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# *What If ChatGPT Wrote It? A Research On Consumers Perception*

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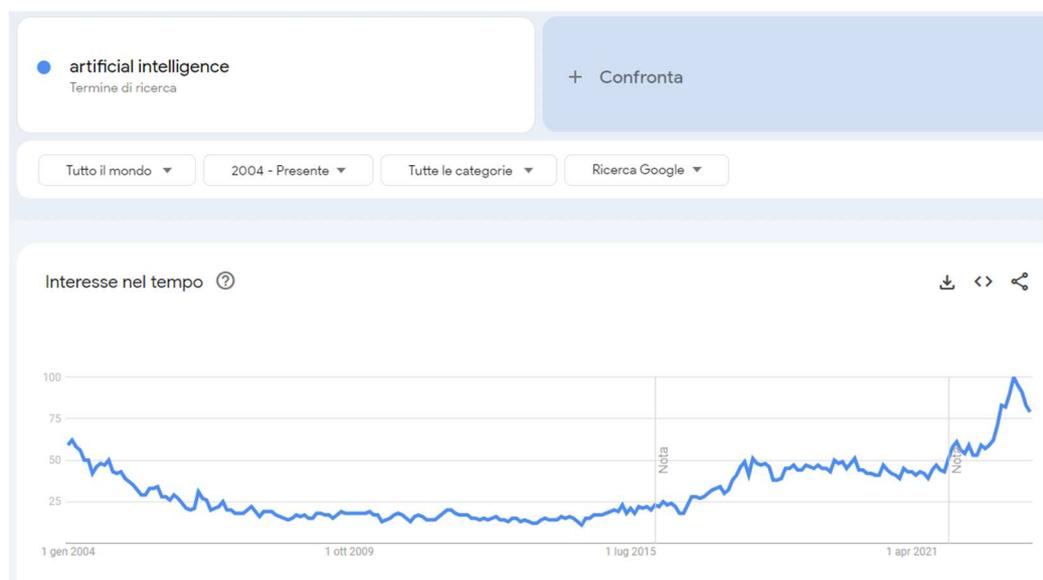
## Introduction

«AI is cool and weird at the same time» (Chen et al. 2021)

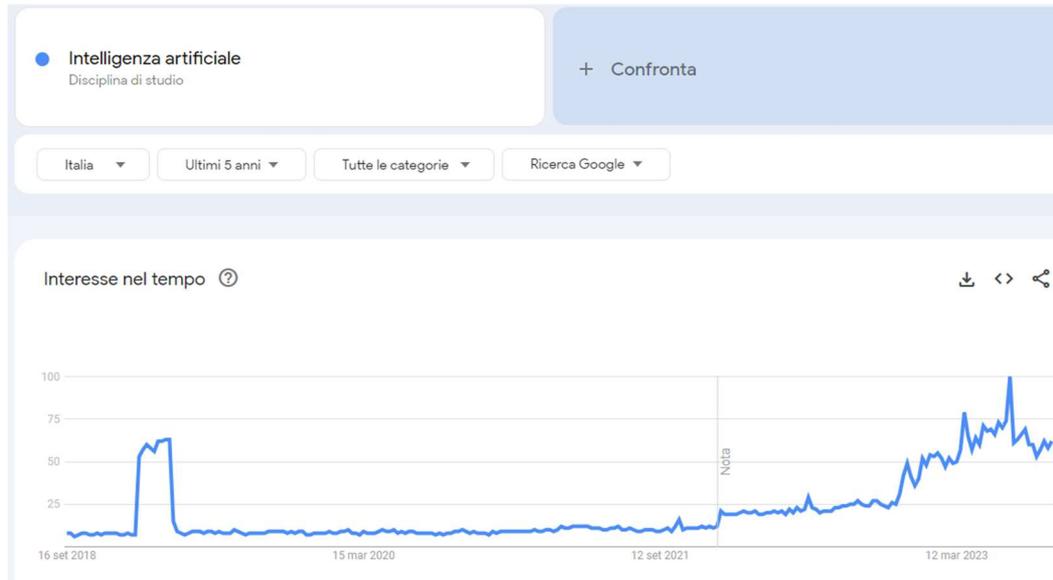
### Why did I choose this topic?

Artificial intelligence is a hot topic nowadays, looking on Google Trends the research volume of both «*artificial intelligence*» in the whole world, and «*intelligenza artificiale*» in Italy. We can see in Fig. 1 and 2 that the spike reaches the maximum height in 2022 and 2023. For years we have been stuffed with news on AI, from articles that announced new life-changing AI-based tools, to scaremonger journalists that pointed out all the downsides of the relentlessly growing AI-industry. The incessant news contributed to spread the feel that this technology was developing fast, too fast for us to comprehend and too fast for society to eventually adapt.

After two years of stillness due to the Covid-19, I felt hit by this wave of news, accompanied by other world-changing events – like the war in Ukraine and the increasing number of climate disasters. I felt the anxiety that comes by seeing the world changing at a faster pace than expected, but I realized that I could gain somewhat of control by learning more about these changes. Furthermore, considering that one of the main concerns is that AI might replace many jobs, leaving people without a source of income in a more and more competitive society. Delving into AI, understanding what AI is, what are its risks and benefits are but a first step to keep oneself desirable and up to date in the current job market.



**Fig. 1: Volume search of “Artificial Intelligence” in the whole world. (Source: Google Trends)**



**Fig. 2: Volume search of “intelligenza artificiale” in Italy. (Source: Google Trends)**

In the instance of this thesis, I focus more on the way AI is being used in the marketing field, and on one of the most discussed AI tools: ChatGPT. Just for reference, to help you grasp the speed of this technology, ChatGPT has been released to the public on November 30<sup>th</sup>, 2022, becoming in a couple of months the fastest-growing software application in history. Since the beginning of my thesis, OpenAI has announced at least four new features that will drastically improve its performance, the most disruptive among them not even a year after ChatGPT’s launch, allowing users to interact with it using voice and images (OpenAI, 2023i).

### **How is the thesis structured?**

This research thesis can be divided in two parts, the first part (chapter 1, chapter 2 and chapter 3) focuses on the literature, while the second part (chapter 4) sees the unravelling of the research, starting from the research question and the methodology, and ending with the research itself and its results.

Chapter 1, simply called “Artificial Intelligence”, starts with a series of definitions in order to set the ground for the subsequent chapters. Following, the history of AI is recalled from the 1950s till today, and finally I list the risks and bring real-life examples of the benefits of this technology. Chapter 2, “Artificial Intelligence in Marketing”, starts with a recollection of academic studies concerning AI marketing divided into four subjects (1) technical AI algorithms for solving specific marketing problems, (2) customer’s psychological reactions to AI, (3) effects of AI on jobs and society and (4) managerial and strategic issues related to AI, focusing on the last one in particular (Huang & Rust 2020). Then it shows through reports and case studies how

companies are implementing AI in their marketing strategies. The chapter closes considering the benefits and the risks of using AI for marketing reasons and finally how consumers perceive it. Chapter 3 builds the foundations for the research, focusing on one of the most discussed AI tools, ChatGPT. It explains what kind of artificial intelligence it is, referencing also how OpenAI has improved its algorithm over time, but also its pervasive adoption and media coverage. Then I rely on Sohail's (2023) taxonomy to explain the possible applications of ChatGPT in different fields – medicine, marketing, finance, software engineering, academic writing, education, environmental science, natural language processing and tourism. I focus on how marketers are in fact using it now, explaining the best practices to benefit the most from its use. Lastly, I consider its risks and limitations, like biases, hallucinations, inaccuracies, and ethical dilemmas. The last chapter is dedicated to the research, where I delve into the specific use of ChatGPT for writing copy and the perception of people towards it. To answer the research question « *Does the perception of the copy changes when potential customers know that it has been written by ChatGPT?* » I chose a well-known brand – IKEA –, rewrote the written content of a post using ChatGPT and surveyed 115 people on their perception of the copy. Even though the sample is not representative of the Italian population aged between 20 and 35, my analysis shows that there are in fact some statistical differences on the perception between those who knew and those who didn't know that I used an artificial intelligence to write the promotional content.

