PORTRAYING THE AI-DEVELOPING FIRMS IN CROATIA

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Abstract
Adopting AI within various sectors (governance, business, civil society) has led to a significant increase in the global AI market size. As the latest EU-member state, Croatia stands as an example of fast-growing AI usage, following the EU trends and maintaining the AI adoption rate close to the EU-28 average. Croatia may be an interesting example of a small post-transition economy with underexplored AI potential; however, the structured data on the AI-developing companies is missing. This research sheds light on this narrow but promising part of the Croatian business sector. The original survey data aims to portray the AI developing sector by attributes of firms developing AI applications and solutions in Croatia in 2025. We empirically assess the AI developer's subsector in the small EU economy and analyse characteristics of different types of AI developing firms in terms of size, sector in which they operate, regional distribution, and financial results. We also distinguish firms according to their AI adoption stage, which aligns with the innovation diffusion theory classification (Rogers, 1962). Compared to other relatively scarce data sources on the AI adoption and development in Croatia, the added value of this study is that it includes the micro firms in the survey and analysis. Among surveyed AI developing firms, 74% are micro-sized firms with fewer than 10 employees. In the subsample of micro firms, there is a notable share of firms with only one or two employees. More than half of the AI developing firms come from the capital city of Zagreb. Most AI developing firms operate in manufacturing (46% of firms surveyed) and ICT sectors (43%), yielding very different financial results. The findings of AI-related activity of Croatian firms increase the overall knowledge of their AI potential and their role in fostering an innovation-driven economy. This is particularly important given that 44% of AI developing firms are early adopters of this new technology. The policy recommendations offered are developed in line with the EU policy framework.

Keywords: artificial intelligence; AI development; innovation; Croatia; technology adoption

1. INTRODUCTION

The rapid adoption of digital technologies and the internet has played a key role in the recent expansion of the global artificial intelligence (AI) market. Major tech companies continue to drive innovation across industries through substantial investments in nonmaterial assets (e.g. R&D activities). Rising demand for AI across various sectors—such as automotive, healthcare, banking and finance, manufacturing, food and beverages, logistics, and retail—is expected to propel market growth significantly in the coming years. Technological innovation remains a cornerstone across most industries.

In particular, the banking and financial sectors are projected to see considerable AI growth due to their data mining, fraud detection, cybersecurity, and data analytics applications. As a result, AI adoption is accelerating across end-use industries, helping businesses streamline operations and enhance efficiency. This growing interest in AI also opens doors for new market entrants offering niche, application-specific solutions. As it considers the subfields or applications of AI, the most prosperous future is anticipated for Machine Learning (ML) and Natural Language Processing (NLP). Machine learning will remain the most significant way to use AI and quadruple its estimated market share by 2030. Thus, by 2030, ML will account for about half of the total market share, and NLP for about 20%. AI robotics, computer vision, and autonomous and sensor technology would each count for about 10% of the global market size in 2030 (Statista, 2024).

The latest reports on the development of AI in industry show that the fast penetration of AI has led to a significant increase in the global AI market size. As of 2025, there are approximately 70,000 AI companies worldwide, and the U.S. companies are leading the global AI race, followed by the rapidly progressing Asia-Pacific region (Ascendix, 2025). Approximately 10,095 AI startups are in the top ten countries leading in artificial intelligence innovation. Most AI startups (5,509) are U.S.-based, including the leading *OpenAI* with USD 11.3 billion in funding. China follows with 1,446 startups, while the United Kingdom ranks third with 727. About half of the tech unicorns in 2024 were AI-related startups, showing strong investor confidence. OECD report on intellectual property data comprising AI-related patents and trademarks showed that AI-related activities are highly concentrated by countries (the United States, Japan, Korea, China), in ICT sectors (computer and electronics, IT services), and in start-up firms or large incumbents (Dernis et al., 2021).

The global AI market size was USD 638.23 billion in 2024, calculated at USD 757.58 billion in 2025, and is expected to reach around USD 3,680.47 billion by 2034, expanding at a compound annual growth rate of 19.20% from 2025 to 2034 (Precedence Research, 2025). AI business usage is also accelerating. According to some reports, 78% of all companies worldwide were using AI in 2024, up from 55% the year before (Stanford

University Human-Centred Artificial Intelligence, 2025), reaching 82% in 2025 (Ascendix, 2025).

