporate or start-up? How can one overcome them?**

The main problem comes from managing stakeholders; there is a need to communicate with internal and external stakeholders. Sometimes, 20 people are involved in the process. When there is no proper communication, everything remains stuck in the funnel, and collaboration fails to happen. One of the ways to make them successful is to define the key stakeholders who acknowledge and agree to be part of the discussion. Once the group is formed, it's important to establish a process to inform and ask for feedback. Internally, there is a need for insightful meetings to present and convince your board. Then, a decision must be taken with the consensus of top executives and clear next steps must be defined. Usually, new people are onboarding during the process to proceed with legal contracts, etc.





Interview of Ms. Emma Fouilloux, Alumna ISI 2019

by Ekansh Ghai, Msc "International Strategy & Influence" (ISI) student

▶ **Q1. What does your position entail and what are your main tasks?**

Emma: I'm currently working in the tech department of a consulting firm called Wavestone. As a consultant, my job is to guide and accompany my clients in their digital transformation. On a daily basis, that means listening to my clients' needs and finding relevant and innovative solutions to their problems. It also entails helping my clients prioritize the different tasks and organizing my team so that we can meet the deadlines. Finally, my company also offers consultants opportunities to get involved in our internal activities, so I also take part in our recruitment processes.

▶ **Q2. What is the importance of your role in the post-Covid19 in your opinion?**

Emma: For several years now, the move towards digital has been undeniable, but the Covid-19 pandemic has accelerated the agenda. What was supposed to take years now seems to have to happen in a few months. Add to that increasingly intense competition in a majority of business sectors and you understand the major challenges that our clients are facing. As tech consultants, we've thus had to adapt, keep increasing our expertise and pay close attention to the ever-evolving technologies to help our clients navigate through these changes.

▶ **Q3. What practices are gaining ground in your field?**

Emma: The publication of numerous reports on the environment has brought about an awareness: climate change is a crisis. The environmental imperative has therefore been gaining ground on the strategic agenda of all major companies. This shift is thus requiring us to add a CSR component to our consulting approach and forge convictions on what tomorrow brings.

▶ **Q4. Is there a requirement/demand for specific skills for roles similar to yours in the current market?**

Emma: To work in the type of consulting I do, there are no specific skills required. What we are mainly looking for are people with an open & creative mind who are able to work in multidisciplinary teams and are fully committed to learning about new topics. Of course, being interested in tech is better when joining a tech department!

▶ **Q5. How would you relate your current position to the MSc ISI you have completed?**

Emma: The MSc ISI helped me gain different skills such as taking a step back to broaden my analysis on a topic, convey key information with structure... All skills that are expected in the everyday job of a consultant. It has also helped me understand the key aspects of knowledge management for example - a key asset for consulting firms.

▶ **Q6. Any advice you would want to give to the current students entering this field?**

Emma: Each student is different and aspires to different careers, so my advice for students wanting to enter a consulting firm is to try and determine what you would want to find in your future workplace so that you can choose the one that fits with your goals.



Interview of Mr. Alim Jaria, alumnus MSc ISI 2021
by Ekansh Ghai, Msc "International Strategy & Influence" (ISI) student

► Q1. What does your position entail and what are your main tasks?

Alim: I worked as a data strategy consultant on one of the E.U. funded projects called MobiDataLab. MobiDataLab was funded under the Horizon2020 project which is an 80 billion euro initiative by the E.U. for the E.U. to boost projects trying to tackle their issues. The problem MobiDataLab was trying to tackle was how to improve mobility in the E.U. by leveraging data collected from mobile equipment (cars, trains, buses, scooters, and electric bikes) and not only analyze the data, but also produce deliverables from them. My tasks included doing desk research and providing benchmarks across different industries to provide the best possible business model option to the stakeholders of the projects.

Since the project was still in its initial stages, it was quite intriguing to run the research from the ground up. My meetings with the stakeholders also included providing samples of how the project would fit in different business models such as Software as a Service (SaaS), marketplace, two-sided, etc. Since I was responsible for the entire project, I did have the chance to do weekly follow ups, conduct interviews with the stakeholders, and run an in-depth analysis of the project and its scope.

► Q2. What is the importance of your role in the post-Covid19 era in your opinion?

Alim: I believe every industry in the near future will find an intersection with big data. It is already happening. We just need to look at the trends around us. Artificial Intelligence and Big Data when combined together are disrupting industries. And the ones to have realized this early on are finding themselves in a comfortable seat.

► Q3. What practices are gaining ground in your field?

Alim: In strategy consulting, data and digital transformation are gaining ground; especially after the pandemic. COVID19 really accelerated the future for everyone. I believe making oneself familiar with new technologies and keeping oneself updated in this ever-changing, fast-paced world is essential. One needs to educate oneself in detail about terms like Artificial Intelligence, Big Data and other digital technologies.



► **Q4. Is there a requirement/demand for specific skills for roles similar to yours in the current market?**

Alim: The answer is similar to the one mentioned above.

► **Q5. How would you relate your current position to the MSc ISI you have completed?**

Alim: I genuinely believe that MSc ISI really helped me get hands-on experience of what consulting missions look like. Our missions for Danone, the courses taught by BCG consultants, as well as the brief interactions with many strategy consultants helped me evolve all the skills I really needed for strategy consulting. This combination of hard skills and soft skills is something that I used during my internship, and which also helped me greatly.

► **Q.6 Any advice you would want to give to the current students entering this field?**

Alim: I would like to highlight my views in three points:

1. **Upskill:** In today's time it is foolish to think you can know everything by completing a degree. One needs to go the extra mile. As a consultant, you will sometimes be stacked on a project that you have no idea about. Do not be afraid. You can literally educate yourself about anything and fill in a skill gap, if need be, by getting help on the internet. Always keep evolving and upskilling. Remember, it is important to sharpen the axe.
2. **Communication:** Don't forget, that it is important to know what your clients are demanding from you. It is very important to be a good listener to first understand the needs of the clients.
3. **Specialize:** In the near future, I believe, one will have to specialize in a particular industry to stay relevant for consulting. One cannot do everything and be everywhere. So, it is essential to spend the initial years working on consulting missions in different industries to know what it is you enjoy working in. Remember, to achieve true success in the long term, one must really enjoy what they are doing, and this holds true for all professions, not just consulting.



Articles



THE GEOSTRATEGIC STAKES OF SEMICONDUCTORS IN THE GLOBAL VALUE CHAIN

By Ms. Laura Cangelosi, MSc ISI students

Craig Benett, the former CEO of Intel Corporation, once qualified the semiconductors that his company produced as *"the most complicated devices ever made by man"*¹.

Semiconductors are indeed highly specialized components that allow electronic devices, such as mobile phones, computers, television, cars, and equipment used in aerospace and national defense, to function by providing the ability to process, store and transmit data. On top of that, the global supply chain involved in the different stages of fabrication is just as complex and globalized. That is why the global shortage, that started with the Covid-19 crisis in 2020, in the aftermath of multiple lockdowns that stopped semiconductor production, coupled with the increasing demand for technology devices, revealed the fragility of the supply chain and the major impacts on several key industries.