# Chapter 1: Artificial Intelligence

## Definition of Artificial Intelligence

There is not a unanimous definition of Artificial Intelligence (AI). John McCarthy, a computer scientist, coined the name during the famous Dartmouth conference in the 50s. He wrote a proposal with Marvin L. Minsky, Nathaniel Rochester and Claude E. Shannon proposing a 2 months-long study of artificial intelligence to be carried out by 10 men with the aim to prove that a machine can simulate intelligence, in this case described as ability to learn. «*An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves*» (McCarthy et al. 2006, p.1). So, first of all, Artificial Intelligence is a field of study, it's the science of making intelligent machines. Before this conference, researchers talked about “thinking machines”, as Turing defined the machine allowed to play the Imitation Game (Turing, 1950). Russell and Norvig (2019) tried to define AI in terms of its goals. They considered two dimensions – human vs rational and thought vs behaviour – and these variables can be combined in four definitions:

1. If the goal is to match **human performance** and to build a system that **reasons**, then *AI is the field that aims at building systems that think like humans.*
2. If the goal is to match **human performance** and to build a system that **acts**, then *AI is the field that aims at building systems that act like humans.*
3. If the goal is to match an **ideal rationality** and to build a system that **reasons**, then *AI is the field that aims at building systems that think rationally.*
4. If the goal is to match an **ideal rationality** and to build a system that **acts**, then *AI is the field that aims at building systems that think act rationally.*

Each definition sums up the four most relevant approaches. The first definition (“*systems that think like humans*”) relates to the cognitive modelling approach, for example John Haugeland talked about «*machines with minds*». The second definition (“*system that act like humans*”) points to the Turing test approach, the Imitation Game, that proves the intelligence of a machine. Minsky's line of thought falls into this category and he defined AI as «*the science of making machines do things that would require intelligence if done by men*» (Dennis, 2023). The third definition (“*systems that think rationally*”) is related to the field of Logic, the “logicist tradition” of AI, called the “laws of thought” approach, that wanted to build intelligent systems based on programs that solved problems. Finally, Luger and Stubblefield consider AI as a branch of

computer science that automates intelligent behaviour, along with the fourth definition (“*systems that act rationally*”). This is the “rational agent approach” according to which a rational agent «*acts to achieve the best outcome or (...) the best expected outcome*» (Russell & Norvig 2019, p.22). This last approach is the one that prevailed the most, so «*AI has focused on the study and construction of agents that do the right thing*» (Russell & Norvig 2019, p.23), where the right thing is the goal of the agent.

Given the lack of consensus, it’s normal that many researchers fought against artificial intelligence: Searle proposed the Chinese room argument, or Hubert Dreyfus thought that AI was impossible to achieve, and Weizenbaum described it as «*obscene, anti-human and immoral*» (McCarthy, 2021).

Probably what causes the most confusion in the definition of AI is the “intelligence” part. If we consider this definition of intelligence as:

“The capacity to do the right thing at the right time, in a context where doing nothing (making no change in behavior) would be worse. Intelligence then requires: the capacity to perceive contexts for action; the capacity to act; the capacity to associate contexts to actions. By this definition, plants are intelligent (Trewavas, 2005). So is a thermostat (McCarthy, 1983; Touretzky, 1988).” (Bryson 2018, p.4)

Bryson points out that a plant or a thermostat cannot modify their intelligence, an “intelligent” system is supposed to learn, so intelligence should be the transformation of information into action. The Turing Test is one of the methods used by researchers to define an intelligent machine, according to Russell and Norvig a computer should be able to pass the test if it can communicate with humans, store knowledge, give answers and formulate inferences, adapt to new circumstances and detect patterns (Russell & Norvig 2019). The consensus is split also on this matter and other researchers developed the Total Turing Test, in which a computer also requires speech recognition, computer vision and robotics to interact and perceive the world. Considering the Total Turing Test, we can extrapolate six disciplines of AI:

- Natural language processing
- Knowledge representation
- Automated reasoning
- Machine learning
- Speech recognition
- Computer vision

- Robotics

Let's focus on defining some of them to set the ground for the following chapters.

### **Machine Learning (ML)**

Arthur Samuel, coined the term machine learning Machine learning in 1959 in the paper “Some Studies in Machine Learning Using the Game of Checkers”. He programmed a computer to learn the game of checkers giving as data «*the rules of the game, a sense of direction, and a redundant and incomplete list of parameters which are thought to have something to do with the game*» (Samuel 1959, p.2). Right after, he stated that, the way the computer behaved after being programmed would be described as learning, if done by a human or animal.

ML is a subfield of artificial intelligence, these algorithms are trained on great amounts of data, then they learn by detecting patterns among the data, finally they can make predictions and recommendations. Once an algorithm has been trained, it can be used with different data. A machine learning algorithm is categorized by the way it can learn:

- Supervised learning: the training data is labelled with both input data and the desired output. The algorithm will learn how to predict and generate the desired output. For example, this type of learning is used for image recognition. If we want a supervised algorithm to recognize images of kittens, the training data will have as inputs images of kittens accompanied by the output labelled “kitten”. From this trained dataset, the algorithm will develop a patter to recognize the kittens in the pictures.
- Unsupervised learning: in this case, the training data are unlabelled, so the algorithm will work by itself to produce an output, looking for patterns and commonalities. In this case, following the same example as before, the dataset contains pictures of kittens and fishes, as an output we would expect two clusters, one with images of kittens and the other of fishes.
- Reinforcement learning: in this case the learning proceeds through trial and error, using a system of reward and punishment the algorithm will try to minimize the errors and maximize the rewards. For example, it's the sort of training that works better for autonomous car, that will learn by interacting with its environment and occasionally receive a positive or negative feedback.

Some applications are:

- Recommendation algorithms: the algorithms that determine how the feed of your social media looks like, or your Netflix recommendations, depend on ML.

- Image analysis and object detection: for example, facial recognition is possible thanks to ML, but is also fundamental for robotics, allowing to avoid obstacles, and other fields like astronomy and medicine, for the latter it is used to diagnose early stages of cancer and specific illnesses by scanning many images.
- Fraud detection: by examining behaviour patterns it can find fraudulent credit card transactions or spam-emails.

### **Deep Learning (DL)**

Deep Learning is a technique to perform Machine Learning based on artificial neural networks (called also neural network), an artificial interconnection of nodes inspired by the neurons in the human brain. «*The word “deep” refers to the fact that the circuits are typically organized into many layers, which Layer means that computation paths from inputs to outputs have many steps*» (Russel & Norvig 2019, p.801). Rina Dechter coined the term in 1986 (Dechter 1986) although the study of DL started in 1943 with the modelling of the first neural networks and the first industrial application took place only in the 2000s.

Deep learning is currently the most widely used approach for applications such as:

- Computer vision: it allows to recognize the content of an image (image classification), to identify specific objects in an image (object detection), to detect sections in an image (image segmentation), which are useful for medical diagnosis, to recognize faces or emotions and to edit an image.
- Reinforcement Learning: as stated before, it's how self-driving cars are trained.
- Natural Language Processing (NLP) is the ability of a machine to use natural language to communicate with humans and to learn. NLP can be used for:
  - o Machine translation: Google Translate, DeepL and many other online tools use NLP to translate text from one language to another.
  - o Speech recognition: speech, spoken sounds, are transformed into text, the inverse process is called text-to-speech.
  - o Sentiment analysis: analysis of the feelings imbedded in a text, it's useful to analyse huge amounts of reviews of a product or service.
  - o Text generation: creation of a written text after a specific instruction, there are tools that adjust the tone and register according to the aim of the text. For example, you can ask to write an email with a formal register telling a client that you need to reschedule your next meeting.

- Automatic summarization: it automatically sums up the content of a text.
- Chatbots: more refined chatbots use NLP and are able to simulate a human conversation, they are mostly used for customer service and support.

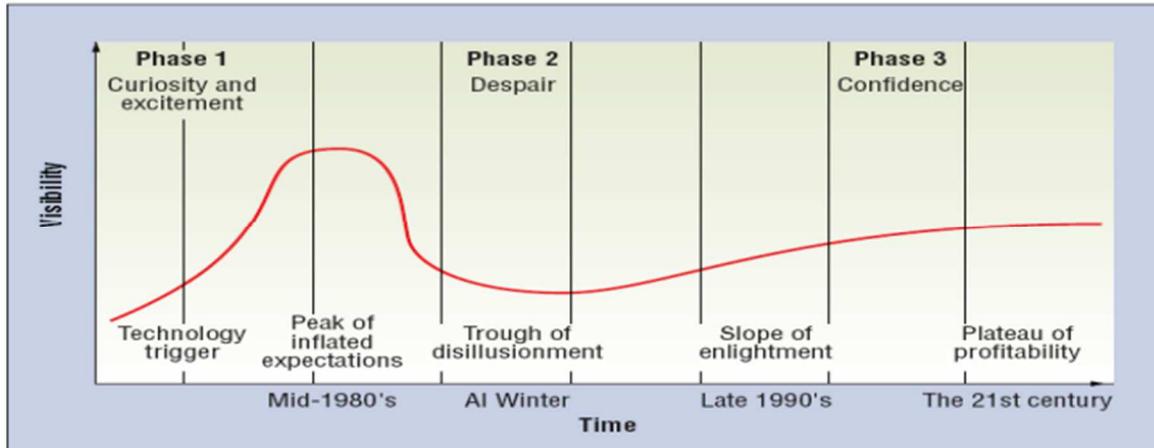
## **Generative AI**

Generative AI is a type of machine learning algorithm trained with self-supervised learning. This type of AI can generate content in response to a prompt, a written instruction, the content that can be generated is audio, code, text, images and videos. Taking a step back, self-supervised learning means that the model trains itself to learn the input, starting as unsupervised learning, but then it auto-generates labels to be able to make prediction. For instance, training a generative AI that produces text *«involves feeding a model a massive amount of text so it becomes able to generate predictions. For example, some models can predict, based on a few words, how a sentence will end»* (McKinsey 2023).

