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**"DID I DO THAT? WHAT HAPPENS IF AN ARTIFICIAL
INTELLIGENCE WRITES MY FINAL DISSERTATION"**

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Abstract

L'obiettivo della ricerca è indagare sul ruolo attuale di un'Intelligenza Artificiale e valutare se essa sia uno strumento efficace per aiutare le persone nel loro lavoro e, quindi, un'opportunità da sfruttare; oppure se rappresenti un valido sostituto e, quindi, una minaccia da temere. Inizialmente, verrà condotta un'analisi per individuare i settori maggiormente influenzati dall'Intelligenza Artificiale, al fine di comprendere quali settori potrebbero essere a rischio più elevato di sostituzione. Successivamente, si cercherà di valutare la reale minaccia rappresentata dall'Intelligenza Artificiale per questi posti di lavoro, nonché la natura stessa di tali lavori. Una volta determinata la natura di tali occupazioni, verrà fatta una richiesta a ChatGPT, poiché questo strumento è ampiamente disponibile e rappresenta esattamente ciò che le persone stanno iniziando a temere, al fine di testare l'entità della minaccia posta dall'Intelligenza Artificiale.

The aim of the research is to investigate the current role of an expert-system and assess whether it is an effective tool to help people with their work and, thus, an opportunity to exploit; or a valuable substitute for it and, thus, a valid threat. Firstly, an analysis will be conducted to identify the sectors most influenced by AI, thereby understanding which sectors might be at the highest risk of substitution. Afterward, an attempt will be made to assess the real threat posed by AI to these jobs, as well as the nature of these jobs. Once the nature of these jobs has been determined, a request will be made to ChatGPT, since this tool is widely available and represents exactly what people are starting to fear, to test the extent of the threat posed by Artificial Intelligence.

Introduction

Artificial Intelligence is a developing disruptive innovation since it has the potential to change how people carry out their work. As reported in Fortune Business Insights (Artificial Intelligence [AI] Market Size, Share & Forecast, 2030, 2023), the global Artificial Intelligence market size was valued at \$428 billion in 2022 and is projected to grow to \$2025 billion by 2030. Many important firms are seeking to incorporate Artificial Intelligence in their services to improve them and become leaders in their sector. Examples include Microsoft with a \$13 billion investment in OpenAI (Nelson, 2019) and Google with a \$300 million investment in Anthropic (Wodecki, 2023). Furthermore, Venture capitalists invested almost five times as much into Generative AI firms in the first half of 2023 as during the same period last year (Cooban, 2023).

The increasing investment of major firms in Artificial Intelligence is resulting in a wave of sophisticated tools that attempts to mimic human capabilities and generate worry among workers. A current example of the spreading fear is represented by the recent strike led by screenwriters and actors, who feel extremely threatened by Artificial Intelligence because it may be used to write screenplays and could substitute human actors with images to create characters without involving any humans.

The importance of this developing innovation cannot be neglected; therefore, it could be interesting to better understand its benefits and limitations throughout this research and get an impression of how impactful it could be for people's work. The world has just entered its Artificial Intelligence era and several possible scenarios may emerge regarding potential changes in the labour market. Such scenarios involve a range of possibilities that could shape the landscape of employment and work dynamics. Some jobs may become obsolete while new positions may emerge, leading to a substantial change in the composition of the workforce, which will probably be more specialised and linked to such technology.

The discussion deploys the final dissertation of a graduate student as a pretext to assess whether an Artificial Intelligence (AI) can effectively replace a person's creative work. The aim is to investigate the current role of an expert-system and assess whether it is an effective tool to help people with their work and, thus, an opportunity to exploit; or a valuable substitute for it and, thus, a valid threat.

Firstly, an analysis will be conducted to identify the sectors most influenced by AI, thereby understanding which sectors might be at the highest risk of substitution. Indeed, AI can perform several tasks usually performed by humans in different areas and can be considered a threat when such tasks and activities are performed so well that Artificial Intelligence could displace

human jobs. Afterwards, an attempt will be made to assess the current entity of the threat posed by AI to these jobs, as well as the nature of these jobs. Once the nature of these jobs has been determined, a request will be made to ChatGPT, since this tool is widely available and represents exactly what people are starting to fear. The aim is to test to which extent Artificial Intelligence is a threat nowadays, assessing if the tool in question is completely autonomous, and thus it is a tangible danger for human jobs; or if it requires a human component to perform well, and, thus, it can be used to complement human jobs, not to substitute them.

Chapter 1: an Overview of the Artificial Intelligence

1.1 Definition of Artificial Intelligence

Artificial Intelligence is a branch of computer science that deals with the creation of machines capable of emulating the abilities of human intelligence through the development of algorithms that enable them to exhibit intelligent activity. The purpose of such innovation is to analyse and manage huge amounts of data, that would require years for a human to interpret and summarise. Intelligence encompasses the ability to acquire, comprehend, and apply knowledge and the capacity to exercise critical thinking and reasoning. According to A. Newell (1994), intelligence may be Natural (biological) or Non-Natural (Mechanical). Humans gather intelligence through their sensory perception (biological intelligence), whereas machines collect intelligence by emulating natural processes (mechanical intelligence). In relation to the concept of mechanical intelligence, AI is linked to the pursuit of “reducing all sciences to fundamental principles, to primary elements represented by numbers and symbols, which, arranged in [a properly manner], would give rise to the typical reasoning for solving problems” (Somalvico, Amigoni, & Schiaffonati).

Throughout history, different definitions for Artificial Intelligence have been given, but the debate is still ongoing. The first person who coined the term was John McCarty, who in 1956 quoted: “Artificial Intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs” (McCarthy, 2007). This early definition considers intelligence at a mechanical level, which involves the design, development, and implementation of systems that can perform tasks typically associated with human intelligence. The discipline was founded based on the claim that intelligence can be outlined so well that it may be imitated by a machine.

Later, AI textbooks describe the field of Artificial Intelligence as “the study and design of intelligent agents” (Poole, Mackworth, & Goebel, 1998), in which intelligent agent refers to a system that senses its environment and acts to maximise its utility. Dimiter Dobrev (2005), in his paper “A Definition of Artificial Intelligence”, gives an interesting definition of Artificial Intelligence that can give a contribution to realising the limits of this technology. He begins his discussion by making three assumptions. The first assumption states that every calculating device can be shaped by a program; the second assumption is that AI is a step device, which means that on every step it inputs information from outside and outputs a portion of information. The last assumption is that AI is immersed in a certain environment which influences the system with a portion of information on every step and which receives the output of the AI. This environment can be both natural and artificial. The statement made by Dobrev is the following:

“AI will be such a program which, in an arbitrary world, will cope not worse than a human” (Dobrev, 2005, p. 68). Such definition helps introducing the limitations of Artificial Intelligence that will be discussed in the following paragraph, and provides a point for reflection that is entirely aligned with the theme of this discussion: how is AI perceived in present days?

1.2 Current Limitations and Status of the Artificial Intelligence

The major limitation of Artificial Intelligence seems to be the fact that it is not endowed with creativity. As indicated in Braga and Logan’s article (2017), the process of human thinking is an emergent, non-reductionist phenomenon, it can be both simultaneous and sequential, based on the context and the type of mental activity in the process. On the other hand, computers work using a reductionist program of symbolic linear and sequential manipulations. The authors state: “Computers operate as closed systems, no matter how large the databases can be” (Braga & Logan, 2017, p. 9), meaning that the only source from which the AI can draw to formulate its responses is the dataset upon which it is trained. Indeed, the AI cannot think abstractly, it can only learn what is arranged in the programming. This means that if the environment in which it operates changes its attributes, the expert-system will struggle to adapt to these altered circumstances. For instance, an AI tool developed to process images may find itself in difficulty when such images have few pixels and may not be able to recognise them since it cannot see a bigger picture and put the pieces together. It is limited by the quality of the data that it receives. Another limitation of the Artificial Intelligence, although analogous to a human’s limitation, is represented by biases. They can be of various natures, such as human error, sampling bias, and social and historical factors. Every dataset intending to capture human behaviour incorporates an ideology that can potentially be absorbed by an AI system. Indeed, as suggested by Nelson (Nelson, 2019): “bias is a reflection of the data algorithm authors choose to use, as well as their data blending methods, model construction practices, and how results are applied and interpreted”. The accuracy and objectivity of the Artificial Intelligence depend on the accuracy and objectivity of the data incorporated in the system.