Securing the semiconductor global supply chain thus appears a necessity and key geostrategic issue for the states involved. This paper analyzes the geostrategic stakes of semiconductors in the global value chain.

To begin with, the semiconductor value chain is highly specialized, dispersed around the world, according to countries' specific comparative advantages, and thus, interconnected.

This global structure aims at saving costs to be competitive when selling final products to high-end consumers. To do so, the global value chain is mainly divided as follows: The United States is a leader in research & development, innovation and design of semiconductors, East Asia is specialized in wafer fabrication and China is a leader in the assembly, packaging, and testing². This means that the United States takes part in the stages with the highest added value, but also the ones that require the most investments. China, on the contrary, oversees the manufacturing process which requires less investment and relies on low labor costs, but strives to move up on the value chain with massive investments and government incentives³. Taiwan and South Korea on the other hand, benefit from having the most advanced semiconductor manufacturing capacity.

However, the fragility of this global supply chain was revealed in 2020 after the Covid19 outbreak that forced production and consumption to slow down. The semiconductor shortage that began in the aftermath is still present and likely to continue throughout 2022, affecting several key industries from the automotive industry to the production of national security

¹ The chip shortage keeps getting worse. Why can't we just make more ?, Bloomberg Journal, Ian King, Adrian Leung and Demetrios Pogkas, May 6th 2021

² Strengthening the global semiconductor supply chain in an uncertain era, BCG & SIA report, April 2021

³ China's emerging role in the global semiconductor value chain, Telecommunication policy, Seamus Grimes and Debin Du

devices. The increased demand for semiconductors has not been met, and massive investments coupled with government incentives cannot provide an immediate response. Indeed, increasing semiconductor production capacity takes time due to its high complexity. For instance, Taiwan Semiconductor Manufacturing Company (TSMC), the world's largest semiconductor manufacturer, decided to tackle this shortage by investing up to 28 billion dollars to build new plants but the process takes at least 5 years⁴.



Given its global character, the semiconductor value chain relies on international interaction and cooperation. However, rising geopolitical tensions affect this specific value chain, and are, to a certain extent, triggered by the aforementioned lasting shortage.

Major powers like the United States, China, and the European Union are now more aware of the strategic stake that a strong position in the semiconductor global value chain represents. Indeed, the higher this position is, the more ability to wield power and negotiate with states it grants. It is thus not surprising that China is trying to move up the value chain to compete with the US and that the Biden administration is seriously reflecting on relocating manufacturing plants. They both act in a bid to decrease their mutual dependency with measures on tariffs, for instance, that can directly impact the global value chain. However, those efforts are not likely to be the best strategies since they would affect the cost efficiency at stake in the current value chain and would end up producing items utterly disconnected from purchasing power. Thus, it is only relevant to say that political discourses are seen placed above the reality of the supply chain.

Another way used by governments to guarantee or reinforce their position in the semiconductor global value chain is to intervene in private corporation deals. Recently, the United Kingdom government rose national security concerns regarding the American firm NVIDIA wishing to buy the British company Arm⁵. The deal that initially involved two private companies drew governments' attention to the extent that it poses a threat to the UK's position in the global

⁴ Why we are in the midst of a global semiconductor shortage ?, Harvard Business Review, Bindiya and Tom Linton, February 21st 2021

⁵ UK weighs national security concerns over Nvidia's \$40bn move for Arm, Financial Times, George Parker, Kate Beioley and Harry Dempsey AUGUST 3 2021

value chain and for the national security implication of this company. Moreover, the Competition and Markets Authority expressed concerns regarding the potential it would give NVIDIA that might lead to a monopolistic position in the industry. Later, the US Federal Trade also expressed concerns regarding this M&A⁶. Leading companies in the semiconductor industry thus have the power to threaten some states, since they can cut their customer off.

On top of geopolitical and geo-economic issues affecting the semiconductor supply chain, external elements also have the power to jeopardize production and reinforce the shortage. Due to the current shortage, the ability for plants to operate at full capacity is a necessity.

Benefits of geographic specialization based on comparative advantage have resulted in the emergence of a more concentrated and interdependent global semiconductor supply chain. However, this also means higher vulnerability when it comes to natural disasters. Plants located in East Asia and mainland China, for instance, are mostly located in a region exposed to a high seismic activity, which represents an underlying threat for the global supply chain.

The closure of even a few plants is very significant for the whole supply chain. For instance, in September 2021, China had to temporarily close some plant manufacturing semiconductors in a bid for the imperative of energy savings, which led to an additional delay in the global supply chain and impacted other industries waiting for their production.

To scale up in the global value chain of semiconductors, France and the European Union are now discussing the implementation of effective measures and actions based on the assets they already have.

The main strength of the European Union, in regard to its position in the semiconductor global value chain, is its research capacity. Indeed, several state members have the capacity and knowledge to produce first-rate research, with, for instance, the IMEC – an R&D hub for digital and nanotechnologies – in Belgium, the LETI/CEA – one of the world’s leading centers for applied research in microelectronics and nanotechnology – in France, and Fraunhofer – Europe’s largest application-oriented research organization – in Germany⁷.

To push the research further, the E.U. thus benefits from connections and knowledge sharing between state members, as well as the possibility to increase the funding capacity of a state toward specific research. Mrs. Ursula Von Der Leyen, the president of the European Commission, thus proposed, in February 2021 the European Chips Act, a 42 billion euro plan to boost semiconductor production inside its borders. Such an initiative is revelatory of the high stakes in producing semiconductors more locally and sends the international community a strong geopolitical and economic signal⁸. This act aims at granting the E.U. more independence and power in the semiconductor global value chain by quadrupling the current local production and attempting to achieve a 20% market share within 10 years⁹.

France acts as a pillar in Europe’s technological vision and strategy, as stated in the recently published description of the **European Chips Act** and the Alliance on Processors and Semiconductor Technologies. Indeed, companies with very high added value in the industry are located around Grenoble, such as SOITEC and ST Microelectronics, which produce necessary components for smartphones. The construction of a semiconductor factory in Crolles, near Grenoble, will be helped through this funding, even if it will take two to four years for these factories to be operational¹⁰. A part of the funding from the European Chips Act will thus aim at

⁶ US regulator raises concerns over Nvidia’s acquisition of Arm, Financial Times, Richard Waters, November 18th, 2021

⁷ How a European Chips Act will put Europe back in the tech race?, European Commission website, September 2021

⁸ Ibid

⁹ “Pénurie de semi-conducteurs : quels sont les atouts de la France dans cette bataille industrielle mondiale ?”, www.frantvinfo.com

¹⁰ Ibid

developing those companies' capacities, both for innovation and production.

To conclude, the semiconductor global value chain has high geopolitical implications, since power in the global value chain is synonymous with more geopolitical and geo-economic power. Moreover, this industry is also a matter of national security, which is why securing the supply chain is even more important for the powerful states involved. In that line, France and the European Union have started to take the measure of these challenges and have undertaken to meet them with an appropriate response.