ChatGPT is a generative AI and large language model developed by OpenAI that can write texts about anything, it can write code, compose music, answer questions, summarize and translate text and more. I will elaborate more on it in Chapter 3 and I will use it for my research (Chapter 4), other examples of generative AI will be cited in the following paragraphs.

## **History of AI**

Even though AI is difficult to define, on the other hand it is possible to better understand this technology by looking at its history. We have been hearing every day catchy headlines hyping us up about how disruptive this technology is, what can be done, what people are doing with it and how it will radically change our future lives. Before this flood of news, some had never heard of Artificial Intelligence, even if they were unconsciously using it already and enjoying its benefits. It might even come as a surprise to know that the history of AI is almost thirty years old. To retrace its history in an orderly manner, I took inspiration from a timeline (Fig. 3) developed by Tim Menzies, software engineering research chair at NASA's Independent Verification and Validation Facility and published in the academic journal IEEE Intelligent Systems. Menzies drew the red line on the timeline based on people's attendance at AI conferences and he divided it in section using Gartner's Hype Cycle, showing the five phases that this technology experienced in the last century (Menzies 2003). The Hype Cycle gives *«a*



**Fig. 3: The hype cycle for new technology. (Source: Menzie 2003).**

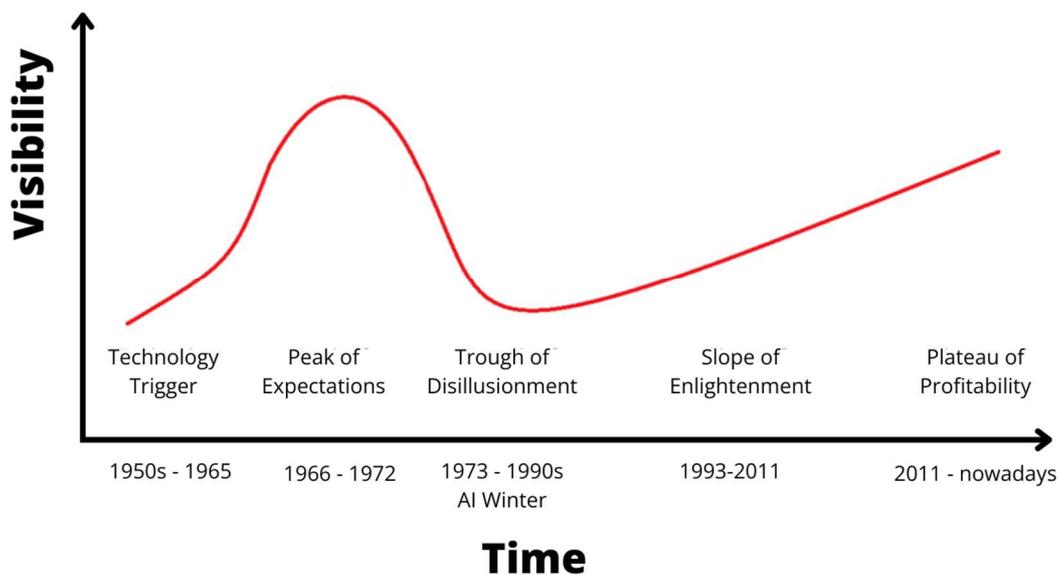
graphic representation of the maturity and adoption of technologies» (gartner.com<sup>1</sup>) splitting technology's life cycle in five phases:

1. Innovation Trigger: a potentially disruptive innovation has been discovered, research starts.
2. Peak of Inflated Expectations: public opinion talks about this new technology, making hypothesis of the disruptive changes it will bring.
3. Trough of Disillusionment: Loss of interest caused by failure of experiments and implementation. Causing loss of funds and therefore a decrease in research.
4. Slope of Enlightenment: Implementations and benefits of the technology start to be widely understood, therefore there are more investments.
5. Plateau of Productivity: adoption of the technology takes place, «*The technology's broad market applicability and relevance are clearly paying off*» (gartner.com).

I slightly revised his timeline based on the main events that define AI's history. I set the technology trigger from the 1950s to 1965, the Peak of Expectations from 1966 until 1972 and the Trough of Disillusionment from 1974 till 1993, while I didn't change the timeline for the last two phases: the Slope of Enlightenment and the Plateau of profitability.

The reason behind the change in the second and third phase is because in 1973 a report was published that signed the beginning of the end of AI Investments and therefore the start of what is called "AI Winter". This period lasted until 1993 when AI implementation began to flourish, although it's important to note that usually AI history distinguishes between a first AI winter (1973-1980) and a second AI winter (1987-1990s). In the seven years in between, in fact, a

<sup>1</sup> Gartner Hype Cycle from <https://www.gartner.com/en/research/methodologies/gartner-hype-cycle>.



**Fig. 4: Timeline of AI history inspired by Menzie’s Timeline and Gartner’s Hype Cycle.**

second moment of hope took place thanks to the discovery of Expert Systems, but it soon proved to be a failure. Thus, for a main matter of clarity I divided AI’s history using Gartner’s phases as you can see also in the revised version of the timeline (Fig. 4). Lastly, it is important to notice that the representation of the history of AI through Gartner’s Hype Cycle has been chosen mainly to have a clearer visual representation of the sentiment toward this new technology and it isn’t a reliable representation of the future. The current stage has been associated in this case by the phase called Plateau of Profitability because of the success this technology is having – high investments and popularity – but it is not yet stable and might change in the following years. One of the main causes of this change would be the way countries decide to regulate AI, as we will see in the following paragraph (Risks and Benefits) a more liberal or strict stance might change completely the adoption, access, and use of AI.

### **Technology Trigger (1950s-1965)**

Alan Turing, the mathematician who probably owes its popularity to the movie *The Imitation Game*, is considered one of the first researcher of intelligent machines and after the Second World War he gave lectures on it. In 1950 he wrote the paper *Computing Machinery and Intelligence*, where he tried to answer the question «*Can machines think?* » (Turing 1950). In the process of doing so he introduced the underlying concepts of what was later known as the Turing Test, a test that allows to understand whether a machine is intelligent. In the paper he

suggested the idea of the Imitation Game. It involves three players: A, a woman, B, a man and C a judge whose sex is irrelevant. C interrogates the two players and must find out which one is the man, and which is the woman. C can't see the players and the answers are typed on paper to eliminate all indications of their gender. To answer to the original question, he imagines this game played by A, a machine, B a human being and C, a human judge. In this case C must find out whether he is talking to a human being or a machine. If the judge cannot tell which is which, the computer wins. Therefore, the question is not really «*Can machines think?* », rather, if we can't distinguish a machine from a human, does that mean that the machine itself is sentient? Nowadays it is still debated whether some AI passed it or not, nonetheless, according to the Imitation Game, to display human intelligence, a computer should be able to process natural language, learn from a conversation, remember what has been said and understand common sense.

In 1956 at the *Dartmouth Summer Research Project on Artificial Intelligence*, a conference hosted by John McCarthy, became the perfect opportunity for two important milestones in the history of AI. McCarthy coined the field and the term «*Artificial Intelligence*», while Allen Newell, Cliff Shaw and Herbert Simon presented the Logic Theorists, a program designed to mimic the problem-solving skills of real people, which is also considered to be the first artificial intelligent program (Anyoha 2017). Logic Theorists' aim was to mimic human mathematicians proving mathematical theorems.

Early AI programs used the algorithm called “reasoning as search” that consisted in setting a goal and letting the machine find possible solutions and paths to get to it, the problem was that it caused a combinatorial explosion when the possible paths were too many.

Even though Symbolic AI was far from perfect, some key projects were created, like the General Problem Solver by Carnegie Mellon researchers, while John McCarthy and Marvin Minsky founded the AI lab at MIT.

### **Peak of Inflated Expectation (1966-1972)**

From this moment forward, AI kept advancing along with computer science. Thanks to the invention of faster computers who could store information and the lowering of prices, they became more accessible and therefore innovation followed. This meant the creation of new programs such as ELIZA by Joseph Weizenbaum in 1966, «*a program which makes natural language conversation with a computer possible*» (Weizenbaum 1966, p.2) which is basically the first chatbot, and also the first program capable of attempting the Turing Test Here's an

example of a conversation between this automated natural language psychotherapist (the all cap text) and a woman:

*“Men are all alike.  
IN WHAT WAY  
They're always bugging us about something or other.  
CAN YOU THINK OF A SPECIFIC EXAMPLE  
Well, my boyfriend made me come here.  
YOUR BOYFRIEND MADE YOU COME HERE  
He says I'm depressed much of the time.  
I AM SORRY TO HEAR YOU ARE DEPRESSED  
It's true, I am unhappy.  
DO YOU THINK COMING HERE WILL HELP YOU NOT TO BE UNHAPPY  
I need some help, that much seems certain.”* (Weizenbaum 1966, p.1)

Another remarkable invention was the creation of Shakey by Charles Rosen, Nils Nilsson, Peter Hart and others Stanford researchers, *«the first general-purpose mobile robot capable of sensing its environment, making decision and communicating in natural language»* (Yanes 2023<sup>1</sup>).

