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European Union Regulatory Framework on Artificial Intelligence (SMEs)

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ABSTRACT

Artificial Intelligence (AI) and its application has become a popular topic of discussion, especially within the last decade, with its being seen with both enthusiasm for the opportunities it rings, and fear of its potential. The current paper aims to investigate the European Union (EU) regulatory framework proposal on Artificial Intelligence, and its impact on small and medium size enterprises (SMEs). Within the paper, the regulatory goals and recommendations, conceptual view of AI, and global trends on its application are presented.

Introduction

Since 1956, when the term "artificial intelligence" was used for the first time by John McCarthy, the understanding of AI and its application have changed, and it has an increasing role in the global economy, as well as in our daily lives. However, our understanding of what it is and its potential are still limited, and there remain many concerns about it, mainly related to the risk and uncertainty AI generates. And yet, this obstacle has not prevented countries around the globe from seeking to compete in its development and application.

A good example of this is a new European Union regulatory framework proposal on AI for SMEs. The proposal aims to provide AI developers, deployers and users with clear requirements and obligations regarding specific uses of AI. At the same time, the proposal seeks to reduce administrative and financial burdens for businesses, in particular for SMEs.

The regulatory proposal is the first ever legal framework on AI to address the risks of AI, and positions Europe to play a leading role globally. Regulations are needed to ensure that Europeans can trust what AI has to offer.

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Thus, the current study aims to test the hypothesis: "*AI can drive greater efficiency in the SME sector.*"

Definition of AI

The term "artificial intelligence" was coined in 1956 by John McCarthy, a computer scientist, who defined it as "the science and engineering of making intelligent machines" (ScienceDaily, 2021).

One of the most common explanations of the term "AI" is given by the Merriam Webster dictionary (Merriam-Webster Dictionary, 2021):

- A branch of computer science dealing with the simulation of intelligent behavior in computers;
- The capability of a machine to imitate intelligent human behavior.

In the current study, AI will be understood according to the European parliamentary research service: "Artificial Intelligence is a term used to describe machines performing human-like cognitive processes, such as learning, understanding, reasoning and interacting" (Samoili et al., 2020).

Conceptual view of an AI system

Currently, an AI system can be explained by three main pillars (fig. 1):

- First pillar – Data – the stage where the data management is performed;
- Second pillar – Environment – the stage where the algorithms and the model are developed;
- Third stage – Influence – where the model is applied to the chosen system.

Within the Environment stage, two approaches can be used:

- Symbolic approach – driven by experts;
- Statistical approach – driven by data and machine learning.

Required enablers are computer power, storage capacity, internet speed and coverage, and some other technological developments, e.g. lower sensor costs, 3D printing, etc.

Small and medium-sized companies in the context of the EU definition

SMEs represent 99% of all businesses in the EU. According to the EU, they are categorized based on (Table 1):

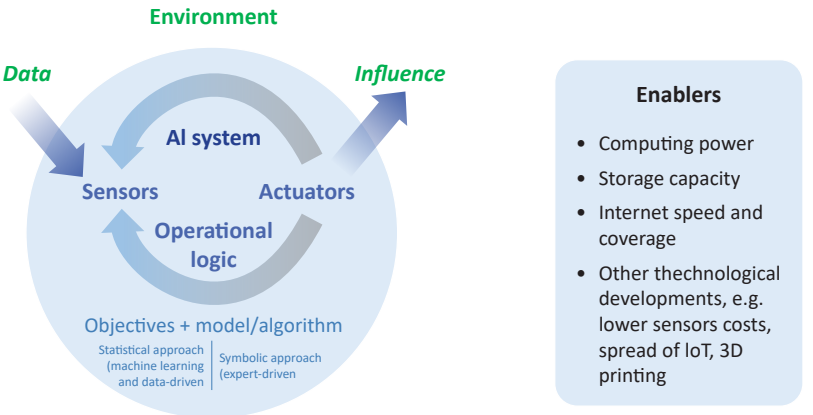

Fig. 1. Conceptual view of an AI system

Source: *Based on OECD (2019), Artificial Intelligence in Society, OECD Publishing, Paris, https://doi.org/10.1787/eedfee77-en*

- Employees;
- Turnover;
- Total balance sheet.