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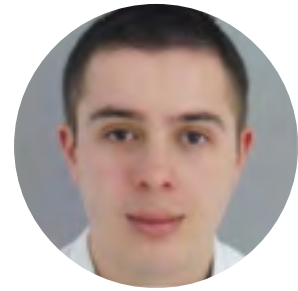
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ECONOMIC AND STRATEGIC INTELLIGENCE IN VAUCLUSE

By Ms. Claire Mallet-Guy and Mr. Thibault Marcelli,
MSc ISI alumni 2021



French companies, from large groups to SMEs, have become aware of the importance of Economic and Strategic Intelligence and have received support from the French government to use further methods and tools of Economic and Strategic Intelligence (ESI).

Of all the countries in Europe, France has invested the most in Economic and Strategic Intelligence since the Martre Report, published in 1994 (See Bisson, 2013). Apart from large groups that have the capacity to allocate resources to ESI, few companies have set up, in an organized and formal way, actions dedicated to Economic and Strategic Intelligence. However, ESI is important, not only for big companies, but also for SMEs, as demonstrated by the Altix case. Altix is a high-tech SME, a worldwide specialist in UV imaging systems and printed circuit board machines (see www.altix.fr). As reported by Altix CEO, Mr. Jerome Van Straaten (see Bisson and Dou 2017), "CI: i. Helped us to see more clearly the changes in the market and their consequences on our own strategy; ii. Better understand the market positioning of our competitors and their ability to develop; iii. Identify our strengths and our weaknesses in relation to them; iv. Identify strategic axes of development, which, until now, seemed rather secondary to us."

Experts pointed out that the lack of global knowledge on ESI is the main reason of Economic and Strategic Intelligence failures in SMEs (Larivet et., al, 2016).

99.9% of French companies are SMEs, of which 96% are very small enterprises (VSE), according to the 2020 INSEE report. We noticed that the Vaucluse economy is mainly represented by VSEs, as, among the 37,373 companies registered in the Vaucluse Trade and Companies Register on January 1st, 2021, structures with fewer than 10 employees represent 93.7% of companies. Forbes made this observation in 2018 and stated that "90% of Vaucluse companies are VSEs that have neither the human nor the financial means to address the issue of economic security." Therefore, the objectives of our work aim at:

- Analyzing the state of ESI activities of the Vaucluse companies of all sizes.
- Establishing the understanding and perception of the Vaucluse companies on public actions in terms of ESI.

1. APPROACH

We investigated by interviewing the managers of Vaucluse companies on the state of their activities in terms of ESI, their motivations, the obstacles they encounter and the measures that could remove them.

Thereafter, an online survey validated by the CCI Vaucluse was sent to the Vaucluse companies. The online survey format was the best way for our thesis to reach out to as many companies as possible in a quick and efficient way. Thus, 120 questionnaires were fully answered.

2. RESULTS

2.1. COMPANIES' PROFILE

A typical respondent of the online survey is an SME with fewer than 20 employees, operating mainly in the service, industrial or construction sectors, with a turnover of less than 5 million euros (see figure 1 and figure 2).

All the companies that responded to the online survey are SMEs and all have less than 100 employees. 40% of the companies have less than 10 employees, 27.5% between 10 and 19 employees, 22.5% between 20 and 49 employees and 10% between 50 and 99 employees.

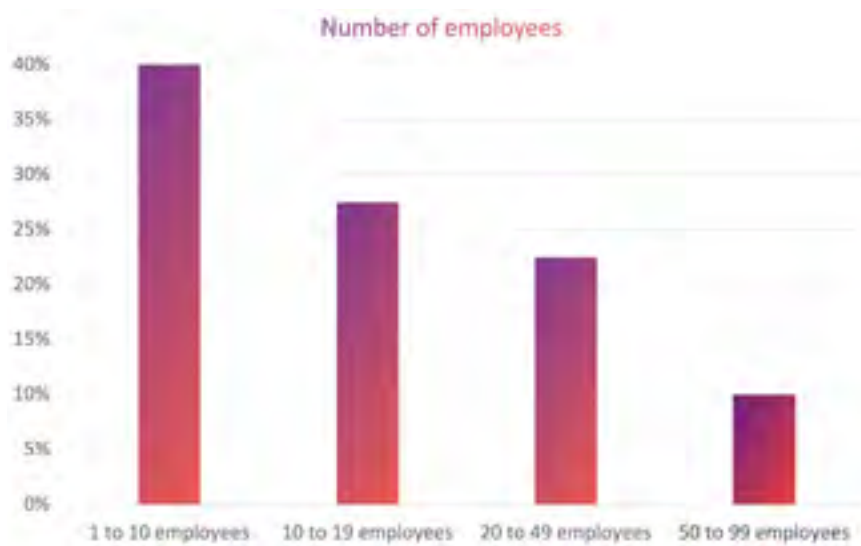


Fig1. Employee number (full-time equivalent)

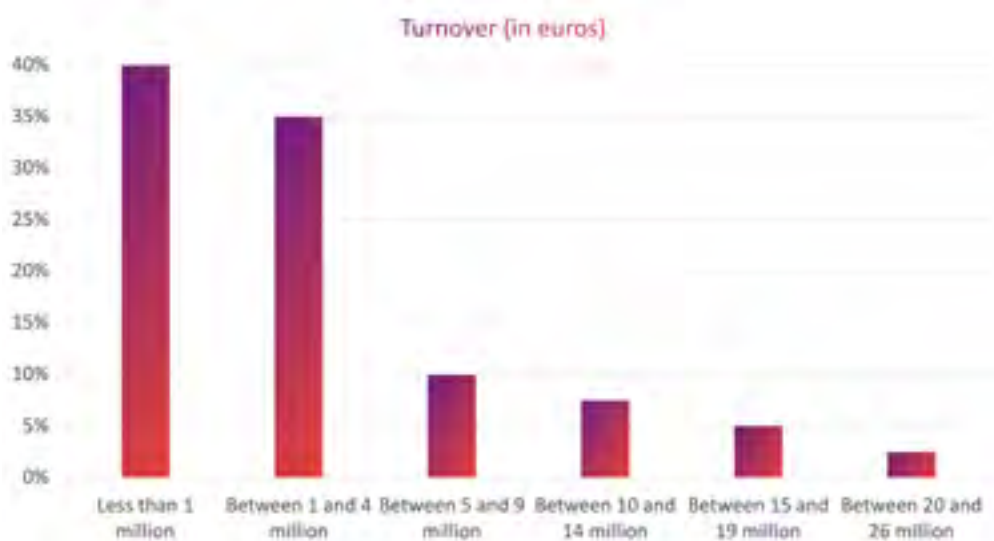


Fig2. Companies' turnover (in euros) in 2020

Most of the responding companies (75%) realized a turnover of 4 million euros or less in 2020. Among these companies, 40% realized a turnover lower than 1 million and 35% did a turnover between 1 and 4 million euros.

In the introduction of the survey, the term ESI was defined: 57.5% replied they know the term ESI before having read the definition proposed in the introduction. However, only 2.5% of companies admitted to practice ESI encompassing this term, while 55% of companies replied they practice ESI activities without using the term. More precisely, on the 42.5% of the companies which do not know this term, 29% practice activities of ESI without knowing it.