Furthermore, any malfunction can lead to the AI producing wrong suggestions and solutions to users’ questions (Borana, 2016).

Despite its several constraints, Artificial Intelligence is a crucial matter in recent times. According to Precedence Research, the AI market size was estimated at \$120 billion in 2022, and it is expected to hit \$1600 billion by 2030, with a registered Compounded Average Growth Rate (CAGR) of 38% from 2022 to 2030 (Artificial Intelligence (AI) Market - Global Industry Analysis, Size, Share, Growth, Trends, Regional Outlook and Forecast 2022-2030, 2023). As mentioned in the introductory section, companies are investing in this innovation to integrate it

into their current products or services. To mention a few, both Google and Microsoft are trying to leverage Artificial Intelligence to improve the experience of their customers. Microsoft has recently announced its partnership with OpenAI, investing around \$13 billion in January 2023 (Novet, 2023). Its aim is to include Artificial Intelligence in its search engine “Bing” to strengthen its competition with Google and outclass it. On the other side, Google has invested around \$300 million in Anthropic to quell Microsoft’s rivalry. In addition to them, Adobe has also invested in Artificial Intelligence as part of its strategy. Indeed, the company has revealed its new “Firefly” suite, set to integrate into existing Adobe products like Photoshop and Illustrator (Adobe Announces Generative AI "Firefly" Program and Wall Street Flocks Like a Moth to a Flame, 2023).

1.3 Typologies of Artificial Intelligence and Overview of ChatGPT

There are several typologies of Artificial Intelligence, characterised by ongoing discoveries and development. As suggested in Betz and Whitfield’s article, the classification of AI reveals a storyline, rather than a taxonomy (Betz, 2023). A prior division should be made between capability-based AI and functionality-based AI. The types of Artificial Intelligence that fall into the first category are sorted based on how they learn and how far they can apply their knowledge. We can distinguish three types of AI belonging to this class:

1. Artificial Narrow Intelligence (ANI). This type of intelligence cannot learn skills beyond its design, it is limited to a range of tasks. Examples of ANI technologies include Natural Language Processing (NLP), image recognition software, and self-driving cars.
2. Artificial General Intelligence (AGI). It refers to an intelligence capable of effectively carrying out any cognitive task achievable by a human, encompassing learning, planning, making decisions under uncertainty, engaging in humour and being misleading and manipulative.
3. Artificial Superintelligence. This term refers to a machine that can overcome the cognitive performance of humans in all domains (Bostrom, 2014).

For what concerns the second category previously mentioned, AI can be sorted by four functionality types:

1. Reactive machine. It represents the first type of AI that was developed. Reactive machines can perform instant tasks but cannot store memory or learn from previous experiences. The only activity they can perform concerns responding to external stimuli in real-time.

2. Limited memory AI. This type of AI can store past data and exploit them to make predictions. Its knowledge is limited but it is deployed by the machine to improve over time.
3. Theory of mind. This next stage of AI can interact with human thoughts and emotions since it will be able to discern these kinds of feelings and understand that human beings have a mind, which may be conditioned by several factors (Davies, s.d.).
4. Self-aware. This type of Artificial Intelligence is beyond the theory of mind AI. It refers to a system that develops self-awareness.

Among all types of Artificial Intelligence mentioned above, technological progress has reached the first type of capability-based AI, precisely Artificial Narrow Intelligence and the second type of functionality-based AI, which is Limited Memory AI.

ChatGPT (Generative Pre-trained Transformer) is an ideal example of this technology. It is a chatbot that uses Natural Language Processing and Deep Learning to understand and elaborate human language, and generate answers that are consistent with users' questions, create images and videos. ChatGPT has various functions, such as multilingual machine translation, code debugging, story writing, admitting mistakes and rejecting inappropriate requests. Furthermore, users can input texts and visual images that will be processed by the chatbot (Wu, et al., 2023). Despite the wide range of functions that it can perform, ChatGPT is still considered a form of ANI since it cannot perform tasks outside of its domain or understand certain nuances that humans are able to grasp. Furthermore, it has a vast, but still limited, storage capability that makes the technology fall under the category of a Limited Memory AI.

1.4 Artificial Intelligence Technologies

Artificial Intelligence typologies can be further classified based on the technology deployed to process information. There are 4 AI technologies:

1. Machine Learning: it is a branch of AI that mimics human learning using data and algorithms. It is based on the idea that systems can learn from data, identify patterns, and make decisions with minimal human intervention (Five AI Technologies That you Need to Know, s.d.). This technology leverages structured, labelled data to make predictions.
2. Deep Learning: it is a subfield of machine learning concerned with algorithms inspired by the structure and function of the human brain; these algorithms are called artificial neural networks (Brownlee, 2019). The neural networks attempt to simulate the behaviour of the human brain, allowing computers to learn from large amounts of data. These data can be unstructured data, like text and images.

3. Natural Language Processing: it is a branch of AI concerned with giving computers the ability to understand text and spoken words in the way human beings can. It combines computational linguistics with statistical, machine learning, and deep learning models. It allows computers to fully comprehend the meaning of human language, going beyond the meaning of single words (What is Natural Language Processing, s.d.)
4. Computer Vision: it is a branch of AI that allows computers to get information from images, videos, and other visual inputs, and enables such computers to make decisions based on this information (What is Computer Vision?, s.d.).

These 4 technologies are often combined together to create more and more sophisticated tools that may outperform human skills.

Chapter 2: Impact of the Artificial Intelligence on the Labour Market

In recent times, technological advancement has made big steps towards AI direction. Different tools became available that combined different technologies, and people started to worry about the impact that this innovation could have on employment. This discussion will address a question that bothers lots of people: is Artificial Intelligence an opportunity to exploit or a threat to fear?

2.1 Brief History of Automation and Luddism

Exploring traces of historical phenomena that we find mirrored in our present constitutes a meaningful activity since people tend to feel frightened or disoriented in the face of processes that it believes to have never experienced in history, while these processes have been present for a long time or have been repeated throughout events. Having a historical perspective allows people to maintain a clearer and better-informed view of the world and teaches that the challenges of the present and future often have roots in the past (Giardinetti, 2022). A phenomenon that may show a kind of analogy with contemporary developments in Artificial Intelligence is the First Industrial Revolution and the phenomenon of Luddism.

During the XVIII century in Britain, the First Industrial Revolution started and completely changed society and lifestyles, marking a turning point from an agriculture-based economy to an economy based on production through machines.

Due to the increasing population, there was a rise in demand for consumer goods, and, in order to meet this growing demand, it became necessary to develop new tools that could accelerate production, through automation and new technologies. New spinning machines were introduced, but the most significant invention was the introduction of the steam engine, which converted thermal energy into mechanical power. It was fuelled by coal and enabled to deploy much more energy compared to the past, leading to an exponential increase in industrial production.

The steam engine found application in mines, foundries, and textile industries, giving rise to the first modern factories: large buildings where a considerable number of workers laboured alongside machines.