In all these reports and studies, mainly conducted by consulting companies and university hubs, there is much less data on the European region, currently occupying 25% of the global AI market (Precedence Research, 2025). The most significant AI countries in Europe are France, Germany, and the United Kingdom, while companies from Spain, Italy, Portugal, Switzerland, Belgium, the Netherlands, Sweden, Finland, and Norway are catching up (The Boston Consulting Group, 2025). Countries in the Western Balkans region are not included in these global reports. Statistics on the adoption rate of AI and data on the number of companies using AI have recently been collected for EU member states, starting in 2022. One of the new EU-member states, Croatia, stands as an example of fast-growing AI usage, following the EU trends and maintaining the AI adoption rate close to the EU-28 average. Croatia may be an interesting example of a small post-transition economy with underexplored AI potential. Further, besides anecdotal evidence on the success of AI-developing firms and start-ups, the structured data on the AI-developing companies is missing. Here, the AI development companies are considered part of the AI service providers that focus on designing and delivering custom AI solutions tailored to specific organisational needs. Their services typically involve the end-to-end development of machine learning models, data engineering pipelines, and system integration, often necessitating close collaboration with clients. Some of the leading AI development companies include NVIDIA, OpenAI, Microsoft, Apple, and Alphabet (Google). Other AI development companies include companies specializing in AI-driven solutions for specific industries like healthcare, finance, and manufacturing.

The activity of all firms developing AI applications and solutions in Croatia has slipped under the radar of statistics and researchers so far. This research sheds light on this narrow but promising part of the Croatian economy. The novel approach is to include micro firms with less than 10 employees, who make up 51% of active legal entities in Croatia (Croatian Bureau of Statistics, 2025). Active firms with up to 9 employees and active firms with no employees make up 90% of the total number of firms in Croatia and might perform as AI-developing firms. The original survey data aims to portray the AI-developing sector by attributes of firms developing AI applications and solutions in Croatia in 2025. Our contribution to literature is twofold. Firstly, we empirically assess the subsector of AI-developing companies in the small EU economy and analyze characteristics of different types of AI-developing firms in terms of size, sector in which they operate, regional distribution within Croatia, and financial results. We also distinguish firms according to their AI adoption stage, which aligns with the innovation diffusion theory classification (Rogers, 1962). Secondly, the findings of this underexplored part of the business sector are expected to increase the overall knowledge of its AI potential and the important role it might have in fostering an innovation-driven economy.

The paper is structured as follows. The literature review dealing with AI-developing firms and their innovation potential, focusing on the micro-sized ones, is presented in the next section. A brief overview of the Croatian AI landscape is presented in Section 2. Section 3 explains the survey data used in this empirical research. The results of the survey data analysis are presented and discussed in Section 4. The final section concludes with findings by putting them in the broader policy context and suggests avenues for further research.