2.2.ECONOMIC AND STRATEGIC INTELLIGENCE ACTIVITIES

57.5% of the responding companies declared practicing ESI. However, 65% of companies do not have a person or department dedicated to ESI. For the 35% who have a department or a dedicated person, it is notably the management department (87.5%).

A large portion of companies (78%) allocates between 0% and 4% of their turnover to ESI activities.

One of the pillars of ESI is information gathering. Many companies spend less than 4 hours a week collecting information on their competitors (87%) as well as on technologies and industry news (69.6%). Regarding customers, 47.8% of respondents spend between 4- and 8-hours monitoring customers and 43.5% spend less than 4 hours.

The information collected is analyzed in 78% of cases. This means that almost a quarter (22%) of respondents do not use the information collected. This observation is reinforced by the fact that 83% of companies' state that they do not have a defined collection, analysis and dissemination process that can be applied by the people involved. For companies indicating they analyze the information, it is usually done via computer software or via analysis tools such as the SWOT matrices or the use of different matrices. 65.2% of the information analyzed (see figure 3) is used for short-term decisions (3 months), 56.5% for daily actions, followed by 43.5% for medium-term decisions (up to 1 year) and 30.4% for long-term decisions (more than 1 year).



Fig3. The use of information collected

Most companies feel potentially threatened (57%). In fact, 83.3% of companies agree that the most important threat is represented by cyber-attacks, followed by industrial espionage for 41.6% and security of premises for 16.7%. To avoid this and protect their information, employee training and computer security seem to be the most effective means at 43.5% each, followed by secrecy at 8.7% and confidentiality contracts at 4.3% (see figure 4).

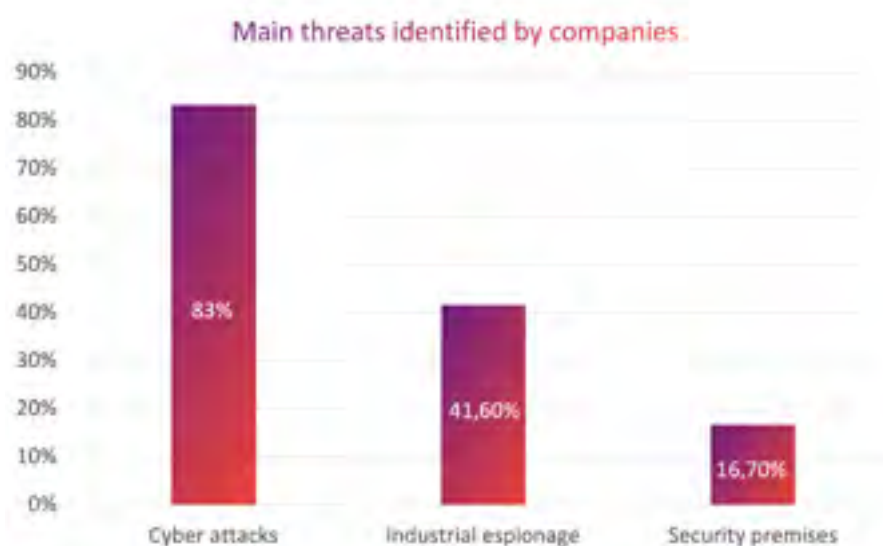


Fig4.

The MGCS program, created in 2012, aims to replace the Leopard 2 tank in Germany and the Influence is an important element of ESI. In this respect, 57% of companies claim to carry out influence activities, particularly through networking (67%), external communication (50%), lobbying (25%) and e-reputation (17%).

Finally, an affirmation was proposed to the respondents: "Economic and Strategic Intelligence is the business of companies and not of the state", to which 69.6% of these companies agreed.

2.3. COMPANIES THAT DO NOT PRACTICE ECONOMIC AND STRATEGIC INTELLIGENCE

70.7% explained this by a lack of knowledge of the subject and its issues, 47.1% by a lack of time, 23% by a lack of human resources and 11.8% by a lack of financial resources. 17.6% consider that ESI is not useful for their company.

For half (52.9%) of them, companies would be interested in knowing more about how to implement ESI activities in their company. However, 94.5% of them would not know who to call if they wanted to set up ESI activities.

2.4. KNOWLEDGE OF THE ACTIONS OF PUBLIC ACTORS

Only 17.5% of companies are aware of the actions put in place by the State in terms of ESI. Among them, they raise that they were informed via the CCI for 42.9%, by internet for 28.6%, by word of mouth and by monitoring on ESI, each for 14.3%. It also seems that many companies (67.5%) are not aware of the SISSE and its actions.

In the same sense, few people know the tools available to companies on ESI (see figure 5). Thus, 75% of the companies do not know either the "Guide du Routard", or DIESE (Diagnostic tool of

Economic and Strategic Intelligence and Security of the Companies), or the 26 thematic sheets of the Economic Security in everyday life. Only 3.6% of companies use the DIESE tool and the 26 sheets. Companies that practice ESI are naturally more aware of the existing tools than companies that do not practice ESI, even if the percentages are not high.

In addition to the low awareness of state actions, 90% admit not knowing the actions of the Southern Region in terms of ESI. For the 10% who were aware, 75% of them believe that they were useful for their company.



Figure 5.

However, companies are relatively interested (62.5%) in receiving training and information on ESI from the CCI. We can note that among the companies which declare not practicing activities of ESI by lack of knowledge on the subject, 50% of them would be interested in training or awareness on the subject.

Concerning the interest in the potential actions of the new bill on the creation of a national program on ESI, companies' opinions are mixed. Only 22.5% consider Article 15 and the setting up of a network of correspondents within the departmental prefectures, to be relevant to their companies. It is also a minority of respondents (37.5%) who think that article 17 could be useful to them. Article 17 proposes the establishment of a bi-annual multi-actor ESI conference bringing together the State, local authorities, specifically the regions, and intermediary social bodies, specifically companies and trade unions. On the contrary, companies are quite receptive (55%) to the proposal of article 16, about the agreement between the State and the regions or the local authorities on a plan of multiannual reindustrialization strategies, specifying the modalities for the implementation of an informational network of support and ESI in an aim to improve local development. Finally, 45% are interested in the proposal of articles 22 and 23 stating that the National Council for Economic and Strategic Intelligence informs and advises the public authorities on all matters relating to ESI in France, at the national and territorial levels.

3. DISCUSSION

3.1. ORGANIZATION OF ESI

A crucial point about ESI concerns its implementation in companies. Our results showed that there is little or poorly optimized organization around ESI in companies. This finding is consistent with the findings of Calof, Arcos and Sewdassf (2018), who noted that less than half

of the companies they surveyed had a process in place. Our results also support the Harbulot (1997) opinion on the lack of formalization of employee training, as it stressed that “the training of individuals is still too often limited to oral knowledge that the most motivated managers and executives pass on to their colleagues if necessary.”