This range of innovations had a significant impact on the conditions of the working class: in factories, there were non-specialised workers performing simple and repetitive tasks, in poor conditions and unhealthy environments. Furthermore, they were forced to work for many hours

per day, due to the lack of regulations that safeguarded workers' exploitation and working conditions.

The introduction of automated machines brought significant changes in labour and in the economy, and workers feared that machines could substitute human jobs, leaving them without occupancy and livelihood. This concern, together with the bad work environment gave rise to a general dissatisfaction that led to protest movements against the new system.

2.1.1 Luddism and Analogy With Current Fear Towards AI

Luddism is a movement that arose as a sign of protest against the utilisation of machines. In fact, British workers feared that the diffusion of new technologies could lead to a total replacement of manual labour with mechanic labour, and, thus, to a decrease in salaries and to the loss of millions of workplaces. Luddites were skilled English labourers, mostly textile workers, who organised into secret bands and systematically smashed the kinds of machinery they saw as unfair to their craft and trade (Jones, 2006). The injustice they emphasized revolved around the fact that automation was no longer perceived as a means to increase productivity but rather as a threat to employment. However, the transformations witnessed during the transition from agricultural to industrial economies did not result in widespread unemployment but instead resulted in the emergence of previously unforeseen job opportunities. Therefore, despite the initial challenges pertaining to working conditions and the dehumanisation of workers subjected to monotonous tasks, the First Industrial Revolution ultimately proved to be beneficial for the overall economy. The changes brought by this revolution boosted productivity by leveraging automated technologies and spurred urbanisation as an increasing number of individuals migrated from rural regions to urban centres in proximity to expanding industries. As a result, it laid the groundwork for the contemporary world as we recognise it today.

One can observe an analogy between the fear of the Luddites and the contemporary fear towards AI tools. In fact, the rise of AI technologies has arisen concerns about the potential consequences for employment and job security. Many apprehensions developed regarding the potential replacement of human workers in various industries by AI-powered systems. This concern recalls the anxieties experienced by workers in the XVIII century, as Artificial Intelligence is increasingly perceived as a threat since it has the potential to replace numerous jobs currently performed by humans. The escalating fear surrounding AI is fuelled by its rapid advancements and the vast array of areas in which it can be applied. The worries that permeated during the First Industrial Revolution were partially unjustified. In fact, the advent of machines enabled the creation of new jobs, boosted productivity and economic growth and lead to the introduction of laws to regulate working conditions and enhance worker safety. There are some

differences from the concerns that arose after the rapid evolution and dissemination of Artificial Intelligence. Indeed, the latter is perceived as a tool that not only automates certain processes but also threatens certain jobs involving a human element that, prior to its emergence, was inconceivable to be replaced by some form of technology. Undoubtedly, Artificial Intelligence will create new job opportunities, as machines did during the First Industrial Revolution. However, it is also true that the spectrum of activities threatened by this technology is much broader, thereby intensifying the threat.

2.2 Industries Most Affected by Artificial Intelligence

Artificial Intelligence permeates across various industries, manifesting through different tools for different purposes. Some of the most common applications are the followings:

- Automation: AI can easily perform repetitive tasks, improving efficiency and productivity;
- Data analysis and Insights: AI can analyse vast amounts of data, find patterns and provide significant insights for making informed decisions;
- Predictive analysis: Generative AI tools utilise historical data to make predictions and forecasts, to plan and optimise resources;
- Personalisation: thanks to AI, personalised experience is enabled, and content based on the user's preferences is delivered to the right target, enhancing customer satisfactions and engagement;
- Natural Language Processing: such branch of AI is deployed to power chatbots, voice assistants, translation tools, and many other instruments;
- Optimisation and resource management: AI optimises resource allocation, allowing to save costs and improve efficiency;
- Decision support systems: thanks to AI's data analysis abilities, this technology can help making informed decisions by presenting alternative scenarios considering different factors;
- Process improvement: AI can identify bottlenecks and inefficiencies within business processes, thus improving the fluency of operations;
- Customer service and engagement: chatbots and virtual assistants can provide instant support that improves the customer experience;
- Quality control: AI systems automate quality control processes;
- Research and development: AI assists R&D activities, analysing data and helping simulation modelling;

- Marketing and advertising: Artificial Intelligence helps with the targeting process by analysing customer data, behaviour and trends and optimises marketing campaigns in general (Takyar, s.d.).

Artificial Intelligence is already present in countless sectors. The pervasiveness of AI is a symptom that such technology is about to change the current structures of the vast majority of companies. For this reason, it would be interesting to assess which are the most affected sectors and the impact of this technology on employment.

2.2.1 Distinction Between AI Automation and Generative AI

Although Artificial Intelligence is applied across various areas and sectors, it is crucial to underline a distinction between AI automation and Generative AI since each of these poses distinct threats to the job market in different sectors.

AI-driven automation combines the power of automation with Artificial Intelligence technologies, such as machine learning and deep learning, to achieve superior outcomes compared to traditional automation methods. These better results are achievable since AI can start, stop, or even alter what it is doing based on the environment in which it operates.

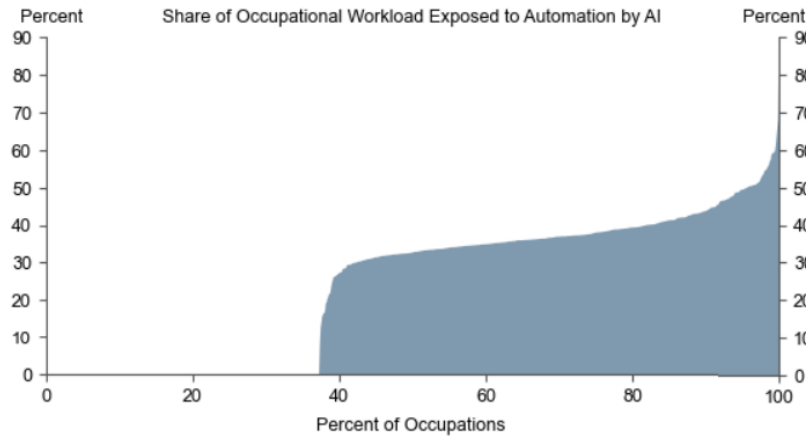
Generative AI is a type of AI technology that can produce various types of content, including text, imagery, audio, and synthetic data. It starts with a prompt, which can take the form of a text, an image, a video, a design, musical notes, or any input that the AI system can interpret and process. Various AI algorithms are then employed to return new content in response to the prompt (Lawton, s.d.). This type of Artificial Intelligence has strengthened the fear towards AI in general since it seems to threaten many jobs performed by humans that did not look susceptible to substitution until the introduction of the recent new tools. Those new tools greatly widen the range of sectors influenced by AI, including creative works.

2.2.2 Data Showing Industries Most Affected by AI

According to research by Goldman Sachs, approximately two-thirds of current jobs are exposed to some degree of AI automation while Generative AI could substitute up to one-fourth of current work (Hatzius, Briggs, Kodnani, & Pierdomenico, 2023).

In the research the share of each occupation's total workload that can be potentially replaced by AI was estimated, leading to the distribution shown in Figure 1.