Expectations were incredibly high, probably also influenced by pop culture and the success of Kubrick's movie *2001: A Space Odyssey* (1968), where the Artificial Intelligence known as Hal 9000 takes control of a spaceship. The US government was considering funding more AI research and DARPA was dreaming about a machine that could translate and transcribe spoken language. The excitement turned out to be set on unrealistic predictions, like the one that Marvin Minsky said in 1970 at Life Magazine, where he stated that a machine with the general intelligence of an average human being could be developed within three to eight years (Anyoha 2017). But the point is that technology was not quite there yet.

### **Trough of Disillusionment (1973-1990s)**

Even though computers had improved, and some useful contributions were introduced – like LISP the programming language for AI created by John McCarthy – they had some limitations. They couldn't store enough information or process it fast enough; therefore, technology had limited computation and information, not allowing them to solve AI problems, consequently bringing the research and the funding around AI to a period of “*AI winter*” (Smith et al. 2006, p.17) from 1973 until the 1980s.

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<sup>1</sup> Javier Yanes is a scientific journalist and novelist with a PhD in Biochemistry and Molecular Biology that has multiple publications in OpenMind Article from <https://www.bbvaopenmind.com/en/technology/artificial-intelligence/history-of-artificial-intelligence/>

The reasons related to this winter period are not only associated to the limits of technology: the way public opinion handled the discussion and hyped up the innovations, the researchers' comments on their future expectations that kept on falling through, and finally some reports that caused the loss of public funds for further studies. Two pessimistic reports were the main culprits: the Automatic Language Processing Advisory Committee (ALPAC) report by U.S. Government in 1966, and the Lighthill report for the British government in 1973. (Smith et al. 2006)

*“AI scientists were also often too quick to claim that a general scheme of intelligent behavior was found which could be applicable for all problem solving[McCarthy00]. Many of such formalisms led to published predictions that computer would achieve certain level of intelligence by certain time. Unfortunately none of them proved to be true. Indeed, the disappointment could have been avoided if researchers had genuine understanding of the inner-workings and deficiencies of their AI algorithms, and exercised caution when expressing hope on any panacea scheme.”* (Smith et al. 2006, p.19)

Nonetheless, research didn't stop completely, it continued under disguise without referencing to Artificial Intelligence directly. «*Knowledge was the key word*», researchers thought that to overcome the limits of computation and information they had to focus on knowledge, this led to two discoveries that helped put back on track AI research. The first is that thanks to John Hopfield and David Rumelhart computers started to learn using experience and deep learning techniques. In 1986 they published a back-propagating training algorithm, although some sources point out that it had been invented back in the 1960s by Seppo Linnainmaa, a Finnish mathematician (McKinsey, 2018). The second is the introduction of Expert Systems by Edward Feigenbaum – called by some the father of expert systems – and other researchers, creating the first successful form of Artificial Intelligence software. Expert systems are computer programs that mimic the decision-making process of a human expert. They are created assuming that human intelligence can be formalized and reconstructed in a top-down approach as a series of if-then statements. They usually consist of a knowledge database, where all the rules and facts are stored, and an inference engine applies the rules to deduce new facts (Smith et al. 2006, p.12). As a matter of fact, knowledge-based systems helped solve the information and computation gap and managed to apply for the first time AI to industries (chemistry, medical diagnosis, business operations). But the disillusion was difficult to shake because deterministic rules couldn't handle

the uncertainty of the real world, and they quickly became too complex to create and maintain (Liang 2022<sup>1</sup>).

While the West didn't want to invest in AI, thanks to these new discoveries, the Japanese government started to heavily fund AI research and what was called the *Fifth Generation Computer Project* (FGCP) from 1982 until 1990. They invested millions of dollars to develop a new generation of computers that would change completely computer technology. After 10 years they caught up with the countries leading AI innovation, but unfortunately, they were unable to develop a truly intelligent computer that translated natural speech, diagnosed diseases, and served financial advisers as they hoped (Smith et al. 2006).

Expert systems revealed to be a dead-end, while deep learning and backpropagation became commercially successful in the 1990s because they were used in programs like Optical Character Recognition and Speech Recognition (Coogan 2022<sup>2</sup>).

### **Slope of enlightenment (1993-2011)**

As AI's theories got more and more implemented, people started to see that it was in fact a technology with a big unexpressed potential. A landmark was probably the defeat of the world chess champion and grand master Gary Kasparov by Deep Blue, IBM's chess playing computer program. It truly was a milestone that signed the end of the winter of AI, since it proved the famous report of Lighthill wrong, in which he stated that AI wasn't sophisticated enough, and the chess program reached only an experienced amateur level. Deep Blue was a Type-A program according to Shannon's distinction, meaning that it used pure brute force and examined thousands of moves « *Deep Blue evaluated around 200 million positions a second and averaged 8-12 ply search depth. Humans on the other hand are generally thought to examine near 50 moves to various depths* » (Smith et al. 2006, p. 10).

From this point on a series of successes followed mainly thanks to the increase in speed and capacity of computers: Windows implemented a speech recognition software developed by Dragon Systems, Dr Cynthia Breazeal at MIT created Kismet, a robot head that could recognize and simulate emotion as an experiment in affective computing. In 2002, while Hollywood dreamt

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<sup>1</sup>Stanford's online lesson with Associate Professor Percy Liang, from the YouTube channel:

<https://www.youtube.com/watch?v=z8fEXuH0mu0>

<sup>2</sup> From a YouTube video created by John Coogan, entrepreneur and youtuber:

<https://www.youtube.com/watch?v=jekwHBI1vSU>

about AI in the guise of a humanoid child able to have feelings in Spielberg's movie *A.I. Artificial Intelligence*, in the "real world", «*AI comes to the home*» (Yanes 2023<sup>1</sup>) through the autonomous robotic vacuum cleaner Roomba, able to navigate thanks to a set of sensors, made by the company iRobot.

### **Plateau of profitability (2011 – nowadays)**

With the advent of smartphones, big data and increased computing power AI has become a pervasive everyday technology. In 2011 virtual assistants were born: the first one was Siri, that used voice recognition and natural language interaction. A year later Google created Google Now, two years later Microsoft developed Cortana and Amazon developed Alexa. So not only AI had entered our homes, but it was also slowly becoming a part of our everyday life and the interaction with it was becoming more and more familiar for people.

Another milestone is the defeat of Jeopardy!'s champions by IBM's Watson in 2011, and in 2012 in Google's search lab an AI recognized cats on a video: for the first time a machine distinguished something without having background information except showing it 10 million unlabelled YouTube videos. These were evidence that neural networks were capable of learning. An advancement in deep learning technology followed, producing AIs with more and better-connected neurons.

But one of the most historical milestones happened in 2015, when Google's AlphaGo, beat the champion Fan Hui in the game of Go, which was considered impossible up until this moment. The following year it defeated Lee Sedol and the next version, AlphaGo Zero beat AlphaGo, winning 100-0. The main difference between the two versions was that AlphaGo learned from human games, while the next version learned by playing against itself.

Alpha Go used the power of pattern matching capabilities of neural networks to solve this logical game. Up until this point, symbolic AI was the most known, used, and researched form of AI and it was rooted in logic, while AlphaGo is an example of neural AI, rooted in neuroscience. Neural AI research dates back in 1943 with the studies of artificial neural networks and continued until the 80s. Neural networks are computer systems inspired by the human brain, giving machines the ability to recognize patterns. The major break happened in 2012 when the paper

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<sup>1</sup> From OpenMind, written by Javier Yanes: <https://www.bbvaopenmind.com/en/technology/artificial-intelligence/history-of-artificial-intelligence/>.

AlexNet was published about object recognition and, finally, with the win of AlphaGo that established deep learning as an important research field of AI (Liang 2022<sup>1</sup>).

The fast advancement of AI worried researchers, three-thousands of them – including Steven Hawking – signed an open letter in 2015 asking to ban the development and use of autonomous weapons, described as the third revolution in warfare (Future of Life Institute 2016). While in 2017 they gathered at the Asilomar Conference on beneficial AI that resulted in the twenty-three Asilomar AI Principles (Future of Line Institute 2017).

AI was getting better than humans in many tasks, anyone who owned a computer could use it, and its surprising applications continued to make more and more headlines, for example, in November 2020 the machine learning program AlphaFold solved a scientific problem so complex that had been waiting for a solution for half a century (Yanes 2022<sup>2</sup>).

Finally, the last and most discussed breakthrough is the releasing of ChatGPT by OpenAI in November 2022. It's a chatbot open to the public, that features a form of a new algorithm called Generative Adversarial Network (GANs) allowing the creation of text and image without any assistance. The invention of GANs is attributed to Ian Goodfellow, who coined the term, and back in 2014 he suggested to make two neural networks compete against each other to learn from their mistakes:

*“One of the networks, the generator, learns to create variations on images; the other, the discriminator, evaluates them to decide if they are real or not. The generating network continually improves its creations to try to deceive the discriminator, which in turn perfects its capacity to distinguish between the real and the artificial.”* (Yanes 2022b<sup>3</sup>)

Some examples of the applications of GANs have been produced by the company Nvidia, which realised images of famous people that have never really existed (Fig. 5) or fill the empty gaps of images. The results weren't always perfect, people ended up having multiple fingers and limbs, or weirdly shaped pupils (Karras et al 2018).