3.2.ECONOMIC AND STRATEGIC INTELLIGENCE PRACTICES

Our results showed that almost a quarter of companies do not use the information collected. This result is in line with the work of Fleisher and Wright (2010), which explained that a cause of ESI failures is the lack of analysis. However, our result seems more positive than Larivet’s 2015 study, which considered that 40% of SMEs “do scanning but do not go any further”.

Our results also appear to be more positive regarding the percentage of companies that engage in ESI activities (57.5%), contrary to the 15% to 20% of the SMEs interviewed by Larivet. This difference in figures can be explained by the fact that we provided to companies the definition of ESI, and that companies had the choice to answer that they practiced ESI activities without necessarily using this term.



The second major point of divergence in the results concerns the use of analytical models. Contrary to the results of the study conducted by Calof, Arcos and Sewdassf (2018), where it is shown that companies use an average of 10.2 analytics techniques, the companies we surveyed use only one analytical technique. The more limited use of analytical tools can be explained by the limited size, in terms of turnover and employees, of the companies that responded to our survey.

Few people have access to the information analyzed. According to our study, 61.1% of companies that practice ESI transmit information to less than four employees. This illustrates, in part, the thinking of Harbulot (1997), who explains that “few company managers have understood the need to draw on pedagogical application (...) to make their staff aware of the new competitive context of the global market.” When information is transmitted, it is transmitted to few people and is often held by the management. Nevertheless, companies seem to be aware of the need to train employees (Harbulot, 1997). Indeed, in our study, when asked about the most effective way to protect information, 43.5% of companies believe that staff awareness is the most effective solution.

This lack of training and transmission of information can be explained either by a defensive attitude of the leaders concerning the will to keep the information secret, in order to have decisional power and to protect themselves from leaks, or by a lack of time and of knowing how to train the employees. This last point may be linked to our study on the fact that most companies do not know the available tools and which would help them to raise awareness among employees.

Despite higher figures on ESI practices, our research results are in line with Alain Juillet's explanation regarding the SMEs' lack of understanding of the potential benefits of implementing an ESI system.

SMEs tend to favor short-term investments that can guarantee their survival through quick returns on investments. Our results confirm the prevalence of short-term over long-term for SMEs: 11.8% of companies that do not practice ESI explain this by a lack of financial resources and 65.2% of respondents practicing ESI stated that ESI is used for short-term decisions (up to 3 months).

As the Global Intelligence Alliance (2013) report shows, 80% of companies that have implemented an ESI system are satisfied with their return "despite the benefits, which are usually not direct or immediate." However, the lack of financial means of SMEs forces them to make a trade-off between short- and long-term, largely in the short-term's favor. This discrepancy, between the fast need for returns on investments and the long-term benefits that the implementation of an ESI system can bring, largely explains why SMEs do not take advantage of all the benefits of ESI.

This lack of long-term vision is deplored by Alain Juillet who considers that "the cost of anticipation is always less than the cost of over-reacting". This observation is verified with the companies we surveyed. Only 57% of companies are aware that anticipation is a key success factor and therefore practice influence activities.



3.3. UNDERSTANDING ESI IN FRANCE

Our study reveals that most of companies do not know the actions that are implemented in terms of ESI, at all levels. This proves that the observation made in the April 2020 report of Regions de France is still valid. The four levels (that of the Regions, that of the State services, that of the Region-State relationship, and that of the Region-State-Regional ecosystem) of prerequisites and conditions to ensure the success of the development of ESI seem essential to apply.

The CCI seems to be a relevant local actor in helping to implement ESI. Indeed, 42.5% of the companies which are aware of the State's actions know it thanks to the CCI. This is related to the purpose of the CCIs, to adapt their actions and their communication according to the needs of companies.

It emerges from our study that 69.6% of the questioned heads of companies, having set up ESI activities, agree rather or completely with the fact that ESI is the business of the companies and not of the State. While some of the questioned company managers have a neutral position on the subject, we note that only 4.3% of them think that ESI is the business of the State. These results are interesting when we know that, since 1994 and the Martre report, France is the country that has invested the most in ESI in Europe. It also seems interesting regarding the results showing little interest of the companies concerning the new law proposal relating to the creation of a national ESI program.

The gap between the investment made by the French State and the use made by companies is a key issue, to which the bill concerning the creation of a National Economic and Strategic Intelligence program, submitted to the Senate in March 2021, attempts to respond, with the objective of "ensuring the defense and promotion of the economic, industrial and scientific interests of the Nation, and in particular of its territories". Nevertheless, the opinion of business leaders, questioned on the key articles of this law, suggest that the French government's efforts may not be tailored to the needs of SMEs, although most of the business leaders surveyed seem to support the measures to implement strategic plans with a local impact and operational measures (Article 16).

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TWEETSCAN: AN INTUITIVE TOOL HELPING TO DETECT THE REAL MOOD

*By MS. Marie Andrieu, Mr. Romain Huguel, Ms. Constance Linquier,
Mr. Emilien Majourel, ISI students.*

Millennials and Generation Z are the first generations to have kept a close connection with friends from high school, even middle school... thanks to social media. These are the first generations who know what their network is doing in real time, through LinkedIn, Instagram, Twitter, etc. These generations are no longer just young or the next generation, they are adults and working. In short, the way these generations handle communication and information sharing is different, and it has had an influence on communication in business. Social medias are now central and massively used.

Social media are great, because they also provide an easy and quick access to all types of information, whether that is what your friend is having for lunch, or what is happening in Ukraine right now. If you need to be informed on a subject quickly, why read a verbose article from a newspaper when you can access to the same information in 280 characters on Twitter? If you do not have the time to delve deep and look further, that is what you might do to be more efficient.

Verifying the veracity and the neutrality of information is key today, as it can have a significant impact on people's decision making. The "Fake News" phenomenon has dramatically increased in the past decade and has made that task harder... Finding qualitative information has become critical and is a strategic asset for companies. As Francis Bacon stated it in *Meditationes Sacrae* (1597), "knowledge in itself is power". But we do have a tool that they didn't have in the 16th century, and that tool is AI (Artificial Intelligence). AI can solve those problems through sentiment and structure analysis; such tools are useful to help decision making and speed up the decision processes [1]. Mastering AI has become a significant competitive advantage and becoming skilled at such a technology is a true asset today. For instance, banks have implemented AI models detecting the tone used in financial disclosures [2]: studies have indeed shown that neutral and optimistic information have no major impact on investment decisions, but pessimistic information does. Such an AI tool helps decision makers to take decisions more easily and to mitigate the potential risks as AI aims to be unbiased, unlike the human mind. Investments are made faster and safer: it also reassures investors and reinforces the trust they have in institutions. This simple application of AI has a virtuous effect on the investment banking chain.

Core information has an impact on the reader, but there is also something called "style", which is not content related, but has an impact on the reader. The structure of a sentence, the choice of word and even the contextualization of the subject have an impact on the understanding of information. If we are not aware of what one might call the ecosystem of information, we might not understand it properly and may make an error. This is a daily problem in an era where we are overwhelmed with information, and we need tools to remain neutral and understand the true meaning of something. AI can be used as a support to the human brain, to ease and accelerate information processing.