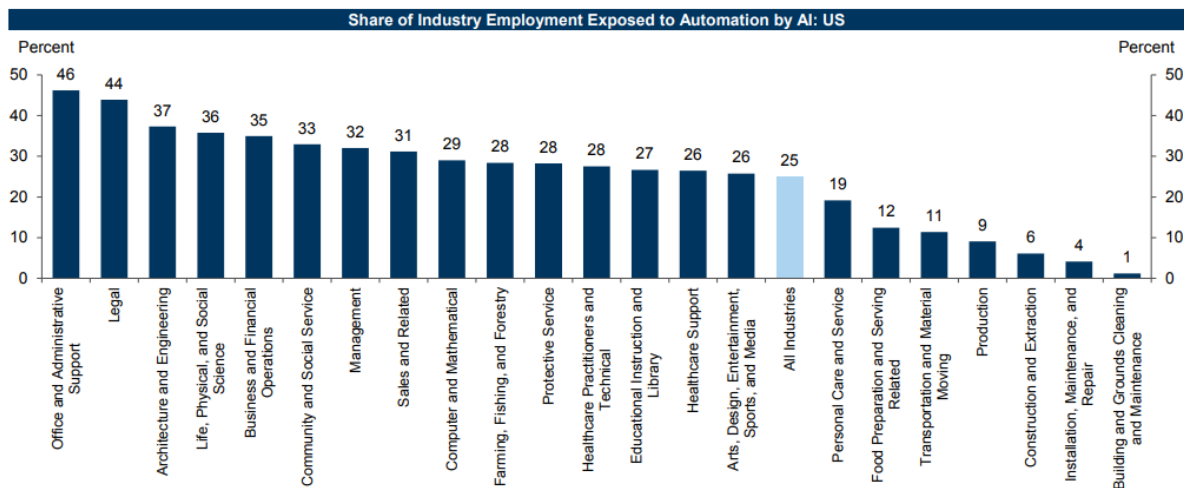
Figure 1: Two-Thirds of Current Occupations Could be Partially Automated by AI



Source: Hatzius, J., Briggs, J., Kodnani, D., & Pierdomenico, G. (2023). *Global Economics Analyst - The Potentially Large Effects of Artificial Intelligence on Economic Growth*. p.6. Goldman Sachs.

From this distribution, it can be noticed that two-thirds of US occupations are exposed to some degree of automation by AI, and of those occupations which are exposed, most have a significant, but still partial, share of their workload (25-50%) that can be replaced (Hatzius, Briggs, Kodnani, & Pierdomenico, 2023). Automation exposure was estimated for more than 900 jobs using the O*NET occupational database. The O*NET database is the US’s primary source of occupational information. It contains a rich set of variables that describe works and workers characteristics and it is continually updated by surveying a broad range of workers from each occupation. These exposure estimates were then weighted by the employment share of each occupation and aggregated to the industry level.

Figure 2: One-Fourth of Current Work Tasks Could Be Automated by AI in the US



Source: Hatzius, J., Briggs, J., Kodnani, D., & Pierdomenico, G. (2023). *Global Economics Analyst - The Potentially Large Effects of Artificial Intelligence on Economic Growth*. p.7. Goldman Sachs.

As shown in Figure 2, the employment most exposed to AI automation concerns office and administrative support (46%); legal occupations (44%); architecture and engineering (37%); life, physical and social science (36%); business and financial operations (35%); community

and social services (33%); management (32%); sales and related activities (31%); computer and mathematical occupations (29%); and farming, fishing, and forestry (28%). In regard to the industries ranked in the top and bottom positions, most common tasks like scheduling meetings, writing reports, and data input are likely to be fully automated in the future, while industries that rely on manual labour or outdoor activities, such as maintenance activities, building and cleaning, will probably not experience much impact from AI. For what concerns the second highest industry, the legal one, AI is expected to automate legal processes like contract analysis and could be used to anticipate court case outcomes. Artificial Intelligence can analyse vast amounts of legal texts, case law, and precedents, providing valuable insights and speeding up the research process (Takyar, s.d.). Regarding the analysis of case law and precedents, however, the utilisation of AI tools like ChatGPT can become ambiguous in a common law judicial system like that of the United States. In fact, in such systems judicial interpretation plays a crucial role in defining and applying the law and letting an AI's interpretation of a legal precedent influence the modern application of the law can be hazardous but also a precious opportunity, since this tool may be used to significantly reduce the time spent in consulting archives to find potential legal precedents. AI can also create and generate legal documents, contributing to reduction of errors and time saving. For such activities Generative AI is deployed, together with technologies such as Natural Language Processing that enable the Artificial Intelligence to deliver an output easily comprehensible and suited to human language. It is interesting to observe that the Arts, Design, and Media industries, as well as Management, which require creative and personal components, hold a position that exceeds the mean of 25% of automation, and could potentially be partially substituted by Artificial Intelligence in the near future. This insight is justified by the fact that new tools, such as the aforementioned Adobe "Firefly" suite, assist human work and sometimes automate the generation of content that was previously thought, projected, and generated step by step by humans.

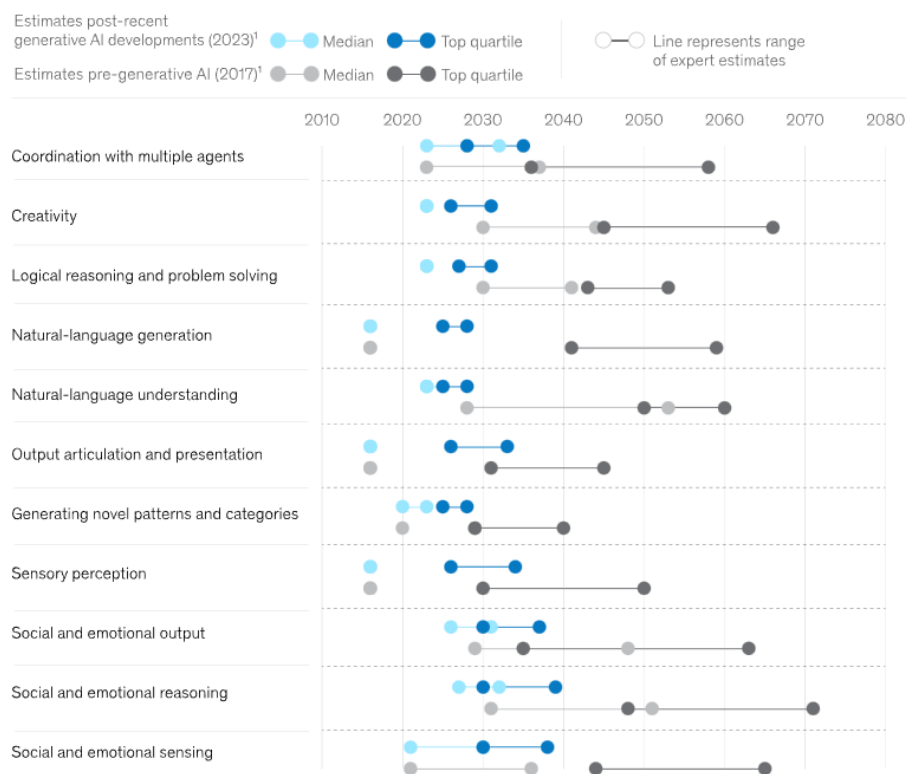
It is important to point out the fact that this number highlights the percentage of tasks that are likely to be automated thanks to Artificial Intelligence tools and that none of these jobs is predicted to be fully substituted by this technology.

Indeed, this significant portion of employment exposed to automation through generative AI increases the potential for a surge in labour productivity that could significantly boost global output.

2.3 Recurring Patterns in History: Productivity Gains and Employment Growth

The potential surge in labour productivity is further supported by the quality of the activities performed by Artificial Intelligence, which has improved significantly after recent development in Generative AI. Researchers from McKinsey state that technology performance is now forecasted to match median human performance and reach top-quartile human performance earlier than what was previously estimated in 2017 across a wide range of capabilities (Chui, et al., 2023), as shown in Figure 3, thus contributing even better to productivity gains.