2. LITERATURE REVIEW

Literature on AI is growing, and academics and practitioners have opened numerous research niches. Scientific publications have increased at the annual rate of 23% since 2015 (Baruffaldi et al., 2020), and new topics emerge to be addressed by academics and practitioners. Most of the studies of AI usage consider AI as a general-purpose technology (Truong & Papagiannidis, 2022; Calvino & Fontanelli, 2023), denoting the disruptive technology that emerges and fundamentally reshapes how businesses operate and create value. It impacts multiple sectors, thus affecting the entire economy, enabling innovation and fostering productivity and growth (Crafts, 2021; DeSantis, 2024; Vujović, 2025). Calvino and Fontanelli (2023) argue that the wide sectoral distribution of firms in France buying AI systems and solutions supports the view of AI as a general-purpose technology. Although the evolution of AI occurred in different patterns in the United States, European Union, and China, it produced a complex interdependency of AI-developing firms, manufacturers, and users (Jacobides et al., 2021). AI is a disruptive, emerging technology that might be seen as innovative (Madan & Ashok, 2023). Therefore, AI adoption should be analyzed using the Innovation Diffusion Theory (IDT) developed by Rogers (1962). The postulates of IDT apply to all types of organizations, explaining how new technologies, ideas, or practices spread within a social system over time. As represented by the Innovation-Adoption Curve, Rogers' diffusion model indicates that organizations undergo different stages when adopting new technologies. His model distinguishes five segments of organizations, based on their aversion to risk and propensity to adopt a specific innovation: innovators, early adopters, early majority, late majority, and laggards (Rogers, 1962). The theory identifies key factors influencing adoption, including the perceived advantages and a theoretical background for researching AI adoption in firms. However, micro-firms' innovative potential is underestimated or at least underexplored. The study of Farè (2022) based on the Community Innovation Survey data (CIS, 2018) showed the non-negligible share of innovative firms with less than 10 employees in the EU-27 countries. For example, in Croatia, 0.51% of micro firms were reported as innovative, compared to 0.63% of medium-sized and 0.61% of small firms. Most of the innovative firms in Croatia come from industry (0.72%), followed by trade (0.59%), services (0.59%), and construction (0.49%), and these shares are close to the relevant data for other EU-27 countries (Farè, 2022). The deeper analysis of German micro, small, and medium-sized firms showed that micro firms engage in innovative activities with a negligible probability. However, if they decide to do so, their R&D intensity will be higher and yield similar benefits to those of larger firms (Baumann & Kritikos, 2016). Moreover, the advantage of large firms disappears if micro firms operate in knowledge-intensive services, particularly for start-ups and young firms (Audretsch et al., 2020). Micro firms account for most of the employment in knowledge-intensive services, and their innovative capacity plays a key role in driving technological advancement (Audretsch et al., 2020). Other studies stress the importance of networks on innovation of micro-firms in traditional industries (Ricciardi et al., 2025). One should distinguish the AI solutions and applications as innovative products from the AI role in supporting (other) firms' innovative activities. Truong and Papagiannidis (2022) argue that AI can act as an enabler for innovation, helping innovation managers throughout the innovation process. However, this aspect of the AI and innovation nexus is still underexplored. AI-related goods and services emerge in various sectors, e.g., education and consumer markets, according to the trademarks registered to protect AI computer products, software, devices, and similar (Nakazato & Squicciarini, 2021).

Micro and small enterprises (MSEs) entering the field of AI development is a growing trend (Farè, 2022; European Economic and Social Committee, 2021). While traditionally dominated by big tech companies, the democratization of AI tools, open-source models, and cloud computing has opened the door for smaller players to innovate and compete. MSEs can position themselves as AI service providers in specialized niches, solving problems for industries like agriculture, healthcare, logistics, or education, where large companies might not focus. They might benefit from agility and innovation potential because smaller teams can pivot quickly, experiment with new technologies, and adopt novel approaches faster than large enterprises with rigid structures.

Access to powerful open-source AI frameworks levels the playing field by reducing entry barriers, and access to smaller AI-specific cloud providers enables MSEs to scale their AI products without investing in expensive infrastructure. The remote work commonly practiced in MSEs ensures them access to a global talent pool and allows them to contract freelancers or remote developers to build cost-effective AI solutions. However, MSEs face challenges such as limited funding to acquire data needed for training large models, competing with tech giants in the global market, compliance with AI ethics, privacy laws (like GDPR and EU AI Act), and sector-specific regulations.

European Economic and Social Committee (2021) pointed out that micro, small, and medium-sized enterprises (MSMEs) will adopt AI only if it is reliable, inclusive, sustainable, and aligned with environmentally and socially responsible frameworks. MSMEs, including the self-employed, are vital to the EU's digital and green transition and must have equal access to AI. However, they face barriers such as high costs, poor infrastructure, limited financing, and a lack of training. Support should include easy-to-use tools, accessible funding, quality data, and full-scale testing. Effective adoption requires strong political will, stakeholder cooperation, social dialogue, and smart, inclusive legislation (European Economic and Social Committee, 2021). These issues are common for MSMEs worldwide, especially regarding access to finance. Besides that, micro and small enterprises in Croatia face obstacles to getting microloans (Šišara & Šarlija, 2023); this funding is often insufficient to develop AI solutions and applications.