Table 1. SME categorization

Companu Categoru	Staff headcount	Turnover	Balance sheet total
Medium-sized	<250	≤ € 50 m	≤ € 43 m
Small	<50	≤ € 10 m	≤ € 10 m
Micro	<10	≤ € 2 m	≤ € 2 m

Source: *User Guide to the SME Definition. Europeam Comission. 2016. https://ec.europa.eu/regional_policy/sources/conferences/state-aid/sme/smedefinitionguide_en*

Using these criteria, companies are divided into three main categories:

- Medium-sized companies – with a staff of less than 250 employees, a turnover less than or equal to 50 mil Euro, and a balance sheet less than or equal to 43 mil Euro;
- Small companies – with a staff of less than 50 employees, a turnover less than or equal to 10 mil Euro, and a balance sheet less than or equal to 10 mil Euro;
- Micro companies - with a staff of less than 10 employees, a turnover less than or equal to 2 mil Euro, and a balance sheet less than or equal to 2 mil Euro.

Global trends in AI application

Within the study, only three main global trends are presented on AI application, representing the most important aspects. First is "Relevant vs. Mitigated Risks - what organizations consider relevant in adopting AI." See Figure 2.

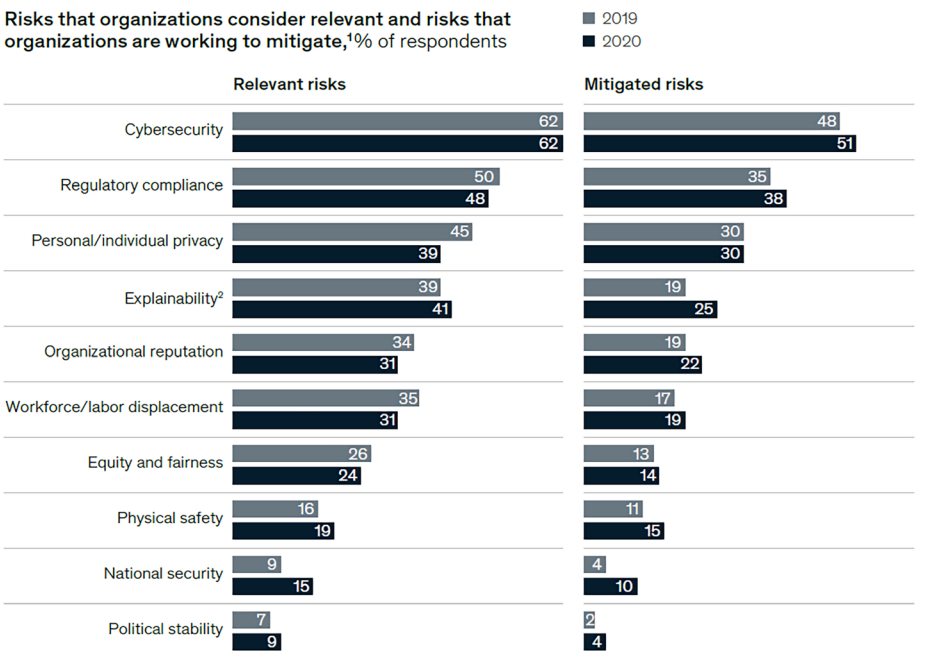

Fig. 2. Relevant vs. Mitigated Risks - what organizations consider relevant in adopting AI (2019-2020)

Source: *The state of AI in 2020. Global survey, Mckinsey.*

According to fig. 2, regulatory compliance is the second trigger that drives SMEs to implement AI, following cybersecurity. Although about 50% of respondents consider regulatory compliance relevant, only 1/3 of them are willing to mitigate this risk. Still, most organisations pay attention only to the risks generated by cybersecurity and thus focus on mitigating that factor in particular.

The second trend represents global publications about AI (fig. 3). In this "competition", China is in the lead, having issued 76,300 publications in the field between 2016 and 2020. This is the highest amount worldwide. The United States and India follow with, respectively, 44,400 and 27,000 AI-related publications in that period. European representatives The United Kingdom, Germany and France take up the next places, but produced a significantly lower volume of publications on AI, namely 16,000, 12,900, and 10,900, which is about 50% less than India and only 20% of that of the leading country, China.

The third trend (fig. 4) represents businesses in the EU having performed a big data analysis. In general, the business sector in most countries shows a **low level of adoption of data analytics**. Nevertheless, some countries have taken the lead – The Netherlands, Belgium and Ireland. In these countries, more than 20% of companies performed a big data analysis in 2018. In last position in this trend are Italy, Austria and Hungary, where just 6-7 % of businesses engaged.

Finland and Luxembourg are considered as innovation leaders. France, The United Kingdom and Germany are said to be more advanced in the transformation process, while Eastern European countries tend to lag behind, with few enterprises engaging in these new practices (The Digital Transformation of SMEs, 2021).