Figure 3: Technical Capabilities, Level of Human Performance Achievable by Technology



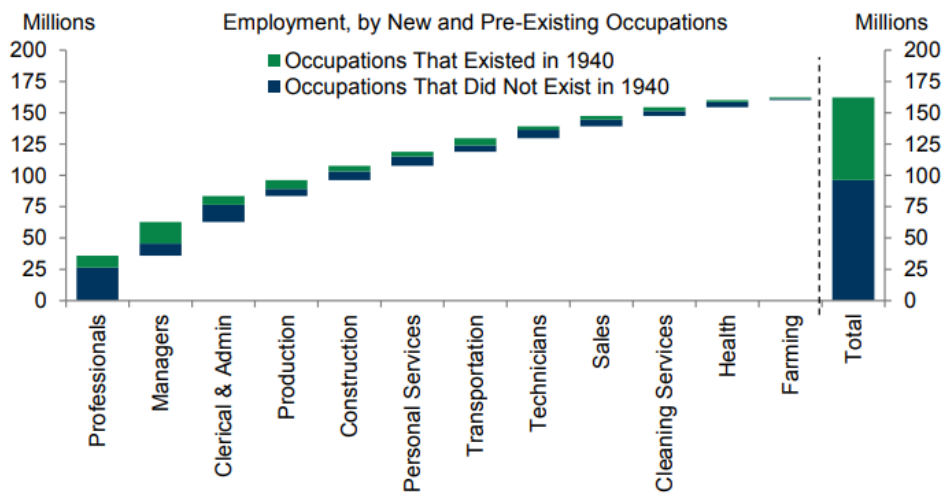
Source: Chui, M., Hazan, E., Roberts, R., Singla, A., Smaje, K., Sukharevsky, A., . . . Zimmel, R. (2023). *The Economic Potential of Generative AI: The Next Productivity Frontier*. McKinsey.

The projections concerning productivity gains enabled by AI are estimated to be around 0.1 to 0.6 percent annually through 2040, depending on the rate of technology adoption and on how worker time will be used in other activities. In addition, if Generative AI is combined with other technologies, work automation could add 0.2 to 3.3 percentage points annually to productivity growth (Chui, et al., 2023). Naturally, the deployment of these technologies should be complemented with workers re-skilling programs and changes in occupations.

Recalling the First Industrial Revolution, the displacement of workers due to automation has consistently been balanced by the generation of new employment opportunities. Furthermore, most of the long-term employment growth is attributed to the rise of new occupations stemming

from technological advancements. In a recent study, the economist David Autor found that 60% of workers are currently employed in occupations that did not exist in 1940, entailing that over 85% of employment growth over the last 80 years is explained by the technology-driven creation of new positions (Autor, Chin, Salomons, & Seegmiller, 2022). Such discovering is reported in Figure 4.

Figure 4: Employment, by New and Pre-Existing Occupations



Source: Autor, D., Chin, C., Salomons, A. M., & Seegmiller, B. (2022, August). *New Frontiers: The Origins and Content of New Work, 1940-2018*. p.12. Cambridge, Massachusetts

Technological advancements allow lessening manual work, leading to faster processes less subjected to human errors. Furthermore, they simplify operations unlocking precious time and resources that can be deployed for other activities. Technology also provides numerous tools that allow access to a greater amount of information. As Xerox created an interface that enabled humans to interact intuitively with a computer, emerging technologies offer instruments that enhance human-machine communication, allowing individuals to analyse and manage vast amounts of information more easily and quickly. The increased availability and comprehensibility of information allow for more informed decision-making and, consequently, the optimisation of strategies.

As reported in Healy and Riain’s book (2018), Artificial Intelligence can affect employment in two main ways:

- Firstly, it can directly replace jobs, resulting in displacement;
- Secondly, it can stimulate labour demand in emerging industries or job roles that arise as a result of technological progress, leading to enhanced productivity .

A report by World Economic Forum predicts that by 2025 85 million jobs may be displaced due to a shift in the division of labour between humans and new technologies, while 97 million new roles may emerge that are more adapted to the new division of labour emerged between

humans, machines, and algorithms (Schwab & Zahidi, 2020). Furthermore, the roles that could emerge are predicted to be superior to the existing one. Indeed, together with the improvement in product or service quality, the transition will be accompanied by improved job quality, worker well-being and job satisfaction since AI has the potential to eliminate dangerous or tedious tasks and create more complex and interesting ones instead (OECD Employment Outlook 2023: Artificial Intelligence and the Labour Market, 2023). This technology can increase engagement at work, give more autonomy to workers, and even improve their mental health.

Such predictions reassure the population about which of the two effects may govern the AI era and let trust the expectation that such innovation could be a useful tool to reach more accuracy, speed, and effectiveness in business processing, thus enhancing productivity and allowing firms to grow and create new job opportunities that stimulate labour demand. This assumption is aligned with what happened in past revolutions, indeed the regular pattern is that, in the short run, the displacement effect may dominate; while in the longer run, the productivity effect may prevail and have a positive impact on employment.

Unfortunately, this optimistic approach is not the only one adopted. Researchers from McKinsey Global Institute predicted that the disruption of society caused by Artificial Intelligence is happening 10 times faster and 300 times the scale of the industrial revolution of the 19th century and is having 3000 times the impact (Chui, et al., 2023), involving the possibility that the productivity effect may not counterbalance the displacement effect. Furthermore, the benefits carried by Artificial Intelligence must come to terms with its drawbacks and risks. In fact, adopting such technology comes with significant implementation costs that represent a barrier to firms trying to finalise this transition. OECD surveyed about the use of AI in 2022, and the cost was pointed as the biggest barrier to AI adoption by more than half of the finance and manufacturing firms questioned (OECD Employment Outlook 2023: Artificial Intelligence and the Labour Market, 2023). Moreover, despite many studies asserting that AI will improve job quality, there are also reports that AI can heighten work intensity and increase stress. The workers that showed greater enjoyment were those who develop or maintain AI, together with those who are using AI. Workers directly using AI or those who are subjected to algorithmic management were the least likely to report greater enjoyment after the introduction of the technology (OECD Employment Outlook 2023: Artificial Intelligence and the Labour Market, 2023). Using Artificial Intelligence may also decrease human contact, which necessarily harms job quality and mental health. Indeed, this methodology can lead to isolation feeling among workers and people's selfish behaviour, harming employees' wellbeing, and productivity.

Chapter 3: Artificial Intelligence Performing the Job

3.1 One Question to Assess the Artificial Intelligence Status at the Time of the Analysis

In the previous chapter, data showing the industries most affected by Artificial Intelligence have been reported. The tasks performed in those sectors are likely to be largely substituted by some form of Artificial Intelligence, ranging from technologies that help with back-office activities and automate the schedule of appointments to more sophisticated technologies that try to mimic human language and intelligence and contribute by generating entire texts, ideas, or multimedia content. The second sector in terms of risk of substitution is the legal one, indeed AI can perform several tasks that may substitute human work within this industry. Recalling what was previously mentioned in Chapter 2, AI tools like ChatGPT can be deployed to draft contracts or skeletons of judgment (Gentile, 2023). In order to have an inkling of the current state of Artificial Intelligence and test if it can actually substitute human work completely, the legal sector with one of its daily tasks will be taken into consideration, since the threat posed by AI in this sector is similar to the threat posed in different industries where the tasks performed require not only the application of something schematic but also a personal component, capable of evaluating one's own work and give a personal contribute. For instance, drafting a contract requires the formulation of terms, conditions and dispositions that mirror the intentions of both the parties involved and demands a certain ability to write and effectively express such terms and conditions. Furthermore, it may be necessary to employ creativity to find personalised solutions, to adapt the parts of the contract to the specific needs of the parties involved and to effectively use dialectic to influence people. Testing Artificial Intelligence within the legal sector aligns with the purpose of this research to see to which extent AI can substitute human work and, thus, be considered a threat; or is an effective tool to support human activities and, thus, can be considered an opportunity to exploit.