That is why we have been thinking about TweetScan: an intuitive tool helping to detect the real mood behind information. We chose to focus on Twitter because it is a news- and business-oriented media that is quite popular among politicians and public figures to make announcements. For the moment, we built a basic model, the user needs to copy-paste the tweet they want to analyze into the dedicated box (see figures 1 and 2). Thanks to the sentiment analysis function provided by PowerApps, the user gets the tone of the statement: positive, negative,

or neutral, as shown in figures 3, 4 and 5 below. That function is already present in the AI builder tool, but we would have liked to go further by training the model ourselves with Tweet databases, as targeted training is key in AI to shape a strong and sharp model. PowerApps also offers the possibility to link a Twitter account that could automatically detect if information is biased or not. It would be a great asset to fight against misinformation and help people finding the raw information, which is essential for elections in France for instance.

What is significant with TweetScan is that by automating this process, the reader will gain a lot of precious time regarding the collection of information and their decision-making process will be even faster and much more efficient. After several checks, the user will also be able to identify the fairest news providers and be able to break the chains of bias. TweetScan would be a sword in the fight for better information and a light towards the exit of the Cave.

TweetScan could be improved and developed. If we go further, we would like to avoid the constraint of copy-pasting a tweet into the application and create a pure analysis tool: the user would be able to select the tweet or the short text to analyze and would then be able to select the “analysis” function to get the result. Also, why limit such a tool to short information? An extension for an Internet browser to detect the sentiment and the veracity of a whole page would be quite useful too. It would be helpful to analyze long articles and even full reports. It might even, at some point, help choose the articles to be dismissed before even reading them. If you are interested in our project and want to know more about it, please get in touch!

References:



Fig1. Enter into the app Fig2. Enter the text into the app Fig3, 4, 5. Examples of the three types of sentiments thanks to AI analysis

* [1] Accenture report, *Artificial intelligence*, <https://www.accenture.com/us-en/insights/artificial-intelligence-summary-index>

* [2] Nopp, C., Hanbury A., *Detecting Risks in the Banking System by Sentiment Analysis*, *Proceedings of the 2015 Conference on Empirical Methods in Natural Language Processing (2015)*



THE IMPACT OF ARTIFICIAL INTELLIGENCE ON CSR

*By Ms. Carla Monzali and Mr. Nathan Leonard,
MSc ISI students.*



The creation of Artificial Intelligence (AI) would be the greatest event in the history of humanity. But it could also be the ultimate", these are the words of Stephen Hawking, theoretical physicist and cosmologist, in which he reveals the complexity of using AI; something that must not be approached from a Manichean perspective. AI is neither a bad thing nor a good thing, but a skill to be developed with precision and sobriety in order to seize opportunities while avoiding possible risks.

First, we will define AI and Corporate Social Responsibility (CSR). AI refers to machines, algorithms or programs that are inspired by human faculties and/or attempt to reproduce them, such as the understanding of natural language, the recognition of visual objects or reasoning in its various forms. CSR is the social responsibility of companies: it includes all the practices implemented by companies in order to respect the 3 pillars of sustainable development, namely the social pillar, the environmental pillar, and the economic pillar.

AI is taking on a more and more important role in our lives, as can be seen from our everyday use of social networks or our Netflix catalogue, and is therefore becoming indispensable to all businesses. However, in recent years there has been a collective consciousness around environmental and social ethics that is affecting the way we consume and live. In this article we will investigate whether these two emerging trends are compatible with each other by looking at the positive and negative points that AI can have on the environment, the economy and society and how companies forced to use it manage to maintain a CSR.

1. ENVIRONMENT

AI relies on very energy-intensive digital infrastructures. Indeed, these can require a large volume of data in the process of learning an action, and then in practice and repetition in order to master the action automatically. Researchers at the University of Massachusetts at Amherst looked at the learning lifecycle of several common AI models and concluded that the process could emit more than 626,000 pounds of carbon dioxide equivalent. 626,000 pounds of carbon equivalent is nearly five times the lifetime emissions of a U.S. car, including the emissions emitted during the vehicle's manufacture.

However, repeated learning and deep learning methods only concern certain complex models and not all AI is concerned. It is therefore up to everyone not to abuse these energy-intensive models. Moreover, the equipment needed to store the data generated by AI is substantial: these are data centers, a physical site with information facilities that stores and distributes data through an internal network or via an Internet access (futura-science.com) that operates continuously and requires permanent cooling. It is important not to overlook the impact generated by the production of these infrastructures, which notably involves the extraction of certain materials, metals scattered all over the world, thus having an impact on biodiversity, soils, etc.

The end of life of these infrastructures also poses a problem, as most of them are not subject to legal recycling channels and end up in open-air dumps. AI raises the question of the impact of digital technology as a whole, whose energy footprint is estimated to increase by 10% per year

according to an analysis carried out. The notion of moderation is essential, and more and more solutions are geared towards “green” infrastructures, but the efficiency of algorithms will also have to be optimized to consume less energy.

However, studies show that AI could enable humans to address the 3 main environmental issues:

1. Global warming
2. Biodiversity loss
3. Widespread pollution



Indeed, several consulting firms have conducted studies on the ability of AI to limit CO₂ emissions. Thanks to AI, companies could reduce their CO₂ emissions by 16% by 2025 (Capgemini 2020 - How artificial intelligence can power your climate change strategy) and, more broadly, AI could reduce global greenhouse gas emissions by 4% by 2030 (PWC 2020 - How AI can enable a sustainable future). Algorithms can measure emissions in real time and predict climate risks, and this data can be used to manage our emissions. There are already programs that allow us to have more data on our emissions and large companies are investing today in greener AI.

Secondly, there is another challenge, which is the preservation of our ecosystems. According to UNESCO, we have seen a reduction of natural areas by 50% with the deforestation in favor of urbanization, as well as pollution that accelerates the process. As a response, companies are working to create programs to preserve our ecosystems. Specifically, we are referring to Microsoft, with its AI for Earth program, which aims to democratize AI to understand species and protect biodiversity, as well as the Metrics program which allows for the accumulation of data on the different species, permitting humans to intervene at the right time. There are many other programs that allow, via machine learning, remote sensing, and mapping, the use of the abundant information on the Internet to establish valuable data for scientists, who can act to safeguard biodiversity.

Finally, we are witnessing a growing and generalized pollution. In 2018, a World Bank report indicated that nearly 2 billion tons of waste are produced each year in the world, and an estimate makes the figure rise to 3.4 billion tons by 2050. This mass of waste poisons ecosystems and contributes to global warming. Here, too, new applications are being developed to map plastic pollution and send volunteers to the scene. AI also allows sorting waste in record time.

