EXPERT AND NON-EXPERT PERSPECTIVES ON AI'S IMPACT ON BUSINESS

SZAKÉRTŐI ÉS NEM SZAKÉRTŐI PERSPEKTÍVÁK AZ MI ÜZLETI ÉLETRE GYAKOROLT HATÁSÁRÓL

CASACCIO, Federica[1] – SUKHOVII, Evgeniia[2]

Abstract

With the consolidation of Artificial Intelligence (AI) and its incorporation in the fourth industrial revolution (Industry 4.0), businesses and industries worldwide are now competing to become AI-focused entities. Economic development and growth are intertwined with the strategic development and implementation of AI-driven systems and tools in several sectors including marketing, production and management for an increasing number of entrepreneurial entities. On top of this, it is now undeniable that the actual impact of AI on business is growing at a fast pace, resulting in a series of challenges in terms of technology business regulations, employee's security and companies management. As a result, the current research, which has been conducted within the framework of the Erasmus+ HEDY-Life in the AI Era project, aims to analyse the relation and most importantly the impact of AI on business. In doing so, it dwells on a detailed desk research supported by the remarks made by AI-experts and non-experts during two different focus groups sessions.

Keywords

Artificial Intelligence, business, economic development, market, industry

Absztrakt

A mesterséges intelligencia (MI) megszilárdulásával és a negyedik ipari forradalomba (Ipar 4.0) való bevonásával a vállalkozások és iparágak világszerte versenyeznek azért, hogy MI-központú entitásokká váljanak. A gazdasági fejlődés és növekedés összefonódik az MI által vezérelt rendszerek és eszközök stratégiai fejlesztésével és bevezetésével számos ágazatban, beleértve a marketinget, a termelést és az egyre több vállalkozói entitás menedzsmentjét. Ráadásul ma már tagadhatatlan, hogy az MI üzleti tevékenységre gyakorolt tényleges hatása gyors ütemben növekszik, ami számos kihívást jelent a technológiai üzleti szabályozás, az alkalmazottak biztonsága és a vállalatirányítás terén. Ennek eredményeként a jelenlegi kutatás, amely az Erasmus+ „HEDY – Élet az MI korában" projekt keretein belül zajlott, az MI üzleti tevékenységre gyakorolt kapcsolatát és legfőképpen hatását kívánja elemezni. Ennek során egy részletes dokumentumelemzésen alapuló kutatásra támaszkodik, amelyet MI szakértők és nem szakértők két különböző fókuszcsoport során tett észrevételei is alátámasztanak.

Kulcsszavak

Mesterséges intelligencia, üzleti élet, gazdaságfejlesztés, piac, ipar

[1] casaccio@aceeu.org | ORCID: 0000-0001-5953-1031 | Junior International Project Officer at ACEEU | Junior nemzetközi projektfelelős, ACEEU (Vállalkozói és Elkötelezett Egyetemek Akkreditációs Tanácsa)

[2] sukhovii@aceeu.org | ORCID: 0000-0002-2224-6920 | International Project Assistant at ACEEU (Accreditation Council for Entrepreneurial and Engaged Universities) | Nemzetközi projekt asszisztens, ACEEU (Vállalkozói és Elkötelezett Egyetemek Akkreditációs Tanácsa).

INTRODUCTION

By the 1970s, the finance community and business management information systems acknowledged the value of intelligent hardware and software, which significantly transformed many business operations [10].

Various business sectors have been attempting to determine how different forms of AI can be implemented. For instance, computer-based systems, hybrid systems, intelligent-agent systems have been equally implemented in management processes, planning, and strategy development [7]. This technological advancement, ascribed to AI, has been revolutionizing the living standards of the human, enhancing human-machine interactions, and above all, innovating and modifying the logic of business models.

Business model innovation is a process of altering the core logic of a company's value creation in order to improve customer value and competitiveness. It may encompass changes in the elements of various business models, as well as changes in the interactions among elements or dynamic mechanisms [10].