Pros and Cons of AI for SMEs

AI application in SMEs can be illustrated best via its pros and cons:

✓Pros

- AI can be applied to most industrial SME activities;
- AI can trigger a new product revolution;
- AI can improve and ease SME business conditions;
- AI will enable SMEs to change their business models and practices, which

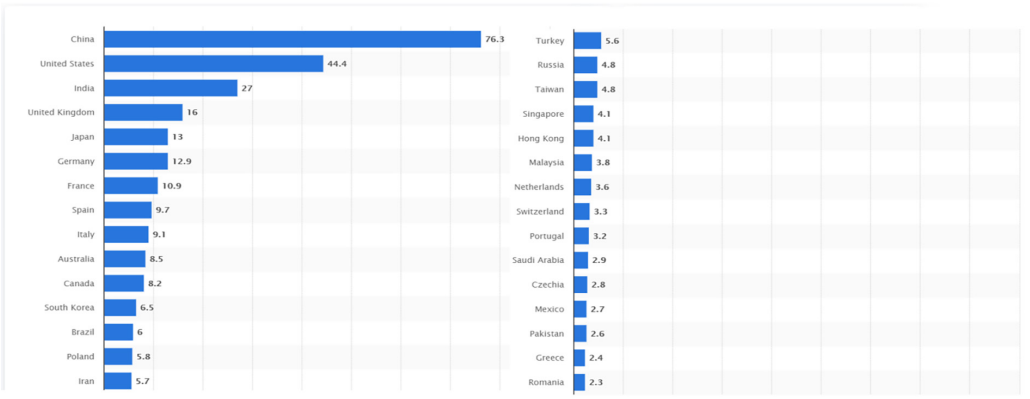

Fig. 3. Number of AI publications worldwide from 2016 to 2020, by country (in thousands)
Source: *Statista.*

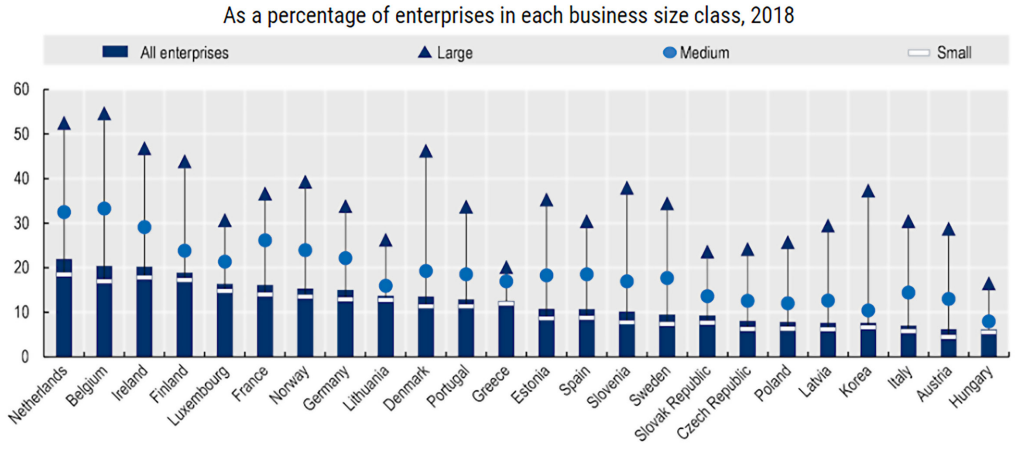

Fig. 4. Businesses having performed big data analysis (2018)

Source: *OECD (2020), OECD Database on ICT Access and Usage by Businesses, http://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS (accessed on 19 September 2020).*

will increase the productivity and scale-up potential;

- AI will free workers from low value-added tasks and will provide an opportunity for them to re-organize and up-grade;
- AI will bring change to the internal value chain of the company.

✓Cons

- High cost and uncertainty about AI benefits;
- Human factor: 1) AI will open new job postings and will require a specific skill-set (trainings); 2) Managers' and workers' lack of understanding of the potential and risks of using AI;
- Lack of data culture and weak data management practices.

Obviously, AI application in SMEs brings more positive effects than negative. A lack of data management practices, the human factor, and uncertainty will easily be overcome thanks to the positive effects of AI. New products, new business models and practices will help companies to scale up and upgrade their employees.

Conclusions

Despite all concerns, uncertainty and lack of knowledge and skills, AI is already part of our lives even, in some cases, without us being aware of it. Its application will increase in future, and understanding and accepting it will help us to better benefit from it.

The hypothesis "*AI can drive greater efficiency in the SME sector*" is confirmed. Further, we can make a few conclusions based on the benefits that SMEs will gain from applying AI:

- Management, trade, service, etc., will be able to shorten and automate processes;
- SMEs will have clear requirements and drivers for AI applications;
- Human capital development will be ensured;
- New products and business models will be made possible.

In this scene, EU regulation is needed, as it will **bring rules, will protect consumer rights, and will move European companies into a**

competitive position globally. AI has significant potential to boost economic growth and productivity.

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