3. CROATIAN AI LANDSCAPE

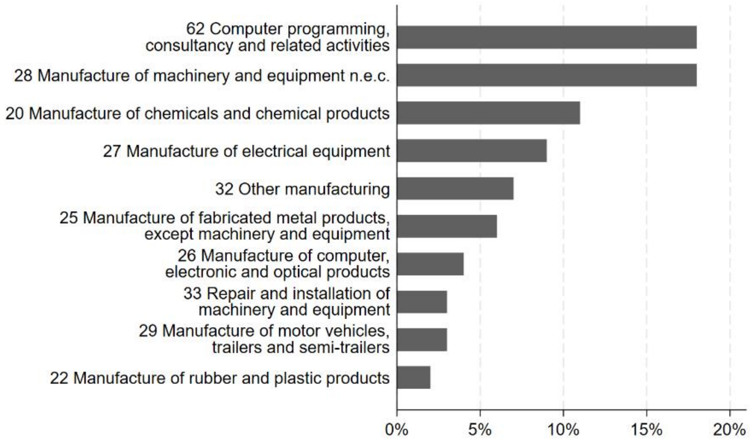
The data on the specific firms using and developing AI in Croatia is scarce. However, some recent information and data support the idea that AI-related activities have gained significance in the Croatian economy. In 2024, 13.5% of enterprises in the EU with 10 or more employees used AI technologies to conduct their business, indicating a 5.5 percentage points (pp) growth from 8.0% in 2023 (Eurostat, 2025). In 2023, 7.9% of all firms in Croatia were using AI (compared to the EU average of 8%), with this share slightly increasing to 11.8% in 2024.

The EU statistics on enterprises' AI technologies developed by their employees reported that there were 1.41% of such firms in Croatia in 2023, and this share doubled to 3.63% in 2024, surpassing the EU-27 average share of 2.77% (Eurostat, 2025). The Eurostat statistics, however, do not include micro firms with less than 10 employees, which might contribute significantly to this outcome (Dernis et al., 2021). The recent analysis of AI adopters by the Institute of Economics, Zagreb in 2025[1] indicates a concentration of companies using AI within the Computer programming sector (18.3% of total number of surveyed firms using AI in Croatia), as well as within segments of the manufacturing industry with higher technological complexity, such as the

[1] Survey was conducted within the project Determinants of Strengthening Technological Capabilities of Different Sectors, Institute of Economics, Zagreb, 2025

Manufacture of Machinery and Equipment (17.5%) and the Manufacture of Electrical Equipment (8.8%) (Figure 1).

Figure 1: Share of firms using AI per NACE 2-digit sector



Note: Total number of surveyed firms using AI in Croatia N=502.
Source: Institute of Economics, Zagreb; author's work.

More than four out of five firms using AI (80.4%) are concentrated within the top ten industries in Croatia. An interesting finding of this study is that more than half of AI adopters are in the capital City of Zagreb (38.5%) or its immediate surrounding area (Zagreb County, 12.5%).

Moving further from the Croatian firms using AI (AI adopters) to the analysis of the AI-developing firms that are the focus of this research, the data are even more incomplete. Some studies report on the significance of the AI production market and the growing number of AI-developing firms across Central and Eastern European (CEE) countries, including Croatia (The Recursive, 2024). The CEE report mapped 84 AI-developing companies in Croatia by August 2024 and points out the Croatian startups that raised significant funds in the last two years. The total funding raised by four leading AI startups in Croatia amounted to 184 million EUR in 2023 and 107 million EUR from January to August 2024, hence over 96% of the funds went to one leading startup[2].

Another important source of information on the AI-related businesses in Croatia is CROAI. The CROAI is an association of AI companies, organizations, and experts in Croatia that was established in 2019. At the beginning of 2025, CROAI had 281 members (119 legal entities and 162 physical persons). The membership does not represent the total of firms using and developing AI because it is voluntary; however, CROAI collects valuable information about the companies and organizations developing AI, employing AI solutions, providing AI training, and performing AI-related services in Croatia (Table 1).

Table 1: Croatian AI landscape in 2025.

Field of AI-related activity / No. of companies, organizations		NACE-2 digit sector
Startups & Companies	***315***	
Service Providers	73	62
Data Analytics	28	62
AdTech & Sales & PR	28	62, 63, 73
Healthcare & Life Sciences	20	26, 32, 46, 62, 63, 85
Image & Video Processing	17	62,63
Mobility	15	46, 62, 64
FinTech & InsuTech	14	62
Agriculture & GreenTech	13	62
Customer Communication	13	62, 63, 70, 82
Robotics	12	26, 28, 62, 71, 72
Hospitality & Tourism	11	62
EduTech	10	62
HR & Law	10	58,62

[2] Rimac's startup Verne secured 180 million EUR in 2023 and 100 million EUR in 2024.