LITERATURE REVIEW

Current impacts of AI on Business

Considered a key driver of future economic development and growth, AI has become a primary value proposition for an increasing number of new start-ups, particularly around Europe [9]. AI is conquering every industry worldwide and motivating businesses to compete to become AI-focused entities. The competitive business environment has been forcing corporate leaders, entrepreneurs, strategists, and investigators to employ AI to develop new strategies and generate new revenue streams [2].

European Commission [3] indicates that in 2017, 25% of large EU businesses and 10% of small and medium-sized enterprises utilized big data analytics. Only one out of every five small and medium-sized businesses was significantly digitized, and one-third of the workforce still lacks fundamental digital skills.

Meanwhile, the advantages of AI applications are widely acknowledged. According to the 2018 Digital Transformation Scoreboard [3], businesses in the commerce, agri-food and construction sectors that have implemented AI report excellent outcomes in developing products or services, attracting new customers and entering new markets. In the meantime, AI has revolutionized online shopping by anticipating shopping trends based on the products that customers buy and when they buy them. Most major e-commerce companies, such as Amazon, Alibaba, eBay, and others, have implemented AI to offer product recommendations that customers may be interested in, resulting in significant revenue growth [16]. Other sectors dominantly utilizing AI are as follows:

- **Marketing:** Marketing is one of the most advanced fields when it comes to AI. Discussions about AI in marketing include how AI methods can help forecast whether a new customer's future spending will reduce or grow after the initial purchase.
- **Management:** AI is widely used in Human Resources to improve decision making processes integrating technical, human, and organizational systems to achieve an enterprise's strategic success.

- **Production:** AI helps improve the quality of production systems and, as a result, the quality of products. AI also enables the creation of highly personalized goods.
- **Digital (Social) Media:** AI is a crucial component of the popular social media platforms that have become to be used primarily for business purposes. LinkedIn uses artificial intelligence to provide job suggestions, suggest new network opportunities and diverse content [9]

While there is a growing interest among businesses in investing in and incorporating AI into their operations, significant barriers exist at the organizational level that prevent businesses from achieving AI's full potential. These barriers have a direct impact on an organization's capacity to gain access to and use enablers that allow AI. Some of the main barriers worldwide preventing AI applications are lack of clear AI strategy, cultural resistance, lack of talent needed for AI solutions, enterprise size, and budget constraints [2].

Findings show that in Europe, a lack of government financing and venture capital are frequently reported as financial obstacles to AI development, particularly in SMEs and non-tech companies [5]; thus governments have been working to determine and eliminate all the constraints that prevent companies from AI adoption. Yet, the development of AI technologies in Europe means reduced dependency on foreign technologies, which is vital for Europe's strategic autonomy. It also assists in the alignment of AI technologies with European values. Such insights into business technology adoption decisions are essential to guide legislation and guarantee that AI technologies benefit both employers and employees by making the technology trustworthy, simple to use, and useful in day-to-day work [6]

In a nutshell, AI technologies have started to be implemented all around the world and are expected to be integrated at the corporate level in order to realize macroeconomic benefits [14]. In 2019 report revealed by Intellectual Property Organization on AI indicates that the number of research papers in the AI field has increased significantly since 2000, with notable growth in patent applications between 2013 and 2016. Until now, several European countries have been massively funding AI technologies and developing long-term plans to adopt AI applications to a larger extent. Germany, for instance, has recognized its backwardness in the field, thus is preparing to take significant action to become more attractive for German entrepreneurs and researchers who tend to leave the country for better opportunities in the field of AI. Moreover, Germany has spent 500 million euros on AI research over the last 30 years. Currently, the German Research Center for Artificial Intelligence (DFKI) is receiving 77 million euros for machine learning research (2017-2021) and 30 million euros for institutional support (2018 to 2022). AI has been and will continue to be financed — albeit on a much lower scale – through new technology initiatives.

Expected impacts of AI on Business

Many businesses, technology, and industry experts consider artificial intelligence (AI) as a game-changing technology that will alter how we work, live, and communicate. For business and industry leaders, it will be necessary to comprehend and be convinced of the idea that proactive management of technology transitions is not only in the best interests of society as a whole but also in the more narrowly focused financial interests of businesses themselves.