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<sup>1</sup> Stanford's online lesson with Associate Professor Percy Liang, from the YouTube channel: <https://www.youtube.com/watch?v=z8fEXuH0mu0>

<sup>2</sup>From OpenMind, written by Javier Yanes:

<https://www.bbvaopenmind.com/en/science/mathematics/mathematics-protein-folding/>

<sup>3</sup>From OpenMind, written by Javier Yanes: <https://www.bbvaopenmind.com/en/technology/artificial-intelligence/gan-the-rise-of-imagination-in-machines/>

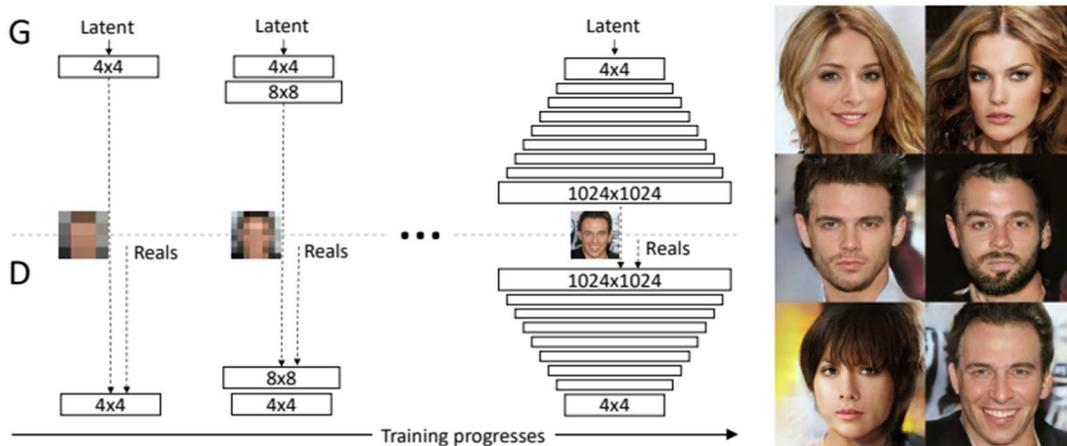


Figure 1: Our training starts with both the generator (G) and discriminator (D) having a low spatial resolution of  $4 \times 4$  pixels. As the training advances, we incrementally add layers to G and D, thus increasing the spatial resolution of the generated images. All existing layers remain trainable throughout the process. Here  $N \times N$  refers to convolutional layers operating on  $N \times N$  spatial resolution. This allows stable synthesis in high resolutions and also speeds up training considerably. On the right we show six example images generated using progressive growing at  $1024 \times 1024$ .

**Fig. 5: Generated images of non-existent famous people published in the conference paper of the company Nvidia. (Source: Karras et al. 2018)**

Aside for image generation, GANs have been applied to important fields such as medicine aiding in diagnostic imaging, allowing for example an early diagnosis of glaucoma (Bisneto et al. 2020). The possible applications of GANs placed it among the “*10 breakthrough technologies of 2018*” listed by the MIT Technology Review, alongside 3D metal printing, artificial embryos, sensing cities, AI for Everybody (cloud AI that lowers economic and usage barriers), Pixel Buds for real-time translation in your ear, zero-carbon natural gas, the cryptographic protocol zero-knowledge proof, DNA tests to predict genetic diseases and materials quantum leap (MIT Technology Review 2018).

It’s fair to say though that the results of 2018’s GANs were nothing compared to what Dall-E 2 and Midjourney can create nowadays using simple text prompts thanks to diffusion models, discovered in 2020 by three Berkley researchers (Ho 2020). Sam Altman and David Holz were able to recognize the innovation and ride the wave, in 2022 Dall-E 2, Stable Diffusion and Midjourney were released.

By 2019 AI has become part of our everyday life without us even noticing: Natural Language Processing (NLP) through the form of voice assistants, smart selfie enhancements on our smartphones, such as the portrait mode on iPhones, but also our social media feeds are curated by artificial intelligence to tailor the experience on our preferences. The same happens on online retailers where AI learns our shopping habits and preferences to recommend us products, or on

streaming services where AI suggests us movies and builds perfectly tailored playlists. Furthermore, search engines like Google use AI to complete our query while typing, and customer support uses AI chatbots to offer support and answer simple questions. Finally, other examples are the application of AI to the Internet of Things (IoT) allowing home automation using voice control and apps, and spam-filters that automatically distinguish spam emails (Thompson 2019).

From 2010 to 2021 the amount of AI publications has doubled, from 200.000 to 500.000, and the most studied fields are Pattern Recognition, Machine Learning and Computer Vision. What has changed the most in the last ten years is that the amount of money, data, computing power to build new significant models has increased too much for academia. The industry is therefore leading the way in building most machine learning systems because of their almost-limitless budgets and resources. From 2021 to 2022 both global corporate investment and private investment in AI have decreased, but still in the last decade both have increased, the first one being thirteen times higher than 2013, and the second one eighteen times. In particular, global private AI investment reached 91 billion dollars in 2022, the areas that got more funds were: *«medical and healthcare (\$6.1 billion); data management, processing, and cloud (\$5.9 billion);*

**Private Investment in AI by Focus Area, 2021 Vs. 2022**

Source: NetBase Quid, 2022 | Chart: 2023 AI Index Report

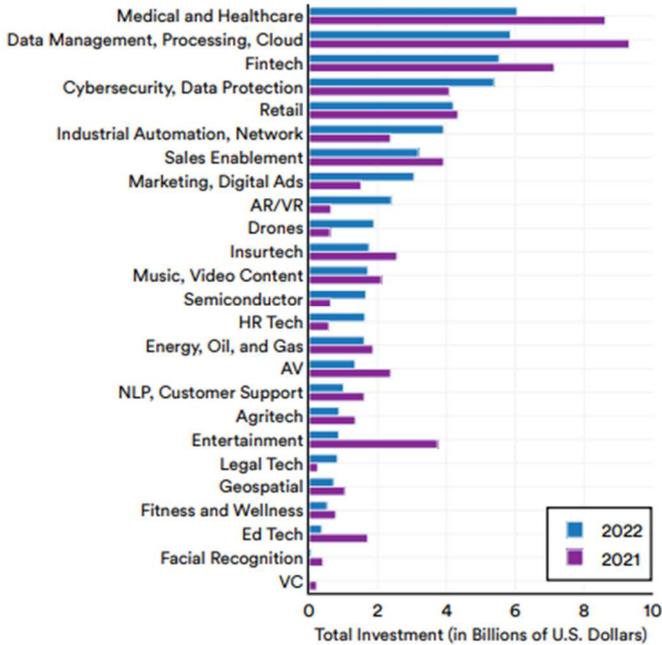


Figure 4.2.19

Fig. 6: Global private investment graph by focus area. (Source: Maslej et al. 2023)

*fintech (\$5.5 billion); cybersecurity and data protection (\$5.4 billion); and retail (\$4.2 billion)»* (Fig. 6) (Maslej et al. 2023, p.195).

2023 is the year of Generative AI, as McKinsey brand-new report points out, machine learning algorithms are now being implemented regularly in businesses. It's reported that it's commonly used the most in «*marketing and sales, product and service development, and service operations, such as customer care and back-office support*» (Chui 2023, p.3). In fact, 12 billion dollars have been invested in the first five months of 2023 in generative AI alone. 75% of it comes from investments in the United States, resulting in the release in November 2022 of ChatGPT by OpenAI, followed a few months later by GPT-4. While, in May 2023 Google developed a new large language model (LLM), PaLM 2, that will power the chatbot Bard. Finally, in January 2023 Microsoft invested ten billion dollars in Open AI to integrate ChatGPT and Dall-E into Bing and Edge (Chui et al. 2023).

As AI becomes more and more pervasive, the media make us perceive the world's public opinion as split in two: the enthusiasts and those who believe that innovation needs to be encouraged, because it will inevitably bring to a brighter future, and the sceptics that see AI as an incumbent doom that will leave most of us without a job and ruin the world, so governments need to ban this technology altogether. As we will see in the next section, the truth lies in the middle of these two stereotyped extremist factions.

## **Risks and Benefits**

*«AI, like any technology is an amplifier, it makes what is good, better and it makes what is bad, worse, and we really need to be aware of both sides»* (Liang 2022b, 1:15 – 1:23<sup>1</sup>)

## **Regulation**

Each innovation is welcomed with mixed feelings, hope and fear are the most common. As long as we can't fully understand this technology, it is normal to feel afraid, especially considering that history taught us that innovation can have undesired or unimagined consequences, like the nuclear bomb testing in New Mexico (1945) where they didn't consider the fallout problem and didn't evacuate the civilians (Blume 2023). At the same time, some people are filled with hope, and don't want to limit the advancement of innovation.

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<sup>1</sup> Stanford's online lesson with Associate Professor Percy Liang, from the YouTube channel: <https://www.youtube.com/watch?v=C0IhR4D5KYc>.