2. ECONOMY

With the development of AI in recent years, some researchers see a disaster scenario with the replacement of humans in many jobs. Indeed, a study was conducted in the United States, and nearly 47% of the country's jobs would be affected. Mostly, AI will affect low-skilled jobs on repetitive tasks that don't require thought, (Administrative, Services, Production Chain, etc.); in this case, we're speaking about "automation" (Mcafee & Brynjolfsson, 2017). However, more qualified jobs would also be impacted, since AI would be able to make better decisions than humans, while remaining more accurate. Today the distribution is 71% for humans and 29% for machines, which have already begun to replace humans on certain tasks, both manual and cognitive. Factories, for example, have replaced a large number of employees by machines for manual tasks, and e-commerce companies have replaced many customer service employees by chatbots.

Another detrimental element to the deployment of AI is its cost. Indeed, the deployment of such systems was previously reserved for large organizations. However, it is now possible, thanks to open source tools (such as Google AI), to drastically reduce the costs of creating a system. Of course, there are other costs to consider, such as learning a language for a system. In short, there are a multitude of costs to anticipate and, at first sight, these do not allow instant accessibility.

As previously mentioned, AI has, initially, mostly been used to replace humans on certain tasks, and sometimes even goes further, which can be only beneficial for the economy, whether on a macro- or micro- scale. A study by the McKinsey firm shows that AI could lead to a global GDP growth of 1.2% per year by 2030. Machine learning, image recognition, natural language processing, virtual assistants, robotization and automation of task chains would make it possible



to be more efficient in repetitive jobs that require few skills. These jobs would be reduced by 10% and, on the contrary, the more qualified jobs, especially new jobs linked to AI, should increase by 10%.

The replacement of humans on non-gratifying tasks is therefore beneficial for companies and for employees, since, theoretically, more men would be promoted to more interesting jobs. For the company replacing humans on these tasks, the benefit would be in a lessening of errors and limitation of stoppages, since the machines are in continuous function and without distraction.

So, there would not be an increase in the unemployment rate, but more humans would work qualified jobs. This can be seen in BlackRock's financing, where traders are assisted by an AI

“Aladdin” which can analyze and even predict the market price of a stock, which leads to better results for the company. This can be applied in almost all sectors of activity, data is the key to balance and economic growth at the international, national and corporate levels.

However, it is necessary to reorganize organizations in order to allow AI to operate, and several models envisage collaboration between humans and machines (Hoc, 2003; Woods, Roth, & Bennett, 1990). In the case of this approach, the jobs do not disappear, but evolve, which provides an opportunity for the human, who is no longer confined to repetitive and intellectually non-stimulating tasks. Organizations are not prepared for the major changes that AI will bring in the years to come. This is what Accenture, a consulting firm, reported when it conducted a study on the fact that companies are using AI without really knowing how to use it.

Therefore, many positions should appear in the years to come in order to make AI work better within organizations (Wilson, Daugherty, & Morini Bianzino, 2017). There are three categories:

- Trainers: which consists of training the AI to perform a task with machine learning.
- Explainers: who will translate between the technical part in charge of the AI and the business managers
- Sustainers: who will make sure that the AI works well in the whole organization

3. SOCIAL

AI is often presented as a solution that will make our lives easier and will replace human beings in certain daily tasks. But what will be the limits of its scope? In 2016, computer science professor Moshe Vardi said, “We are approaching a time when machines will be able to outperform humans at almost any task.”

According to a Roland Berger study commissioned by the Journal du Dimanche (JDD), 3 million middle class jobs, management jobs, liberal professions and manual jobs will disappear in France by 2025. The defenders of AI put forward the creation of jobs generated by the new technologies, but acknowledge they will be lower than the number of jobs lost.

Indeed, according to the report “The future of employment”, it is primarily low-skilled, direct jobs that are threatened. The job losses will concern specifically those of the most fragile social categories, thus increasing social inequalities. AI entails risks, but these can be converted into opportunities, especially if we consider that jobs must be transformed and not irreversibly eliminated.



Others see the replacement of humans on the “non-gratifying” tasks as something positive, so it would also be socially beneficial. Indeed, as previously mentioned, if low-skill jobs are eliminated, there will be more skilled jobs that are created, and therefore it would allow many people to have a more rewarding job, a better salary, and to rise socially. In addition, AI is used in the medical field with more precision in analysis and research and could therefore discover diseases before humans as well as more appropriate treatment. In surgery, for example, we know that machines have a major role today because they are more precise than humans. The use of AI in medicine could therefore increase the life span of humans.

In all the above examples, AI and its applications can make human life better, as is the case if we reduce pollution and global warming. Less polluted water as well as availability in countries that

suffer from its lack, better air quality, contributing to a less criminogenic world...

AI can also be used in the context of personal assistance. While it was still science fiction a few years ago, today we can see new technologies, such as Alexa, that, with the right home automation installations, allow it to close shutters, turn on the lights, close doors with the sound of your voice, etc. This can be a great help for the elderly or people with disabilities.

CONCLUSION

The way we look at AI is changing. While algorithms can help companies gain in productivity, they can also be used in the service of the common good. In the future, protecting humans and nature could become the main objectives of new technologies. Data would then be our best ally to make the world sustainable. However, AI will have an environmental impact, especially with its servers running 24 hours a day, and we will have to recycle many servers.



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THE WEB 3.0 AND ITS IMPACT ON COMPANIES' STRATEGIES

By Mr. Akash Jogi and Mr. Sam Bassil, MSc ISI Students



This article is divided into three different parts. The first will explain what is web 3.0, following that we'll get into blockchain technology, and then finally explain the raging NFT phenomena and how all of this may be helpful for your company's future strategy.

1. WEB 1.0

To understand web 3.0, we'll first need to understand the history of the Internet. As you may have guessed, the first thing that came was web 1.0, a.k.a. the first iteration of the Internet. During this phase, most websites were built by developers and computer engineers, unlike right now where you can just go to WordPress and create a website by clicking on what kind of layouts you'd like on it. Thus, these people had to code the whole website by themselves, and it was completely customizable, but it lacked a lot of the features that modern Internet has. For example, online payments or even security. Hacking on those websites was easier. This phase of the internet lasted from 1991 to 2004.[1]

2. WEB 2.0

After web 1.0 came web 2.0, the second iteration. This is the Internet that most of us have primarily consumed. Through Facebook, Google, YouTube and anything that you can think of on the Internet. It's all web 2.0. This happened because the barriers to entry into the world of the web decreased, allowing anyone to go on the Internet and build a website. There were bigger ideas and the world became a smaller place, as you could now connect with literally anyone on the entire planet. The key difference between web 1.0 and web 2.0 is that: most of the people on web 1.0 were consumers and only a handful of people created content. On web 2.0, anyone can become a content creator. The world economy has thrived on this feature as companies use social media websites to advertise and connect with their demographic by creating content they'd consume.

One of the most important features of this form of the Internet was the monetization and security of apps[1]. Think of all the social media that you use at the moment. It's all monetized in some form or other. We have all noticed how they do it. They make the application and get as many users as they can on board, and, at a certain point, they decide to monetize the user database. The strategy here is to increase the market share first and then monetize the market share, a model that has been replicated by a number of companies.[1]

There are some security issues on web 2.0 as well, as there have been frequent data breaches and the user data has been compromised[1]. If you are business that depends on Facebook for example, your whole business model is going to suffer if Facebook shuts down forever, which is highly improbable, but you have to be ready for the worst-case scenario.