The availability of funding and the amount of AI companies are good indicators of the feasibility of an AI ecosystem [2]. The EU, China, and the United States have all placed a strategic emphasis on fostering the development of AI enterprises through a supportive legislative environment. The current EU start-up environment is broad and dynamic, however, only 10% of digital unicorns are located in Europe. Due to the lack of an adequate venture capital ecosystem, these companies are considered unable to attract significant investment. In this regard, Europe has raised its investment and the commitment to AI research to increase Europe's technological growth potential and catch up with the countries leading the AI race. According to European Commission (2020), implementing an AI ecosystem can bring significant benefits of the technology to the EU and the economy in general. As for business development, innovative products and services can be boosted by AI in areas where Europe excels (machinery, cybersecurity, transportation, farming, the green and circular economy, healthcare, and high-value-added sectors such as fashion and tourism).

While this is the case, in the transformation process, organizations face major and particular obstacles and questions about the future of the business world [8]. The business world is rather skeptical about the rapid pace of technological change and its impacts. Concerns about privacy, ethics, and trust are also present and are expected to rise in the near future. The most common cause of privacy issues is the exposure of personal information; thus, companies strive to set out particular objectives to gain trust. For instance, Google stated that it would not pursue the AI applications that have caused, or are expected to cause, widespread harm and will proceed only if the benefits outweigh the risks, and will include appropriate safety limits if there is a material danger of harm [15].

Privacy and data protection is a major and frequently discussed ethical issue. Although privacy and data protection are not synonymous, for the purposes of AI ethics, informational privacy is the most important privacy concern, and data protection can be thought of as a means to protect informational privacy. AI based on machine learning generates several risks to data protection. On the one hand, it takes immense datasets for training, and access to those datasets can generate data security concerns. The fact that AI and its ability to recognize patterns may raise privacy risks, even when no direct access to personal data is allowed, is more noteworthy and more specific to AI. According to some studies, AI can detect sexual orientation from Facebook friendships, which is a good example. It is easy to understand how AI can be utilized to generate data that raises privacy concerns. AI also has the ability to re-identify anonymized personal data in ways that were not anticipated when machine learning's capabilities were discovered. While most nations have well-established data protection laws, AI has the potential to generate new data protection issues that are not addressed by legislation, raising additional ethical problems. AI could also use or generate sorts of personal data that are now neglected, such as emotional personal data, contributing to the problem [17].

Relatively, some of the current ethical concerns include AI making choices in favour of AI systems, drastic job losses as well as the change in the workforce. Studies predict that AI may transform the concept of the workforce by extinguishing some jobs. The problem of trust is also considered from the perspective of both consumers and employees. Customers may prefer human interaction over AI and building trust in AI technologies may take a while [8].

Conversely, the majority of studies emphasize that when strategically implemented and developed, AI technologies are likely to bring various advantages and impact every business sector for good. Some of the impacts derived from the use of AI algorithms in business are:

- Increase in productivity and cost efficiency,
- Human error reduction,
- Faster business decisions,
- Customer satisfaction,
- Sales maximisation (Soni et al., 2018).

AI-enabled logistics management is expected to forecast product demand by analysing previous sales, geography, buying patterns, and other factors. Every year, retailers all across the world lose money owing to improper inventory planning. The inventory issues will be significantly eliminated through the newly created AI-powered warehouse drones.

Besides, AI's integration into the workplace and daily life will have a substantial impact on digital literacy skills. By analysing speech and search trends and recommending online sources to improve understanding, AI will help more people expand their digital literacy skills (Herdiana, 2013). A research conducted by McKinsey [12] on AI's potential impact on global economic activity underlines the highly potential development of as many new jobs as the number of ones that are being or will be replaced. It is estimated that there will be more available vacancies for engineers, software developers, and ICT professionals in Europe in the near future. According to Deloitte Human Capital Trends [1] report, newly created jobs will be more service-oriented, interpretive, and social, requiring creativity, empathy, communication, and complicated problem-solving skills. As for Accenture research, the AI-driven jobs that will be created are "trainers," explainers" and "sustainers." These new jobs will include training AI systems, guaranteeing that they continue to perform as designed and do not learn the "wrong" thing, and closing the gap between business and technology (Herdiana, 2013).