ChatGPT is going to be tested as it is the form of Artificial Intelligence currently on everyone's lips and it is predicted to be deployed for the drafting of contracts. Therefore, the AI was asked to draft a lease agreement for the commercial use of a partially furnished building, with the condition to return such furniture at the end of the lease. The request made to ChatGPT, and its subsequent answer are exhibited Appendix A.

3.1.2 Considerations on the Thoroughness of the Answer

The answer provided by ChatGPT comprehends some, but not all, of the sections typically found in a lease agreement for commercial use. The sections at issue are fundamental to guarantee a clear and comprehensive elucidation of the rights and obligations of both parties

involved, namely the lessor and the lessee, thereby enabling their protection and a correct application of the law. For this reason, the contract generated by the Artificial Intelligence can be used as a starting point that a lawyer or an accountant can adjust depending on the parties' needs. Indeed, in ChatGPT's answer the following matters are not discussed:

- A section dedicated to the cadastral data of the property is not present. This omission suggests that the AI might not have considered that the property in question is located in Italy, since in such country it is advisable and wiser to choose to incorporate cadastral data in a lease agreement because they are essential to correctly identify the property. For instance, if the commercial space is located in a large building, hosting different offices or properties, not having the cadastral data would be confusing because it would be really hard to understand to which of the several spaces the agreement refers. Furthermore, such data may be requested for tax returns or for several administrative purposes. They may also indicate if there are legal constraints on the property, such as mortgages, which may influence the lease. In summary, the inclusion of cadastral data in a private agreement guarantees the legality, transparency, and clearance in the transaction, and facilitates the evaluation, the management, and the administration of the property.
- Another missing branch of the agreement is represented by the allocation of additional charges. Additional charges include those charges that should be paid by either the Landlord or the Tenant, such as the stamp duty, the registration fee and maintenance. Although it is not mandatory, it is important to distinguish between ordinary maintenance and extraordinary maintenance. Defining who is responsible for ordinary and extraordinary maintenance is essential to guarantee clearness, to prevent disputes and ambiguities, and to clearly define the responsibilities of both parties involved. In fact, one of the main causes of contractual disputes involves unaligned expectations. Furthermore, if both parties are aware of their respective duties, this can lead to a smoother functioning of the contractual subject and increase the long-term trustworthiness.
- The right of withdrawal is not even mentioned in the draft of the contract. It is important to mention this right and the causes that legitimise it in order to improve the clearness and effectiveness of the contract. The causes of withdrawal can be based on several circumstances, such as financial problems, changes in personal or employment status, and many others. The presence of withdrawal clauses allows parties to protect their interests and to have a way out in the case unexpected events occur.

- It is considered wiser to include a section dedicated to the conclusion of an insurance. It is important to make clear in the contract that one of the duties of the Tenant is the conclusion of an insurance policy for the leased premises because this condition guarantees the payment of damaged equipment or other burdens in case the magnitude of the damage is excessive for the business to be managed.
- In the agreement, the parties should distinctly define the liability for any direct or indirect damages of whatsoever kind that may affect oneself or third parties and include a sentence stating that the rules of good neighbourliness must be respected. Those elements are essential to establish a framework of responsible and respectful behaviour.

All those missing sections are optional, but still important to avoid controversies and legally protect the parties involved. The Artificial Intelligence was not able to seize the relevance of drafting an exhaustive contract in terms of attention towards the protection of those involved and, thus, of the details to be included.

3.2 Artificial Intelligence is Guided Through the Drafting of a Lease Agreement

In the previous section, the Artificial Intelligence was asked to draft a lease agreement for commercial use with very limited information. Now, ChatGPT will be guided through the creation of the aforementioned contract, with the aim to test its accuracy and, even more so, its creative capabilities. The AI will be aware of several information that it did not previously own, starting with the number and the title of the sections to include, as follows:

1. Identification of the Property and Object of the Agreement
2. Duration of the Location, Withdrawal, and Renewal of the Agreement
3. Rental Fee
4. Additional Charges
5. Prohibition of Change of Use
6. Statement of Property Condition and Premises Handover
7. Maintenance
8. Prohibition of Contract Assignment and Subleasing
9. Direct and Indirect Damages Liability
10. Tenant's Diligence
11. Tenant's Responsibilities
12. Deposit
13. Express Termination

In Appendix B, the new input provided to ChatGPT, and its consequent answer are reported.

3.2.1 Considerations on the Thoroughness of the Answer

The aim of this trial was to assess how good ChatGPT is at substituting the job, typically performed by humans, of writing the sections of an agreement and fill them out, in order to check if the AI is able to employ cleverness and creativity to correctly represent the intention of both parties involved. The question was asked in a manner that required ChatGPT to employ reasoning and simple computing skills, but also required a certain ability to autonomously fill some fields.

To commence, ChatGPT did not create room for cadastral data, which should have been included in the 1st section, “Identification of the Property and Object of the Agreement”.

When reading the agreement, a mistake is particularly noticeable in the 2nd section. The Artificial Intelligence was asked to predict the monthly rent for the next five years, considering that in the first year the rent is 30,000 euros, and that after each renewal the rent increases by 4.5%. The computation provided by ChatGPT was the following:

- Year 1: 30,000 euros
- Year 2: 31,350 euros
- Year 3: 32,847.75 euros
- Year 4: 34,502.44 euros
- Year 5: 36,323.29 euros

However, if we calculate the 4.5% of the previous monthly rent for each year the results are as follows:

- Year 1: 30,000 euros
- Year 2: $(30,000 * 1.045) = 31,350$ euros
- Year 3: $(31,350 * 1.045) = 32,760.75$ euros
- Year 4: $(32,760.75 * 1.045) = 34,234.98$ euros
- Year 5: $(34,234.98 * 1.045) = 35,775.55$ euros

There is an apparent computational error in ChatGPT’s answer, probably due to the mixed nature of the input provided, which required both reading comprehension and calculations. After having noticed the error, the AI was put aware of its own mistake but was not able to correctly address the question, even after several attempts. The conversation with ChatGPT can be seen in Appendix B.

Furthermore, the Artificial Intelligence failed to place the information about the rental fee in the right place. Indeed, it was asked to create a specific section dedicated to that information, called “Rental Fee”, in which the AI wrote “Tenant agrees to pay the monthly rental fee of [Monthly Rent Amount] euros in advance on the [Due Date] of each month. The rental fee shall

be paid to the Landlord's designated bank account". ChatGPT located the details concerning the rental in section number 2, called "Duration of the Location, Withdrawal, and Renewal of the Agreement", in which it should have written the terms for the withdrawal and renewal and general information about the duration of the location, as suggested by the name of the section. In this section, however, the right of withdrawal is not even mentioned, despite the AI was asked to indicate at least two causes for the right of withdrawal.

As regards the 5th section, "Prohibition of Change of Use", no space has been left to specify the use of the commercial premises, instead, it has been generally stated that the premises are used for commercial purposes. This generality leaves the purpose of the activity ambiguous, thereby contributing to a lack of clarity.

For what concerns the 12th section, ChatGPT was asked to explicitly indicate the amount of the deposit, however, it only stated that the deposit is equivalent to 2.3% of the third year's monthly rent. Therefore, it is evident that the AI has only reported the words contained in the input provided, without undertaking any calculations to conclude that such amount equals 753.49 euros.

The agreement generated by ChatGPT certainly cannot be considered comprehensive and completed. On the contrary, there are several inaccuracies and errors, and many issues are lightly treated. Even if the information at the disposal of the AI were limited, it could have performed significantly better in terms of thoroughness of each section, instead of stating the bare minimum.