Although web 2.0 is safer and profitable for companies and people, there are concerns among the people about their security. Big social media companies make their user data available to the

advertisers on their platform, and sometimes the users don't like this. This gave rise to the third and the newest iteration of the Internet: the web 3.0

3. WEB 3.0 AND ITS SALIENT FEATURES.



The main difference between web 2.0 and web 3.0 is decentralization. For web 1.0 and web 2.0, the data was stored on servers and everything was centralized. In web 3.0, the users don't build a website or app on just one server. Neither is all the data stored in a single data base. The easiest way to describe this would be that the data in this iteration of the internet is not owned by one entity, but instead it is shared. The data is stored in blocks which can exist in multiple servers at the same time and the only way to access this data is to be a part of the blockchain. We explain this further in the later part of the article where we talk about Blockchain technology. At the moment, let's take a look at some of the new features that web 3.0 has allowed us to have.

Some of the important features of web 3.0 are:

- Artificial intelligence: Although, it's not a new concept, according to experts, AI technology will get a huge boost under web3.[2]
- 3D Graphics is a widely used feature on web3 websites. These includes museum tours, games, geospatial contexts, etc. [3]
- Connectivity: A more secure connection to communicate with web3.[3]
- Ubiquity: All of the content could be accessed from anywhere around the world since all the devices are connected to the same metadata. [3]
- Verifiable[1] and Native built-in payments[1]

To understand web 3.0 further, let's understand what blockchain technology is and how it works.

4. BLOCKCHAIN TECHNOLOGY AND DAPPS

In this technology, data is stored in blocks. Each block has a certain amount of storage capacity. When this capacity is filled, the current block is linked to the blocks that were filled before this one. This forms a chain, hence the name blockchain.[4] The most important feature of blockchain is that data cannot be faked, nor can it be duplicated. It is a shared database and everyone can look at it. Each transaction done on a blockchain is validated by another user at random instead of just one centralized entity. This ensures transparency of the data. There are different types of data that can be stored on blockchains, but right now it's mainly used for

cryptocurrencies like Bitcoin and Ethereum. In short, the data in blockchain technology allows for it to be recorded and distributed, but it cannot be reversed or erased. It's there, forever.[4]

Now, how is this technology used in web 3.0 unlike web 2.0, where we build an application on one particular server? Here, we build apps on multiple servers. These applications run on blockchains and are often referred to as decentralized applications or dApps for short. [5] These dApps run on a peer-to-peer network and their performance is provided by the users of the dApps. There are different types of dApps and many ways to differentiate them. We chose to differentiate them based on how they are used:

- Financial dApps: In these kinds of dApps, the users can manage their cryptocurrencies and their transactions. You can even manage your savings and organize your personal finances, etc.[6]
- Indirect financial dApps: In these dApps, you are not actually working with money, but tokens and bonus points, like a rewards system at your local supermarket. It's widely popular in gambling dApps.[6]
- Non-financial dApps: Here, as the name suggests, it has nothing to do with finance, but other services like artificial intelligence, virtual reality, decentralized file storage, etc.[6]

According to Emergen research, in 2019, the dApp market capitalization was valued at \$10.52 billion and is anticipated to reach \$368.25 billion by 2027 at a CAGR of 56.1 percent.[7]

5. WAYS YOU COULD LEVERAGE BLOCKCHAIN TECHNOLOGY AND DAPPS FOR YOUR BUSINESS.

A dApp is, by nature, faster than an application that works on a centralized database. This provides users fast access to whatever they want to access on your dApp. It is highly secure, where a centralized server is prone to breaches and leaked information, a decentralized one is just impossible to breach. This means that making cloud storage on a dApp would be a fantastic idea, and also a much cheaper option than using a normal cloud storage service, since this data will be handled by the community of users of the dApp and the blockchain technology you will build the dApp on. dApps are only one aspect of web 3.0 that the world at large is still to hear about. However, we do hear a lot about NFTs nowadays. So, let's dive further into that to understand what exactly it is and how might the world be affected by this raging phenomenon.

6. NFTS

Non-Fungible Token (NFT) is a type of cryptocurrency that is derived by the smart contracts of Ethereum. Nowadays, you would have heard a lot about this new terminology being bandied about, the NFT (Non-Fungible Token). Fungible means replaceable. This means that NFTs, i.e.



Non-Fungible Tokens, are non-replaceable. According to Forbes.com, "NFT is a digital asset that represents real-world objects like art, music, in-game items, and videos. They are bought and sold online, frequently with cryptocurrency, and they are generally encoded with the same underlying software as many cryptos." [7]

The concept of NFTs comes originally from a token standard of Ethereum (Decentralized Open-Source blockchain), aiming to differentiate each token with distinguishable signs. According to Wang (2021), "By using NFTs on smart contracts (in Ethereum), a creator can easily prove the existence and ownership of digital assets in the form of videos, images, arts, event tickets, etc. Furthermore, the creator can also earn royalties each time a successful trade is carried out on any NFT market or by peer-to-peer exchanging. Full-history traceability, deep liquidity, and convenient interoperability enable NFTs to become a promising intellectual property (IP)-protection solution [10].

The NFT ecosystem is still in its early stage and NFT technologies are still considered immature, which means that new players might get into the market and the current players will be driven out. Nowadays, Digitalization is the trend that everybody is looking forward to, given the importance it has on so many levels (Cost Savings, Revenue Growth, Improved Efficiency, etc.). NFTs can give another touch to the Digitalization world by tackling real-world objects such as Art, music, etc.

Although NFTs have been around for a while (2014), it has gained a significant amount of fame in the last couple of years, where it has been estimated that the amount of trading value was nearly 22 billion Dollars in 2021 [9]. This amount of money should raise an eyebrow, given the significant impact it might have on the physical objects out there. That being said, we realize that NFTs can be a double edge sword, where, on one side you can make the most out of the royalties on the web, on the other side, it can jeopardize the value of the physical objects out there. This is something that humanity should be very careful about since the immensity and importance of physical objects are not to be ignored. The history and quality of those objects (whether a piece of art or a ballad song from the '60s) should keep their form and should be appreciated for centuries to come. As long as people keep on differentiating between both, we should be fine.

NFTs are part of the Ethereum blockchain. Ethereum, like bitcoin or dogecoin, is a blockchain that supports NFTs (they store extra information, which will allow them to work differently). NFTs are mainly bought and sold using cryptocurrency, which proves the close relationship between NFTs and Cryptocurrency [8].

CONCLUSION

dApps are where companies can use their innovation to come up with ideas and capture a position in the web3 space. The decentralization of the Internet would undoubtedly make it difficult to maintain the current business models we use on the web 2.0. Moving into web 3.0 and dedicating a good amount of resources into research and development in the field would be the best way for companies to maintain their edge, and for newer companies to level the playing field with the biggest Internet companies in the world.

NFTs are paradigm switch between physical art and entertainment to digital ones. There is no doubt that the magnitude of the NFT world is beyond expectations and yet to be explored, but one should question the impact it might have on society's art and culture.

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