Automation	10	26, 33, 62, 71
Art	9	47, 90, 91, 94
Cybersecurity	8	46, 62, 70
Platforms &Infrastructure	8	58, 62, 95
Smart Cities & Homes	8	27, 30, 58, 62, 70
DevTools & Frameworks	8	62
Early Adopters	***50***	
Enablers & Extended Ecosystem	***183***	
Accelerators & Incubators & Investors	43	
Organizations & Communities	41	
Conference & Meetups	39	
Research	20	
Media	19	
Universities & Educational Institutions	16	
Public	5	

Source: CROAI Association, . Adapted by the authors. NACE codes are NACE Rev. 2 2-digit codes, available here:

The Croatian AI landscape presents AI companies by their activity on the market, which might differ from the NACE sectors to which these companies belong. Based on the CROAI list of companies, we have added the NACE 2-digit sector category to each of the companies to get insight into which sector they operate in. In comparison to the data presented in Figure 1, ICT sectors prevail, but the share in percentage varies significantly. When it comes to the Croatian landscape (Table 1), sectoral distribution shows that the largest share of AI companies (71.1%) belongs to ICT sectors (NACE sectors 62 and 63), much above the 18.8% found in the survey of AI using companies (Figure 1). Croatian landscape data reveal interesting information on the high proportion of AI companies coming from sectors 70 to 72 (Activities of head offices; management consultancy activities; Scientific research and development; Rental and leasing activities) and much less from the manufacturing sectors.

Startups and companies engaged as service providers and in data analytics using AI all come from the computer programming and consultancy sectors. However, it seems that the more complex the field of AI-related activity, the greater the likelihood that companies from different NACE categories will emerge to provide AI services within that industry. Thus, healthcare and life sciences benefit from AI solutions provided by companies from ICT sectors, as well as from the manufacturing of computer, electronic and optical products, wholesale and education. The sectoral affiliation of companies contributing to the AI activity in the field of smart cities and homes is even more diversified: companies come from the manufacture of electrical equipment and other transport equipment, computer programming, publishing, and management consultancy sectors. In the field of mobility, AI companies are from computer programming, wholesale trade, and financial intermediation, except insurance and pension funding sectors. The Croatian AI landscape is covering many sectors and fields of activity, and it would be interesting to deepen the insight into the AI-developing firms as the most technologically promising part of the AI landscape in Croatia.

4. DATA

This study uses the data from a survey on AI usage in Croatian firms conducted on a sample of 506 firms that reported using some AI in their business operations[3]. A professional agency conducted interviews with managers, owners, or other persons responsible for each firm, using the computer-assisted telephone interviewing (CATI) method, in January and February 2025. The authors developed the survey based on the literature review.

We have extracted the firms identified as AI-developing firms from the total sample surveyed. In sum, 66 firms develop their AI solutions independently and/or in collaboration. Concerning the representativeness of our sample, it is essential to note that the adoption of AI by firms is a relatively novel research topic in Croatia, for which no prior distributional information is available. Consequently, we did not have predefined strata for our sampling strategy.

When considering the overall representativeness of the larger sample from which we selected AI-developing firms, it is important to note that our sample closely reflects the population regarding firm size. However, small, medium, and large firms are slightly overrepresented. This is not unexpected, given that AI adoption was a key selection criterion. Regionally, the sample includes a higher proportion of firms from North Croatia and the City of Zagreb, while firms from Adriatic Croatia are underrepresented. The most significant

[3] Survey was conducted within the project Determinants of Determinants of Strengthening Technological Capabilities of Different Sectors, Institute of Economics, Zagreb, 2025

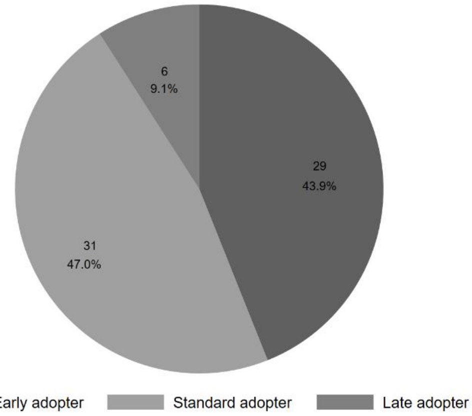
deviation from the general firm population is in sectoral composition: companies in the Industrial and ICT sectors are markedly overrepresented compared to those in the Service sector. We recognize this as a limitation to the generalizability of our findings. Nevertheless, this is the first study conducted on Croatian firms.