Finally, AI will be a market trend and a business opportunity during the next decade. It is predicted that it contributes $ 15.7 trillion to global GDP and that this index will be 14 percent higher by 2030 attributable to AI. Analysts predict a 6.6 trillion-dollar gain in production, with a 9.1 trillion dollar increase in consumption. If Europe develops and disseminates AI in accordance with its current assets and digital position in relation to the rest of the world, it may contribute €2.7 trillion, or 20%, to its combined economy output by 2030, resulting in 1.4 percent compound annual growth. This impact would be nearly double that of previous general-purpose technologies which developed countries have adopted in the past [12].

RESEARCH METHODOLOGY

To provide insights about the relation between Artificial Intelligence and business, we have conducted two focus groups with AI experts and non-experts. More specifically, within the framework of the project HEDY, the term "expert" is define as a person who is

partially/very familiar with artificial intelligence, and in particular with its impacts on business.

The focus groups were held in two different sessions and they involved professionals in the AI sectors as AI experts and students enrolled in different universities as non-experts in AI. The two focus groups were recorded on video.

Planning and implementation of the Focus group with AI-experts

The discussion with the AI-experts focus group took place online. The participants had to comply with the following requirements:

- Have a university degree
- Being members of at least one professional scientific organization
- Have been working in areas related to artificial intelligence, digital society, human robot interaction, Industry 4.0 for at least 5 years
- Have given/participated in at least 3 presentations at scientific and professional conferences

Overall, 7 experts participated in the online focus group discussion. The demographic description of the participants can be seen in Table 1.

Gender	Age	Profession	Qualification
7 males	Min. age: 26 years old Max. age: 50 years old Average age: 35 years old	1 analyst/economist, 2 physics engineers 1 engineer-entrepreneur, 1physicist/researcher	PhDs: 2 in Physics 1 in Biomedicine

Table 1.: Demographic description of focus group 1

In Table 2. are collected the questions asked to the participants during the focus group:

Introduction	1. What is your experience with Artificial Intelligence?
Transition	2. Do you have direct experience with AI management?
	3. Based on your expertise, what is the most important benefit and disadvantage that AI can bring to the business environment?
Key questions	4. How do you define AI in your business or business world in general?
	5. According to your expertise, is there currently an impact of AI in your company or other business companies?

Key questions	6. In your expert opinion, how do you expect AI to affect people's way of working and their work environment?
	7. How should AI be developed in the university learning process?
Ending	8. Of all the needs we discussed, which one is most important to you and your business (workplace)?

Table 2.: Questions to focus group 1

AI-Experts: Results analysis

In the introduction part, the experts talked about their first experience with artificial intelligence (AI). Half of them had already a long history with AI and its implementation in their workplaces, businesses and professions. The ones who were not directly working with AI stated that they interact with it every day both intentionally and unintentionally. Most of the experts agreed that everybody who is having smart phones and smart technology directly interact with AI. An example is when people use banking systems, they also use AI unintentionally, or their data is being used in an AI-supported system to enhance the banking network. Experts mentioned banking systems that are implementing AI to analyse data and create opportunities/offers for customers accordingly. They called AI "a revolution" several times and agreed that it can be considered a tool that is changing our daily lives by solving issues and by becoming more common day by day.

When asked about benefits and disadvantages that AI can bring to the business environment, experts mostly agreed on the fact that AI speeds up the tasks, particularly the ones that do not require complex processes and that therefore it reduces simple mistakes while saving time. Some comments given by experts on the benefits and disadvantages of AI included: "We use AI to have sentiment analysis and these all are advantageous. The cost related to these activities can be disadvantageous, as well as finding people who can manage these processes is problematic" and "There are algorithms which are not properly regulated, which can be an issue. I'm also skeptical that AI would not do human errors. But what if the algorithm was trained falsely or with some bias(racism)? In this case AI can do mistakes. So, who is to make the last decision - AI or the human? we don't know how AI comes to a decision. Why whatever decision was made, we don't know. Thus, there needs to be made with effort to make AI systems more explicable to understand why it decides for or against things."

Generally, experts agreed that AI is as fundamental contribution to their business as it reduces the complexity within different situations, it personalizes their products and it saves time. One expert stated that AI are tools that help with specific tasks.