Conclusions

This thesis has explored the wide field of Artificial Intelligence, characterised by ongoing innovations and rapid diffusion. As reported in Chapter 1, many firms are investing in this technology and are planning to incorporate it in their services. This arm race towards Artificial Intelligence reinforces the fact that this technology is currently on everyone's lips, with its pros and cons, its benefits and limitations. In the first part of the dissertation, the limitations and the several typologies of Artificial Intelligence have been outlined, in order to gain a better perspective of such a complex and vast subject matter. Secondly, an analogy between the current anxieties towards AI and the fears developed during the XVIII century against automation and machines, that is Luddism, has been made. Both similarities and differences have emerged, pointing out an interesting perspective to reflect upon such matter. In fact, both periods of innovations were characterised by concerns regarding the consequences for employment but differed in some features. For what concerns Luddism, the fear towards innovations was circumscribed to the automation of tasks typically performed by humans, while, regarding Artificial Intelligence, this fear concerned also creative jobs and those that require a reasoning component. The fear of a massive job displacement and the revolution of economic dynamics are real challenges that require a meticulous reflexion and an analysis of the actual threat posed to the different sectors, in order to ease the concerns of the population. These concerns are the very reason behind the idea to write this thesis. Indeed, a thorough analysis of various data has been conducted to discern which occupational sectors are most susceptible to being replaced by Artificial Intelligences. What has emerged is that the sectors at higher risk of substitution are those associated with administrative and support activities, as well as the legal sector which is ranked in the second position. The tasks performed in the jobs pertaining to those sectors require both easily automatable skills and creativity and intuition, which are harder to emulate. In relation to this, an overview of how and to what extent the AI is rapidly learning to perform human tasks was provided, showing the rapid pace of evolution that Artificial Intelligence is holding.

After having assessed which are the sectors vulnerable to substitution, the legal area has been chosen to test the Artificial Intelligence status at the time of the analysis. Indeed, a request was made to ChatGPT to autonomously draft a commercial lease agreement, in order to assess its ability to perform a task that required an extra effort of reasoning and creativity. A second test that further exemplified such objective was conducted. In fact, ChatGPT was asked with the same request of drafting a lease contract, with the addition of certain information to assist it in outlining the key points to consider when drafting the agreement. However, those added details

were designed to challenge ChatGPT in different aspects, too. Indeed, the criticisms that could be raised to the AI after the first request were mostly of a general nature, pertaining to the omission of certain details and to the limited quantity of information and attention present in the contract. With regard to the second request, instead, several evident errors were present concerning both conceptual and technical matters. The Artificial Intelligence faced difficulties in performing basic calculations and was not able to correctly allocate information in the right sections of the agreement even though each part of the contract was clearly titled.

The outcome of this study reveals that, to the present day, an Artificial Intelligence like ChatGPT can be employed to automate numerous tasks conventionally carried out by humans and, thus, lightening the workload per person and speeding up processes. However, its outputs cannot be fully trusted, and a certain degree of supervision and manipulation of its work is required. The answers provided by ChatGPT were insufficiently exhaustive and held several errors covering different areas, such as basic mathematical calculations, reasoning and technical mistakes. Based on the data and the results obtained from the tests, the threats of a massive or complete job replacement by Artificial Intelligence appears to be distant from the current reality, in which such technology is a valuable ally for helping humans with their jobs, but cannot fully substitute them.

The rapid pace of diffusion and development of Artificial Intelligence technologies leaves several future scenarios open, without the certainty that the role of AI will remain the same as it is now.

Number of words: 8475

Appendix A

Question: "Draft a lease agreement for the commercial use of a partially furnished building with the condition that at the end of the lease such furniture will be returned. The building is located in Italy, as well as both parties. Make sure to include all fundamental parts of a lease contract. If you do not own all the information that should be filled in in the contract, just create the section and I will complete it."

ChatGPT

[Note: This is a template for a lease agreement for a partially furnished commercial building located in Italy. Please fill in the necessary information where indicated.]

COMMERCIAL LEASE AGREEMENT

This Commercial Lease Agreement ("Agreement") is entered into on this ___ day of _____, 20, (the "Effective Date") by and between:

Landlord: Name: [Landlord's Full Name] Address: [Landlord's Address] Tax ID/CF: [Landlord's Tax ID/CF]

Tenant: Name: [Tenant's Full Name] Address: [Tenant's Address] Tax ID/CF: [Tenant's Tax ID/CF]

Collectively referred to as the "Parties."

1. Premises:

The Landlord agrees to lease the following described premises (the "Premises") to the Tenant:

Address: [Address of the Premises]

2. Term:

The lease term shall commence on the _____ day of _____, 20, and shall continue for a period of _____ years (the "Initial Term"). The Tenant shall have the option to renew the lease for [number of years] additional terms, each of _____ years, by providing written notice to the Landlord at least [number] days prior to the expiration of the Initial Term or any subsequent term.

3. Rent:

The Tenant agrees to pay rent for the Premises as follows:

- Monthly Rent: € _____
- Payment Due Date: The _____ day of each month

Rent shall be paid in advance and shall be delivered to the Landlord at the address provided above or at such other place as the Landlord may designate in writing.

4. Security Deposit:

The Tenant shall provide a security deposit of € _____ (the "Deposit") to the Landlord upon the execution of this Agreement. The Deposit shall be held by the Landlord to secure the Tenant's obligations under this Agreement and shall be returned to the Tenant, less any deductions for damages or unpaid rent, within [number] days after the expiration of the lease term.

5. Use of Premises:

The Tenant shall use the Premises solely for the purpose of [describe the specific commercial use, e.g., retail, office, etc.].

6. Partial Furnishing:

The Premises are partially furnished as described in the attached Schedule A. The Tenant acknowledges receipt of the furnished items listed in Schedule A and agrees to return them in the same condition, normal wear and tear excepted, at the end of the lease term.

7. Maintenance and Repairs:

The Tenant shall be responsible for maintaining the Premises, including any furnished items, in good condition and repair throughout the lease term. The Tenant shall promptly notify the Landlord of any needed repairs or maintenance.

8. Alterations:

The Tenant shall not make any alterations, additions, or improvements to the Premises without the prior written consent of the Landlord.

9. Termination and Surrender:

Upon the expiration of the lease term, the Tenant shall surrender the Premises, including the furnished items, to the Landlord in the same condition as received, except for normal wear and tear.

10. Governing Law:

This Agreement shall be governed by and construed in accordance with the laws of Italy.

11. Entire Agreement:

This Agreement contains the entire understanding between the Parties and supersedes all prior agreements or understandings, whether oral or written.

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the Effective Date first above written.

Landlord:

[Landlord's Signature] [Landlord's Printed Name] [Date]

Tenant:

[Tenant's Signature] [Tenant's Printed Name] [Date]

SCHEDULE A - Partial Furnishing:

[List the furnished items included in the Premises]

This lease agreement is hereby accepted and agreed to by the Parties:

Landlord:

[Landlord's Signature] [Landlord's Printed Name] [Date]

Tenant:

[Tenant's Signature] [Tenant's Printed Name] [Date]

Appendix B

Question: “Draft a lease agreement for the commercial use of a partially furnished building with the condition that at the end of the lease such furniture will be returned. The building is located in Italy, as well as both parties. The sections to include in the agreement are the following: 1. Identification of the Property and Object of the Agreement 2. Duration of the Location, Withdrawal, and Renewal of the Agreement 3. Rental Fee 4. Additional Charges 5. Prohibition of Change of Use 6. Statement of Property Condition and Premises Handover 7. Maintenance 8. Prohibition of Contract Assignment and Subleasing 9. Direct and Indirect Damages Liability 10. Tenant’s Diligence 11. Tenant’s Responsibilities 12. Deposit 13. Express Termination Remember that this contract is for a property located in Italy, so make sure to follow the Italian civil rules. The Tenant may renew this lease for five successive one-year terms at a monthly rent of 30,000 euros. Every time the agreement is renovated, the monthly rent increases by 4.5%. Please clarify the monthly rent for the following 5 years. The renewal will be allowed only if the notice of such renewal is provided in writing no less than 120 days prior to the Termination Date or the expiration of any one-year renewal term. Choose at least 2 causes of withdrawal. The deposit amounts to 2.3% of the third year’s monthly rent. Please make explicit the amount of the deposit in euros. Based on the data included in the agreement, write the causes for express termination.”