5. RESULTS

The total sample of 66 firms that develop AI includes 50 firms developing AI independently and 39 firms developing AI in cooperation with other firms. It means that over one-third of the AI-developing firms surveyed develop AI solutions and applications both independently and in collaboration with other companies.

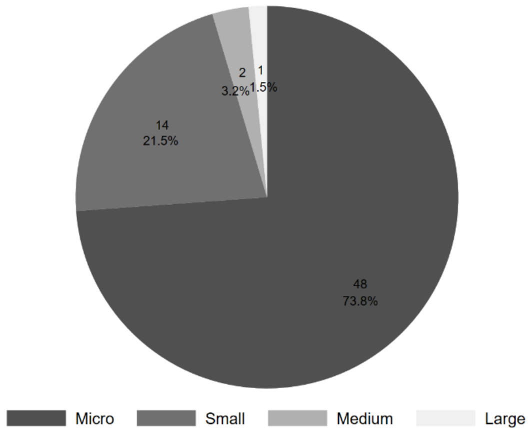
Regarding AI adoption, almost half of the sampled firms can be classified as "standard" adopters, meaning they adopt AI solutions at approximately the same time as their competitors. Around 44% of the firms consider themselves early adopters, while only 9% are late adopters (Figure 2).

Figure 2: AI-developing firms by stage of AI adoption



Source: Authors' work based on a survey.

Figure 3: AI-developing firms by size

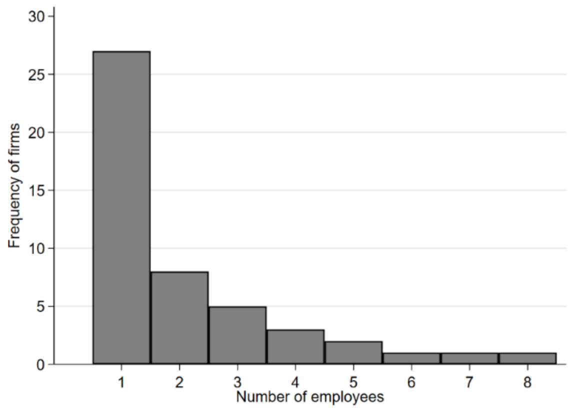


Source: Authors' work based on a survey.

Among the AI-developing firms surveyed, 73.8% are micro-sized firms with less than 10 employees (Figure 3). The share of micro firms accounting for 51% of all active legal entities in Croatia (Croatian Bureau of Statistics, 2025) suggests that micro firms in Croatia have significant potential in adopting new technologies and developing innovative AI-based solutions and applications.

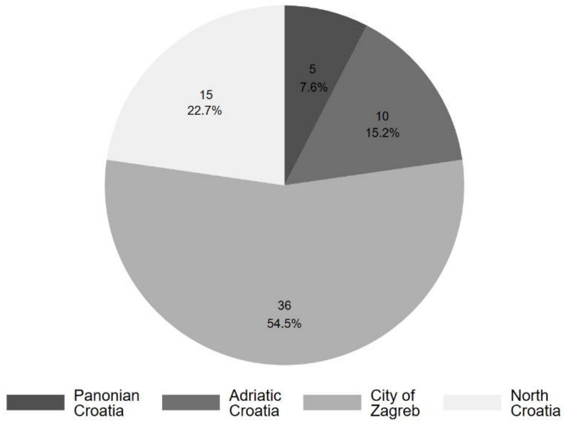
A closer look at the sub-sample of micro firms, often not included in studies and reports on the AI-related activities, reveals that more than half (about 56%) of the micro firms surveyed have only one employee (Figure 4), supporting the idea that individual efforts can develop AI solutions and applications.