When asked about the current impact of AI on business and their work environment in particular, experts highlighted the changes that AI brought to their work experience. According to them, AI creates differentiation and increases the efficacy in specific field such as the medical one. On the other hand, one expert indicated that AI can also have negative impact as it can make people/employees feel useless and uncomfortable within such an innovative and automated environment.

On a general note, experts expect AI to reduce the complexity even more in the near future, but they also expect it to add new and complex tasks as well as opportunities, which would need to be learned and practiced by humans. The general opinion is that everything depends on the field of work: "AI can open doors for new tasks but in some fields, it can just replace the human labor and reduce the complexity. So, it really depends."

When asked about the AI development in the university learning process, experts agreed that AI has already changed the higher education environment as now everybody can learn new skills individually: "AI is expected to create flexible and personalized education by analysing and detecting students' weak or different points".

Experts underlined that the higher education in general has a crucial role in teaching the technology-based mindset and in providing best practices and real examples from business cases. In their opinion it can bring different and rather innovative teaching methods, which can become one of the advantages.

When concluding, some experts indicated that the most important needs that AI can provide include saving time, shortening tasks, automatization, having the ability to analyse big data more efficiently and reducing the complexity of some field, especially finance and medicine. More specifically, one of the experts highlighted the importance of the ability of AI to enhance the capabilities and perspectives in business, however it was also stated that AI should not replace human capability and decision-making: "Humans are the ones who can distinguish the things in fields like biomedicine. But we can still AI for simple detections. And in larger medical fields it is important to use AI but we should be sure that it is safe and will not cause big errors. Expert knowledge shouldn't be replaced by AI but rather enhanced. It should give recommendations but should not decide. I would prefer AI to enhance what humans can do. We are very far from that point where AI can replace the human knowledge anyway. Plus, it can be dangerous. Also, the responsibility (trolley problem) is another issue to consider when it comes to AI making decisions."

Planning and implementation of the Focus group with AI non-experts

The discussion with the AI non-experts focus group took place online. The participants were university students enrolled in master's degree at the time when the focus group took place. None of the participants had taken part into a focus group survey before.

Table 3 collects the demographic description about the focus group participants:

Gender	**Age**	**Profession**	**Qualification**
3 males 4 females	Min. age: 22 years old Max. age: 30 years old Average age: 24 Years old	7 students	Master's Degree in: Marketing and Sales Mathematics Business Business Engineering Politics/Linguistics

Table 3.: Demographic description of focus group 2

Table 4 collects the questions asked to the participants of the focus group with AI non-experts:

Introduction	1. Have you ever participated in a focus group?
Transition	2. What is your first association with the term artificial intelligence (AI)?
	3. Can you give us an example of an interaction (preferable in the work environment) you think you had with AI?
	4. When you think of AI, what is the most important benefit and advantage that AI can bring to business life?
Key Questions	5. When you heard the term AI management in business what did you think it was?
	6. Do you need AI in your current or future job?
	7. Is there currently an impact of AI in (your) business environment?
	8. In your opinion, how do you expect AI to affect people's business lives?
	9. What is your experience with artificial intelligence?
Ending	10. Of all the needs we discussed, which one is the most important to you?

Table 4.: Questions to focus group 2

AI non-experts: Results analysis

In the beginning, all participants stated that they have never taken part into a focus group before this survey. Most of the participants stated that their first association with the term artificial intelligence was with machines able to perform independently without the need of a human presence and agreed that the general view on AI had been influenced by science fiction.

When asked about which interaction they think they have had with AI, most of the participants mentioned virtual assistants such as general chatbots and Amazon's robots "Earnie and Bert" which are part of Amazon IU development and are generally used to help warehouse workers with packages and deliveries. By the answers provided, it resulted that all participants agreed to have had some sort of interactions with AI, especially when navigating websites and using different platforms (e.g. LinkedIn). In this regard, one of the participants mentioned that they are aware that tools such as Google SEO and more generally marketers have indeed integrated some sort of AI in their systems.