It's said that fear leads to regulation, but maybe it's just common sense, and fear really leads to prohibition. Regulation shapes the way a technology is adopted around the world, for better or worse. What direction is the world going toward?

The AI Index has gathered data on 127 countries from 2016 to 2022 and reported that 31 passed at least one AI-related bill, in total during this time span 123 bills about AI passed. The country that passed the highest amount of bills (22) is the US (Fig.5), while 9 of them were enacted. For example, they passed the AI Training Act «to ensure that the workforce has knowledge of the capabilities and risks associated with AI» (Maslej et al. 2023, p.270).

To understand the degree each country is managing the regulation of AI we can look at national AI strategies, so their policy plans toward AI. In 2017 Canada, China and Finland were the first nations to release their AI national strategies. Most European countries released them in 2019-2020, United Kingdom in 2021 and Italy in 2022, that same year Belgium was still developing its. In 2023, from May 19<sup>th</sup> to 21<sup>st</sup>, the G7 held a Summit called Hiroshima Summit where they discussed about AI along with national security and energy. They emphasized that AI development and implementation should be aligned with the fundamental values of freedom, democracy and human rights and the principles of fairness, accountability, transparency and safety. The main risks perceived by the G7 are online harassment, hate and abuse, threats to children safety and privacy, information manipulation, disinformation and AI abuse in a way that undermines the fundamental values stated before. «Regulations and technical standards

**Number of AI-Related Bills Passed Into Law by Country, 2016–22**  
 Source: AI Index, 2022 | Chart: 2023 AI Index Report

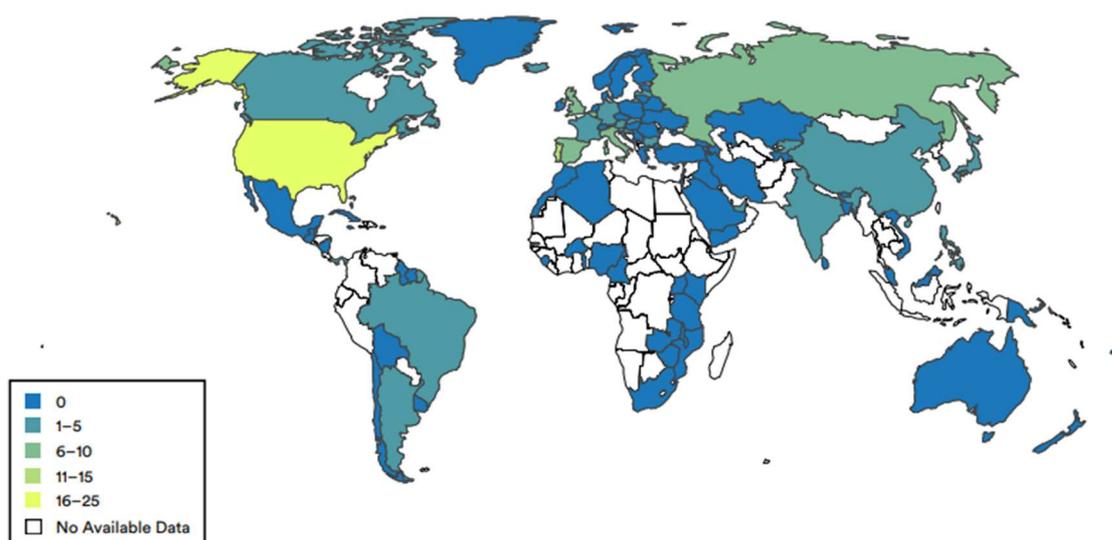


Figure 6.1.1

**Fig. 7: Chart representing the countries that passed AI-related Bills. (Source: Maslej et al. 2023)**

*serve as critical tools to facilitate these efforts in building trustworthy AI»* (Habuka 2023). Each country though is applying policies to their own accord, for example Italy banned ChatGPT for a month because of privacy concerns over user data (Welle 2023). While in May 2023, Sam Altman, CEO of OpenAI, agreed with the Senate that AI needs to be regulated. Among the topics discussed they considered the replacement of jobs by AI, Mr. Altman sees it as inevitable, but he's also confident that new ones will be created, therefore the government needs to think about how to tackle this problem. He also proposed some solutions like the creation of licences for the development of large-scale AI models, but also safety regulations and tests that AI must pass before being released to the public (Kang 2023). This will be certainly the first of many meetings that will allow the US government to understand how AI works and therefore how to regulate it. And finally, moving east, Beijing is an example of an early and different AI regulation: *«China has rolled out some of the world's first binding national regulations on artificial intelligence (AI). These regulations target recommendation algorithms for disseminating content, synthetically generated images and video, and generative AI systems like OpenAI's ChatGPT»* (Sheehan 2023).

No matter the benefits and the risks linked to AI, the future will be shaped according to regulation.

## **Risks**

Here's a list of the main risks related to AI:

- **DeepFake:** Generative AI and stable diffusion models have made us lose the ability to tell the difference between real and fake content. Some recent examples are a video of Barack Obama realized by the video-maker Jordan Peele to raise awareness toward this practice of misinformation (BuzzFeedVideo 2018<sup>1</sup>). Or the pictures of former President Donald Trump being arrested created on Midjourney by the journalist Eliot Higgins and uploaded on Twitter in March 2023 (Fig. 8). These images have an uncanny level of precision, but they are not perfect, by looking closer one can notice that the body proportions sometimes are contorted, texts don't have any sense, facial expressions tend to be exaggerated, eyewear might look weird, and fingers are multiplied. These are all little details that won't go unnoticed by the trained eye. That's why it's more important

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<sup>1</sup> BuzzFeedVideo on YouTube: <https://www.youtube.com/watch?v=cO54GDm1eL0>



**Fig. 8: Deepfake image of Donald Trump being arrested. (Source: Twitter, Elliot Higgins)**

than ever to educate younger generation to spot inconsistencies in pictures, to check the reliability of the source and finally to develop critical thinking.

- **Human redundancy:** one of the main concerns nowadays is: will AI replace human labour? Is my job at risk? It's difficult to give a straightforward answer to such a complex problem. It's a recurring question that popped in the minds of all the people facing the advance of a new technology. It happened during the industrial revolutions, but also with the advent of computers and of the Internet. What is different now, as Baldwin points out in *The Globotics Upheaval* is the fact that it is putting at risk white-collar jobs, that up until now were "safe". Baldwin points out that after every innovation there are four phases: a period of transformation, followed by an upheaval, a backlash and finally a resolution. He considers that we are living through what he calls the Globotic Transformation, the third great economic transformation caused by globalization and automation. AI automation is one of the innovations that will cause jobs displacement and according to the many sources he scoured: «*Almost all the experts expected substantial job displacement by AI. What they differed on was whether there will be*

*equally impressive job replacement»* (Baldwin 2019, p.162). Therefore, the main problem is not only whether this new technology will disrupt labour, but also how fast is the pace of job destruction and whether it can be matched by job construction. We should prepare ahead for the upcoming disruption by asking governments for the right policies and regulations, instead of banning AI altogether, «*Big disruptions also create new policy needs and we should start working now so that AI is harnessed in a way that society benefits, that businesses benefit and that workers benefit»* (Baldwin 2019, p.226). The advent of previous disruptive technologies showed us that, no matter how scared we are, the future catches up sooner or later, so we better accept the changes. There are already new AI-related jobs on the market, such as Machine Learning Engineers, AI Data Scientists and Prompt Engineers, but according to the McKinsey Report, *The state of AI in 2023: Generative AI's breakout year*, most of the respondents expect to be reskilled in the next three years and that there will be little or no change in number of employees (Fig. 99) (Chui 2023). We can see then that at the moment AI is included in the workspace and is used as a power tool to improve quality and efficiency, to cut costs and increase revenues.

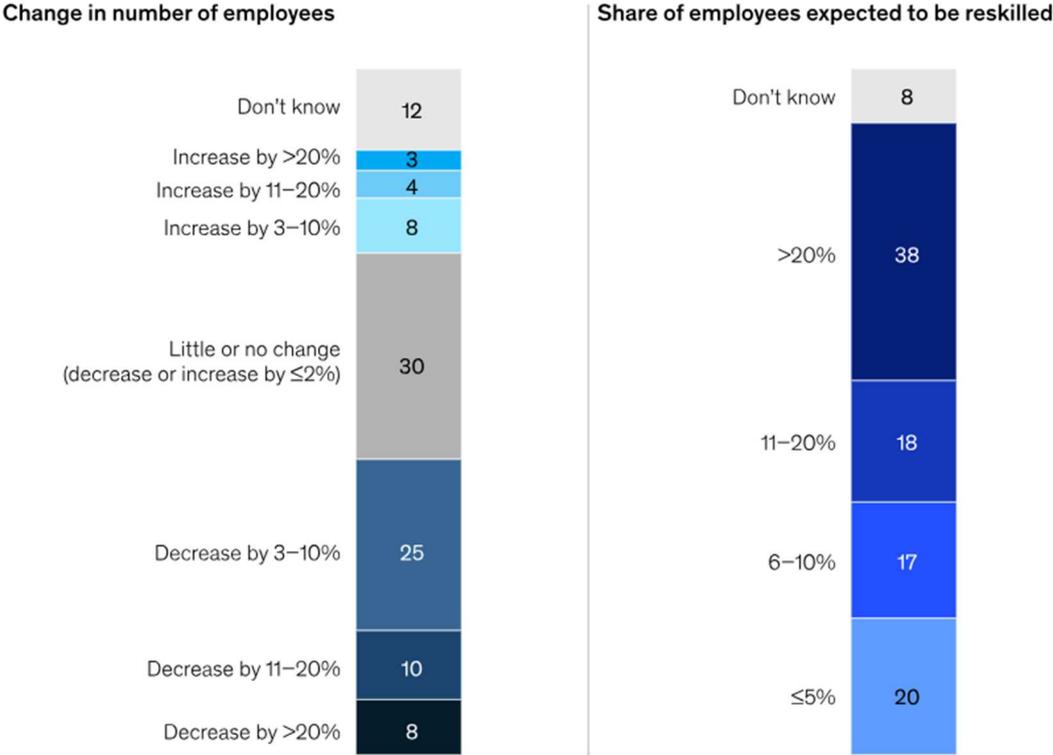
*“Generative AI can be used to write code, design products, create marketing content and strategies, streamline operations, analyze legal documents, provide customer service via chatbots, and even accelerate scientific discovery. It can be used on its own or with “humans in the loop”; the latter is more likely at present, given its current level of maturity.”* (Ellingrud et al. 2023, p.12)