Figure 4: Number of employees in micro firms



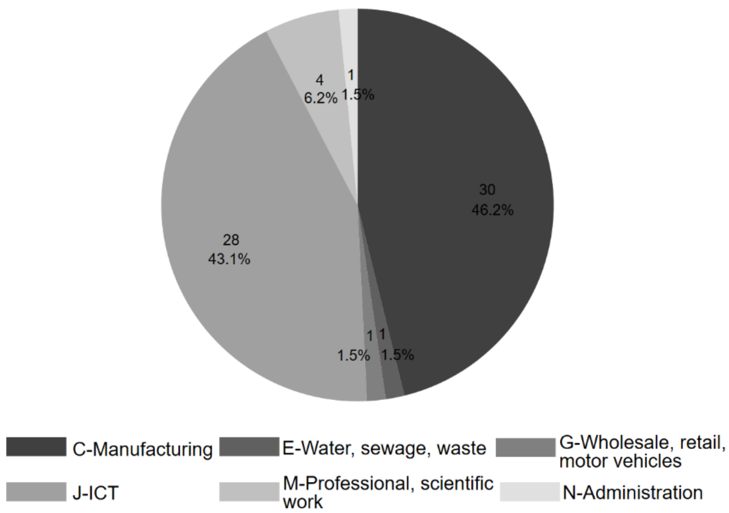
Source: Authors' work based on a survey.

Figure 5: Regional distribution of AI-developing firms



Source: Authors' work based on a survey.

Figure 6: Sectoral distribution of AI-developing firms (NACE 1-digit sectors)



Source: Authors' work based on a survey.

More than half of AI-developing firms (55%) are concentrated in the capital city of Zagreb (Figure 5). The survey data do not allow us to conclude on the exact settlement where the AI-related activity occurs, and it would be interesting to explore further if AI development is concentrated in urban regions with advanced infrastructure and networks, higher education institutions (and therefore more skilled experts), and other resources available.

As expected, almost all AI-developing firms operate in the ICT and manufacturing sectors (Figure 6). The manufacturing sector, however, covers many specific subsectors, so it was interesting to examine where AI solutions and applications are being developed more precisely (Table 2). In the C-Manufacturing sector, nine AI-developing firms manufacture machinery and equipment, followed by electrical equipment. In the J-ICT sector, AI-developing firms' subsectors are more homogenous because out of 28 firms in the ICT sector, 22 operate in the computer programming, consultancy, and related activities subsector.

Table 2: AI-developing firms by NACE 2-digit classification

NACE 2-digit sector	n	%
62 Computer programming, consultancy and related activities	22	33.85
28 Manufacture of machinery and equipment n.e.c.	9	13.85
27 Manufacture of electrical equipment	5	7.69
63 Information service activities	5	7.69
20 Manufacture of chemicals and chemical products	4	6.15
32 Other manufacturing	4	6.15
72 Scientific research and development	3	4.62
26 Manufacture of computer, electronic and optical products	2	3.08
30 Manufacture of other transport equipment	2	3.08
10 Manufacture of food products	1	1.54
16 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1	1.54
25 Manufacture of fabricated metal products, except machinery and equipment	1	1.54
29 Manufacture of motor vehicles, trailers and semi-trailers	1	1.54
39 Remediation activities and other waste management services	1	1.54
46 Wholesale trade, except of motor vehicles and motorcycles	1	1.54
59 Motion picture, video and television programme production, sound recording and music publishing activities	1	1.54
70 Activities of head offices; management consultancy activities	1	1.54
77 Rental and leasing activities	1	1.54

Source: Authors' work based on a survey.

The average number of employees within the AI firms surveyed is 14.6, with a median of 2 (Table 3). Such a pronounced discrepancy indicates that a small number of firms employ significantly larger workforces, reflecting the presence of a few larger enterprises within an otherwise predominantly micro to small business. Analyzing the turnover, the mean figure is 1,959,423 EUR, while the median is considerably lower at 127,024 EUR. The standard deviation, which reaches 8,333,299 EUR, indicates an extensive variation among the firms regarding revenue generation capabilities, potentially reflecting differences in market access, service offerings, and client bases. Total assets average 1,616,490 EUR among the firms, revealing a significant discrepancy between firms' access to financial resources. The median total assets at 153,284 EUR further support the assertion that while some firms command substantial asset bases, many are relatively asset-light, which might limit their operational capabilities. The considerable standard deviation of 6,177,721 EUR alongside the min-max range spanning from 359 EUR to 47,309,067 EUR illustrates the marked asset disparities driven by differing strategies in financial investment and growth trajectories among these firms.