In reference to the benefits and disadvantages that AI bring to business life, most non-AI experts agreed that AI brings benefits such as forming reference models to solve future problems using past data as in the case of finance and providing process optimization in business. Another AI benefit identified during the survey is the support that AI provide to companies and brands in terms of image innovation, individualisation and personalization in order to attract customers. Nonetheless, almost all participants raised concerns about AI. In this context some of the disadvantages that have emerged from the survey include the cost optimization that follows the implementation of certain AI and that results in higher levels of unemployment for humans. The participants reported also concerns concerning AI reliability and their ability to predict human moves (e.g. automatic email composition): "Companies can benefit from AI to innovate their image and it leaves a good impression. Also cost optimization in human resources. It is good for business perspective. But as for CSR and human labour it can be problematic as AI replaces some jobs."

When asked about the meaning of "AI management in business" most participants agreed that it had to do with data collection. On the one hand, some participants highlighted the connection between data collection and decision-making, especially in marketing environments and social media, as AI has the ability to influence users' choices. On the other hand, other participants stated that AI management in business concerns the "infrastructure and different operations of the companies "and the way how they collect and store data, from which AI can learn and improve. Following, non-AI experts were asked to tell whether they need AI in their current/future job. According to most of them, knowing about AI technologies and their use is necessary to be more competitive in today's working context and it will become even more a need in the future. In addition, two among the participants have stated that AI is already visible everywhere such as in public services, higher education, and even governments: "When it comes to needing AI, it is necessary, but we don't need it necessarily. To stay competitive, it is a need for companies but for individuals it is tricky. Too much reliance on it might arise new problems. Like getting a job after having been interviewed with a robot is likely realistic."

Concerning the AI impact on (their) business environment, most participants agreed that AI is creating new types of jobs, but that there is also a shift in the work force where several jobs are being replaced by machines. Non-AI experts working in the educational field highlighted that people are currently studying and that they are getting ready to tech things that are still unknown. However, a participant stated that AI improved the quality of their work in the fashion industry.

When asked about how they expect AI to affect people's business lives, most participants reported that AI will bring several benefits and opportunities (e.g. In the medical sector and in costume care) as it will be integrated more and more into everyone's working life. Despite this, the answers collected show that the participants agreed that human interaction will be still needed and that thinking about the ethical issues related to AI is necessary: "AI cannot be fully implemented as we need interaction and we need to speak with real people. I was also thinking of ethical issues. People need to think about this particular subject. And it is prone to impact society as well as business life."

Towards the end of the survey it was asked to the participants which direct experiences did they have with AI and almost all of them reported that they had some kind of

problems with automated virtual assistants and that only by connecting "with a real person" it was then possible to solve their issues.

In conclusion, non-AI experts were asked to identify which need, among those discussed, was the most important. Most of them reported that AI development should be tested, as it is supposed to make humans life easier by taking care of their tasks, by saving lives and by improving the productivity "instead of making them feel paranoid". Finally, they recommended that education institutes should provide classes for the younger students to learn about AI and technology: "It could be useful to give some AI classes for younger students so they know how to deal with it and know the risks/challenges. We already use it but it is still tricky and we don't reflect on it a lot. Maybe it can be useful to have these courses at school to learn about it more."

CONCLUSIONS

The findings emerged from the two focus groups have provided insightful results about AI and its role in the business environment. From the analysis of the answers provided by the AI experts of Focus Group 1, it is clear that AI technology is already a big part of everyone's daily-life and work. AI has great potential especially when it comes to saving time, facilitating tasks and bringing innovative solutions, especially in field such as medicine, biomedicine and finance. Nonetheless AI experts agreed that AI should not replace human capability and decision-making.

The same consideration was raised by the non-AI experts of the Focus Group 2, who mentioned on several occasions that AI should be approached from an ethical perspective and that human freedom to make decisions should be prevented from being influenced by AI-driven tools. Also, non-AI experts agreed that AI is a type of technology that is spreading in several working environments (e.g. higher institutions, public and governmental offices) and that such trend will increase in the future.

In conclusion, the main recommendation coming from both Focus Groups is the necessity to provide teachings, courses and trainings in schools and higher education institutes to facilitate the use and adoption of AI for young people and future generations.

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