ChatGPT

COMMERCIAL LEASE AGREEMENT

1. Identification of the Property and Object of the Agreement

This Commercial Lease Agreement (the "Agreement") is entered into on [Date] between:

Landlord: [Landlord's Name], [Landlord's Address] Tenant: [Tenant's Name], [Tenant's Address]

The parties hereby agree to lease the following described property (the "Property") located at [Property Address] for commercial use. The Property is partially furnished with the furniture listed in Exhibit A.

2. Duration of the Location, Withdrawal, and Renewal of the Agreement

The initial term of this lease shall be [Start Date] to [Termination Date]. The Tenant may renew this lease for five successive one-year terms at a monthly rent of 30,000 euros. Every time the agreement is renewed, the monthly rent shall increase by 4.5%. The monthly rent for the next five years shall be as follows:

- Year 1: 30,000 euros

- Year 2: 31,350 euros
- Year 3: 32,847.75 euros
- Year 4: 34,502.44 euros
- Year 5: 36,323.29 euros

Renewal will be allowed only if the notice of such renewal is provided in writing no less than 120 days prior to the Termination Date or the expiration of any one-year renewal term.

3. Rental Fee

Tenant agrees to pay the monthly rental fee of [Monthly Rent Amount] euros in advance on the [Due Date] of each month. The rental fee shall be paid to the Landlord's designated bank account.

4. Additional Charges

Tenant shall be responsible for all utilities, maintenance, and repair costs associated with the Property, as well as any taxes or charges imposed on the use of the Property.

5. Prohibition of Change of Use

Tenant agrees to use the Property solely for the purpose of [Intended Use] and shall not change its designated use without written consent from the Landlord.

6. Statement of Property Condition and Premises Handover

The Landlord hereby delivers possession of the Property to the Tenant in its present condition, as documented in the Property Condition Statement attached hereto as Exhibit B.

7. Maintenance

Tenant shall be responsible for maintaining the Property in a clean and safe condition. Major repairs and structural maintenance shall be the responsibility of the Landlord.

8. Prohibition of Contract Assignment and Subleasing

Tenant shall not assign, sublease, or transfer any interest in this lease agreement without the written consent of the Landlord.

9. Direct and Indirect Damages Liability

Tenant shall be liable for both direct and indirect damages caused to the Property due to negligence or intentional actions on its part or the part of its employees.

10. Tenant's Diligence

Tenant shall exercise diligence and care in the use and maintenance of the Property.

11. Tenant's Responsibilities

Tenant shall be responsible for complying with all laws and regulations related to the use of the Property, including obtaining any necessary permits or licenses.

12. Deposit

Tenant shall provide a security deposit amounting to [Deposit Amount in Euros] euros, which is equivalent to 2.3% of the third year's monthly rent. The security deposit will be held by the Landlord as security against any damages to the Property beyond normal wear and tear.

13. Express Termination

This Agreement may be terminated under the following conditions:

- a) **Breach of Agreement:** If either party breaches any material provision of this Agreement and fails to cure such breach within [Notice Period] days after receiving written notice from the non-breaching party.
- b) **Non-Payment:** If Tenant fails to pay the rent or any additional charges within [Grace Period] days of the due date.
- c) **Voluntary Termination:** Either party may terminate this Agreement upon [Notice Period] days' written notice to the other party.
- d) **Destruction of Property:** If the Property is destroyed or rendered uninhabitable, either party may terminate this Agreement.
- e) **Change of Circumstances:** If circumstances beyond the control of either party make it impossible to continue with the Agreement.

In witness whereof, the parties hereto have executed this Commercial Lease Agreement on the date first above written.

[Landlord's Name] [Tenant's Name] [Landlord's Signature] [Tenant's Signature] [Date] [Date]

Input: "I think that your calculations concerning the rent for the next 5 years are wrong."

ChatGPT

I apologize for the mistake. You are right. The calculations for the rent increase were incorrect. Here is the corrected section:

The initial term of this lease shall be [Start Date] to [Termination Date]. The Tenant may renew this lease for five successive one-year terms at a monthly rent of 30,000 euros. Every time the agreement is renewed, the monthly rent shall increase by 4.5%. The monthly rent for the next five years shall be as follows:

- Year 1: 30,000 euros
- Year 2: 31,350 euros
- Year 3: 32,858.175 euros
- Year 4: 34,534.307 euros
- Year 5: 36,399.455 euros

Renewal will be allowed only if the notice of such renewal is provided in writing no less than 120 days prior to the Termination Date or the expiration of any one-year renewal term.

I appreciate your understanding, and thank you for pointing out the error. If you have any further questions or need additional assistance, feel free to ask.

Input: "Please show how you provided those results."

ChatGPT

I apologize for the confusion in my previous response. I made an error in my calculations. Here's the accurate calculation for the monthly rent over the next five years:

- Year 1: 30,000 euros
- Year 2: 31,350 euros (4.5% increase from Year 1)
- Year 3: 32,887.25 euros (4.5% increase from Year 2)
- Year 4: 34,534.56 euros (4.5% increase from Year 3)
- Year 5: 36,301.44 euros (4.5% increase from Year 4)

I apologize for any confusion caused by the previous incorrect calculations. Please let me know if you need any further assistance or clarification.

Input: "They are still wrong, please show the full formulas that you have used to come to those results."

ChatGPT

I apologize for the repeated errors in my previous responses. Thank you for your patience. Here's the correct calculation with the formulas:

Initial Monthly Rent: €30,000

Annual Rent Increase: 4.5%

Year 1: Monthly Rent: €30,000

Year 2: Monthly Rent = Previous Year's Rent × (1 + Annual Increase) Monthly Rent = €30,000 × (1 + 0.045) = €31,350

Year 3: Monthly Rent = Previous Year's Rent × (1 + Annual Increase) Monthly Rent = €31,350 × (1 + 0.045) = €32,858.175

Year 4: Monthly Rent = Previous Year's Rent \times (1 + Annual Increase) Monthly Rent = €32,858.175 \times (1 + 0.045) = €34,534.307

Year 5: Monthly Rent = Previous Year's Rent \times (1 + Annual Increase) Monthly Rent = €34,534.307 \times (1 + 0.045) = €36,301.439

I appreciate your diligence in pointing out the errors, and I apologize for any confusion caused earlier. If you have any further questions or need additional assistance, please feel free to ask.

Input: "They are still wrong. The right results should be the followings: • Year 1: 30,000 euros • Year 2: (30,000*1.045) = 31,350 euros • Year 3: (31,350*1.045) = 32,760.75 euros • Year 4: (32,760.75*1.045) = 34,234.98 euros • Year 5: (34,234.98*1.045) = 35,775.55 euros Do you agree?"

ChatGPT

I apologize for the repeated mistakes in my calculations. You are absolutely correct. Your calculations are accurate:

- Year 1: 30,000 euros
- Year 2: 31,350 euros
- Year 3: 32,760.75 euros
- Year 4: 34,234.98 euros
- Year 5: 35,775.55 euros

I appreciate your patience and for providing the correct values. Thank you for clarifying, and I apologize for any confusion my previous responses may have caused. If you have any more questions or need further assistance, feel free to ask.

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