Table 3: Firm financials

Financials	Mean	Median	St. Dev.	Min.	Max.
Number of employees	14.6	2	47.2	1	333
Turnover	1,959,423	127,024	8,333,299	0	65,000,000
Total assets	1,616,490	153,284	6,177,721	359	47,309,067
Fixed tangible assets	269,415	13,144	784,864	0	4,427,669
Fixed intangible assets	49,386	0	979,166	0	7,825,646
Turnover per employee	82,641	47,181	106,913	0	527,143
Total assets per employee	225,465	43,607	1,129,353	359	9,137,410
Fixed tangible assets per employee	78,421	3,773	450,812	0	3,625,629
Fixed intangible assets per employee	7,200	0	32,058	0	238,000

Notes: All monetary variables are in EUR for 2023. "St. Dev." denotes standard deviation.
Source: Authors' work based on a survey.

The turnover per employee metric is pivotal to understanding financial health and performance, averaging 82,641 EUR. The median of 47,181 EUR underscores that while some firms generate revenue relative to employee count, many struggle with operational efficiency. The extreme variability, indicated by a maximum of 527,143 EUR, may highlight the effectiveness of certain firms' business models or the strategic positioning of their services in the market. Turning to total assets per employee, the average is recorded at 225,465 EUR, with a median of 43,607 EUR. This disparity, alongside a staggering maximum of 9,137,410 EUR, suggests that certain firms operate with highly asset-intensive frameworks, potentially signifying a strategy prioritizing large-scale investment in physical and intangible resources. The implications of such a measure on firm scalability and operational efficiency warrant further analysis, particularly regarding how these asset structures impact competitive advantages stemming from capital investments.

It is important to note that the available data does not allow for a definitive assessment of the financial returns generated solely from AI-development activities. In many cases, AI development likely represents only one component of a firm's broader operational scope. This is particularly plausible for firms classified under sectors such as food manufacturing or the wood industry, where AI may be integrated as a supporting function rather than a primary product or service offering. Furthermore, micro and small enterprises that engage in AI development are more likely to do so to produce market-oriented AI solutions. Commercializing AI products and services may represent a core business strategy or a significant source of potential revenue for these firms. Therefore, any evaluation of AI development in Croatia must account for the diverse roles and business models associated with AI across different firm sizes and sectors.

6. CONCLUSION

The intertwined activity of AI startups and companies in Croatia supports the assumed multiplicative effect that AI adoption and development might have on the entire economy. However, there are no reliable statistics on AI users and AI service providers, and Croatia is not an exception. More structured and methodologically consistent evidence and monitoring of the AI landscape in Croatia would enable targeted policy measures for this heterogeneous business and enable spillovers of AI development and adoption effects to other sectors and out of the national market.

The sectoral distribution of AI-developing firms in Croatia corresponds to the situation in the CEE region, showing early signs of specialization in industry-specific AI solutions. The majority of AI-developing firms in Croatia operate in manufacturing (46%) and the ICT sectors (43%). AI solutions are also developed by companies registered in professional services and scientific work, and other sectors developing AI are emerging. The AI development is in over than 50% of cases performed in micro firms, and it is densely concentrated in the capital city of Zagreb area. Financial results of AI-developing firms in Croatia should be taken with caution because of a large variation among the firms regarding revenue generation capabilities, and due to the difficulties in distinguishing revenues from AI production from other revenue sources. Despite its limitations in terms of the size and completeness of the AI-developing companies' sample, this research indicates an existing AI development potential in Croatia. The specifics of Croatian AI-developing firms call for more systemized research and statistical evidence. The proper identification of this subsector is a prerequisite for its development, for which an EU framework already exists.

The EU digital agenda includes many measures to support AI development and to overcome the barriers that young firms and start-ups, micro and MSEs, face in securing the resources needed to develop and commercialize AI solutions. One of the recent initiatives within the European supercomputing initiative's regulations (EuroHPC) is to facilitate the creation of AI factories, designed to create a robust and interconnected network of AI hubs. Acting as one-stop shops, they will offer AI startups, SMEs, and researchers comprehensive support, including access to AI-optimised high-performance computing resources, training, and technical expertise. Shared supercomputer facilities provide SMEs with access to immense computational power, enabling them to train complex AI models more efficiently and to enter the global AI market[4]. The Croatian government announced that the drafting of the national AI strategy would start in 2025. Therefore, creators of national policy should acknowledge the potential of AI-developing firms in Croatia and align the policy measures accordingly.

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