On a research conducted by McKinsey about the future of work in America, the data don't indicate job losses, but they don't exclude the possibility. One thing is certain though, life-long-learning and reskilling are extremely important to stay relevant and to be competitive, because it's proven that AI is changing and will continue to change work activities (Ellingrud et al. 2023).

For instance, the occupations where there is an increasing labour demand and high change of work activities are STEM professionals, Creatives and arts management, Business and legal professionals and Education and workforce training. While in Customer service and sales there is a decreasing in labour demand with a change in work activities. Jobs characterised by repetitive tasks, data collection and elementary data processing will be easily replaced by automated systems. The burden of helping society

# Survey respondents expect AI to meaningfully change their organizations' workforces.

Expectations about the impact of AI adoption on organizations' workforces, next 3 years, % of respondents<sup>1</sup>



Note: Figures may not sum to 100%, because of rounding.  
<sup>1</sup>Asked only of respondents whose organizations have adopted AI in at least 1 function; n = 913.  
 Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

**Fig. 9: The expected impact of AI on organizations' workforces. (Source: McKinsey 2023b)**

deal with the changes brought by AI and innovation doesn't stand only on the shoulders of the government though. Companies could invest in training and reskilling their workforce to help them overcome the difficulty that comes from adapting, or they could change altogether the way they hire people focusing on their potential and training them on the job.

*“To capture the full benefits of generative AI to make knowledge work more productive, employers, policy makers, and broader ecosystems would need to establish clear guidelines and guardrails—and workers would need to see these tools not as job destroyers but as work enhancers.” (Ellingrud et al. 2023, p.18)*

- **AI takeover:** Strictly related to AI regulation is the issue about safety, meaning how safe is this new technology? Many have expressed concern toward the possibility of AI

becoming super-intelligent and overcoming humanity. Merely hypnotized by sci-fi writers and filmmakers, now researchers and entrepreneurs – such as Elon Musk – are frequently vocal about the impending doom of AI. But should we be scared or not?

Essentially, not right now. According to Joanna J. Bryson, from the University of Bath, firstly we are far from achieving artificial general intelligence (AGI), secondly, she distinguishes between human-like AI and AI capable of learning without limits. She suggests that the former is unachievable because the flaws and limits of the human mind would be therefore replicated into the AI, while the latter, an AI that learns how to learn, according to her is not ludicrous, but to avoid unintended consequences or hazards we need to regulate them. (Bryson, 2018)

The solution of regulation has already been proposed by others, like Sam Altman during his testimony in front of the US Senate, as previously stated. John Coogan, entrepreneur and YouTuber, compares the regulation of AI to that of nuclear power and uses it as a case study. He points out that both these technologies have two possible uses, from the government and from civilians, and the worst-case-scenario would be that civilians can't access this technology while governments build AI weapons (Coogan 2023<sup>1</sup>). So, as most of the time, the truth lies in the middle and it's essential to find the right balance between safety and regulation, an example of this are the Asilomar AI principles, developed at the beneficial AI 2017 conference (Future of Life Institute 2017). These principles give researchers and people some guidelines to use AI in a beneficial way. The first section is focused on research issues, pointing out that the goal of AI research should be to create beneficial intelligence, funding should be preceded by an inspection to make sure of its beneficial use. Furthermore, researchers and developers should be transparent to each other and have exchanges with policymakers, and finally developers should follow safety standards. The second section is centred on ethics and values such as safety, failure of transparency, judicial transparency, responsibility, privacy, liberty, but also in alignment with human values such as dignity, rights, freedom, and cultural diversity. It focuses on the importance of benefit for all humanity, human control, non-subversion and to avoid the creation of lethal autonomous weapons. Finally, the last section is about long-term issues like the capability caution, asking to avoid strong assumption on future AI

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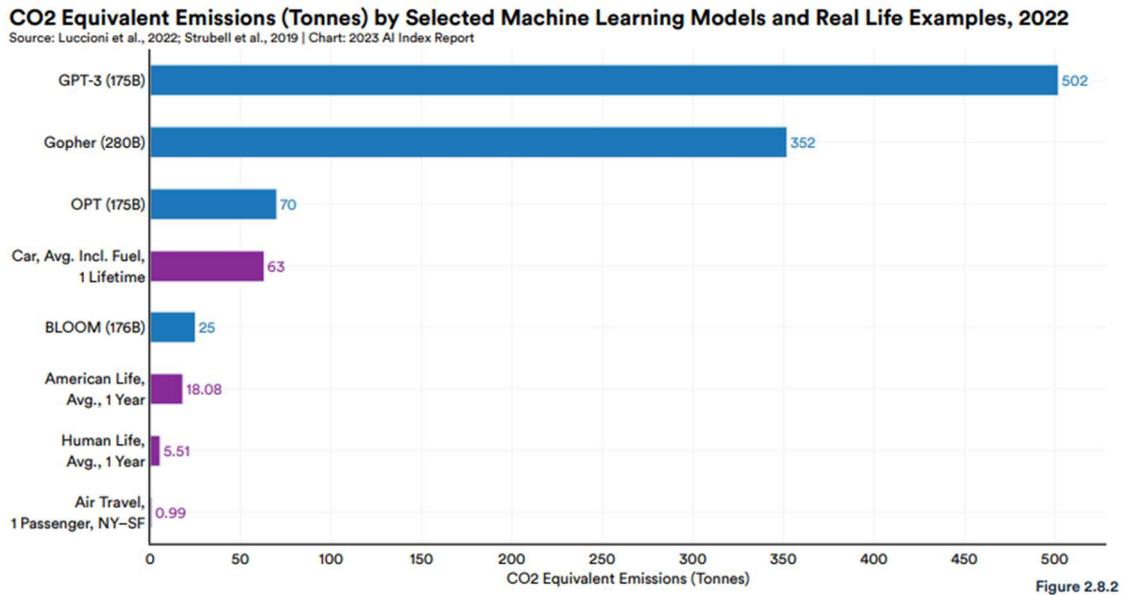
<sup>1</sup> From a YouTube video created by John Coogan, entrepreneur and youtuber: [https://www.youtube.com/watch?v=Heqb3W8Jw\\_E](https://www.youtube.com/watch?v=Heqb3W8Jw_E).

capabilities, but also the importance of managing AI considering the changes it could set in motion, both in positive and in negative. Ending with the principle of common good:

*“Superintelligence should only be developed in the service of widely shared ethical ideals, and for the benefit of all humanity rather than one state or organization.”* (Future of Life Institute 2017)

- **Energy consumption and carbon footprint:** climate change, pollution and global warming are the most sensitive issues of this century, but rarely they are put in relation to technology. AI has a huge environmental impact that no one is talking about. In 2019 some researchers of the University of Massachusetts, published a paper exposing the energy consumption needed to train neural networks, in particular Natural Language Processing. *«These models are costly to train and develop, both financially, due to the cost of hardware and electricity or cloud compute time, and environmentally, due to the carbon footprint required to fuel modern tensor processing hardware»* (Strubell 2019, p.1). They compared four models: the Transformer, ELMo, BERT, and GPT-2 and measured the energy consumption needed to train them. Then they converted it into pounds of carbon dioxide, for example, BERT had a footprint of 1,507 pounds of carbon dioxide, which is approximately the amount of a trip for one on a plane from New York to San Francisco and back. What's worse is that training is the minimum amount of work required, they often need many rounds of tuning and training.

A more recent study shows even more shocking results. Luccioni, Viguier and Ligozat estimated the carbon footprint of the BigScience Large Open-science Open-access Multilingual Language Model (BLOOM), a language model. Among the machine learning models, large language models are the biggest and therefore require more time to train and, therefore, they emit more carbon dioxide (Luccioni et al. 2022). In Stanford's AI Index 2023 Annual Report the estimates on carbon emissions are translated into real-life examples: *«BLOOM's training run emitted 1.4 times more carbon than the average American uses in one year and 25 times that of flying one passenger round trip from New York to San Francisco. BLOOM's training consumed enough energy to power the average American home for 41 years»* (Maslej et al. 2023, p.120). Please, take time to compare it with the previous example, BLOOM is 25 times that. Related to other language models its consumption is even limited (Fig. 10).



**Fig. 10: Machine Learning Model’s CO2 emissions (Source: Maslej et al. 2023)**

As a response, the movement “Green AI” has been developed, with the aim to make machine learning cleaner, and in general researchers are more sensitive on the matter and want to know how much carbon dioxide their experiment is producing and what can be done to reduce it. Some researchers from Stanford, Facebook AI Research and McGill University have developed «an easy-to-use tool that quickly measures both how much electricity a machine learning project will use and how much that means in carbon emissions» (Andrews 2020). Keeping track of consumption helps them decide where to continue their research, because doing it in a country that relies on oil or fossil fuels has a different impact than one that relies on sustainable sources. This also allows them to choose an algorithm that performs the same but that uses less power:

*«At Stanford, for example, more than 200 students in a class on reinforcement learning were asked to implement common algorithms for a homework assignment. Though two of the algorithms performed equally well, one used far more power. If all the students had used the more efficient algorithm, the researchers estimated they would have reduced their collective power consumption by 880 kilowatt-hours – about what a typical American household uses in a month» (Andrews 2020)*

- **Privacy and Surveillance:** Big Data have created a system called Surveillance Capitalism, where data are the currency. We feed this system by navigating the internet, every action disperses some data and gives information about ourselves, our preferences, our location, our lifestyle and so on. It is not new that in the age of surveillance capitalism

we have little if no privacy and AI has the potential to increase the consequences. Big data allow the storage and accessibility of infinite data, AI and AI-based algorithms can find patterns within these set of data and build our “profile” by understanding our political ideas, our economic status and even our feelings.

*«We have lost the default assumption of anonymity by obscurity. We are to some extent all celebrities now: any one of us can be identified by strangers, whether by facial-recognition software or data mining of shopping or social-media habits» (Bryson 2018, p.14).*

This information can be used then to manipulate us and to shape the future, as it happened in 2016 when two major political elections changed the course of history: Trump’s presidential election and Brexit. Only two years later the world discovered that Cambridge Analytica, the data analytics firm working for both campaigns, harvested millions of Facebook profiles and used them to build a software able to influence voters (Graham-Harrison 2018).

Other extreme practices have been used in foreign countries like face identification in China. A report by Human Rights Watch (HWR) released in 2020 exposed how Chinese authorities installed in Xinjiang a camera system based on facial recognition to select Muslims to detain in “re-education centres”. The region is home to 12 million of Uyghurs, a Muslim ethnic minority, and millions of them have been detained based on personal data collected with or without consent from 2016. The program was called Integrated Joint Operations Platform (IJOP) and used facial recognition, information from smartphones and personal computers, and spyware to profile the citizens and to decide who to send in the “re-education centres”. According to HWR this type of predictive policy is based on the presumption of being guilty until proven innocent and it is a violation of fundamental human rights. What is even more scary is the fact that people were flagged also for lawful behaviour, like their relationship, their communications, being related, travelling or meeting someone considered suspicious. And they were detained for many reasons, like practicing Islam, travelling in certain countries, switching off the phone too much, using specific software, being “generally untrustworthy”.

*«Those facing detention have no right to due process, including access to lawyers and family members, or a chance to stand trial to contest such allegations. The use of intrusive surveillance, including in and around*

*people's homes, also violates everyone's right to privacy» (Human Rights Watch 2020).*

A true genocide was taking place, those who resisted were punished, beaten, placed in solitary confinement and tortured. Many were killed and others took their lives. That's why regulations like the GDPR for the European countries are fundamental to protect the citizens but also specific AI regulation needs to take place. Other solutions are mainly acts of civil disobedience that allow citizens to remain as anonymous as possible, for example an Italian startup, Cap\_able has designed knitted garments that shield facial recognition (Fig. 11).

- **Bias:** Another issue related to facial recognition happens when the algorithm is biased. Before explaining how that happens, let's take a step back to see what algorithmic bias means:

*“Algorithmic bias is measured in terms of allocative and representation harms. Allocative harm occurs when a system unfairly allocates an opportunity or resource to a specific group, and representation harm happens when a system perpetuates stereotypes and power dynamics in a way that reinforces subordination of a group. Algorithms are considered fair when they make predictions that neither favor nor discriminate against individuals or groups based on protected attributes which cannot be used for decision-making due to legal or ethical reasons (e.g., race, gender, religion)”. (Maslej et al. 2023, p.130)*

In facial recognition, that happens because, while training an algorithm, the dataset can harbour stereotypes and remove them is hard. Facial recognition is based on machine



**Fig. 11: Demonstration of how Cap\_able clothes shield from AI facial recognition. (Source: <https://www.capable.design/>)**

learning algorithm, in order to “see” and recognize a face, they are trained with a set of pictures labelled as “face” or “not a face” and with time it will be able to distinguish a face to everything else. However, these models are trained with data that come from society, so any biases in society reflected in the data will be propagated or even amplified by AI. A training set not diverse in terms of phototypes is enough to create a biased AI.

*“Generative models also reflect the biases in the datasets on which they are trained. As many large datasets are collected from the internet by automated systems, it can be difficult to remove these biases, especially when the images are unlabeled. If samples from generative models trained on these datasets proliferate throughout the internet, then these biases will only be reinforced further”.* (Ho 2020, p.9)

Many researchers realized this problem and were vocal about it around 2017, one of the loudest was probably Joy Buolamwini, MIT grad student that started to notice this problem while working with a facial analysis software that couldn’t detect her face. Another example she showed was that AI couldn’t label the correct gender when looking at pictures of black women, even famous ones like Michelle Obama or Serena Williams. As she pointed out in a Ted Talk, the problem becomes far more serious when it leads to discriminatory practices. In fact, the US police started to use a biased facial recognition software that wasn’t good at recognizing black people, this confusion even led to wrongful arrests (TED 2017<sup>1</sup>). The first one to be wrongfully arrested based on a false facial recognition hit was Robert Williams in 2020. This problem was brought to light back in 2016 by a Georgetown Law’s study, it pointed out that the main difference was that:

*“Historically, FBI fingerprint and DNA databases have been primarily or exclusively made up of information from criminal arrests or investigations. By running face recognition searches against 16 states’ driver’s license photo databases, the FBI has built a biometric network that primarily includes law-abiding Americans”* (Garvie et al. 2016).

Facial recognition isn’t the only threat though, other AI algorithms can be biased and lead to discrimination or unfairness. During the Grace Hopper Celebration (GHC) 2018, Buolamwini listed potential harms from algorithmic decision-making (Fig. 12):

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<sup>1</sup> Buolamwini’s TED Talk: [https://www.youtube.com/watch?v=UG\\_X\\_7g63rY](https://www.youtube.com/watch?v=UG_X_7g63rY)

POTENTIAL HARMS FROM ALGORITHMIC DECISION-MAKING		
INDIVIDUAL HARMS		COLLECTIVE SOCIAL HARMS
ILLEGAL DISCRIMINATION	UNFAIR PRACTICES	
HIRING		LOSS OF OPPORTUNITY
EMPLOYMENT		
INSURANCE & SOCIAL BENEFITS		
HOUSING		
EDUCATION		
CREDIT		ECONOMIC LOSS
DIFFERENTIAL PRICES OF GOODS		
LOSS OF LIBERTY		SOCIAL STIGMATIZATION
INCREASED SURVEILLANCE		
STEREOTYPE REINFORCEMENT		
DIGNATORY HARMS		

Fig. 12: slide from Buolamwini’s session “AI, Ain’t I A Woman?” at GHC (Source: AnitaB\_org).

they can decide who gets hired, who has access to housing or college admission, credit decisions and different prices while shopping online. In 2018, for example, Amazon’s recruiting engine based on machine learning was biased against women (Dastin 2018). The models were trained to score applicants by observing pattern in resumes submitted to the company during the 10 years prior. Since most of them were from men, the AI learned by itself to penalise women. Another example can be found in machine translation, Google’s researchers found out that their performance dropped between 2% and 9% when the translation included the feminine pronoun “she”, while the performance reached its peak (between 97% and 100%) when the sentences were built with the masculine pronoun “he” (Maslej et al. 2023). Finally, also text-to-image models can be biased, a study reported in the AI Index 2023 Annual Report showed that Stable Diffusion and Dall-E2 at the prompt “CEO” produced almost all men in suits. Midjourney’s results at the prompt “influential person” created mainly old white-haired men and only once a young woman. Similarly, after the prompt “someone who is intelligent” the results were old white men with glasses that recalled Albert Einstein.

In 2022 Data Robot released a report on the state of AI Bias with the collaboration of the World Economic Forum and they noticed that the problem of biased AI was still standing, with a third of the organization surveyed experiencing challenges because of bias in their algorithms like loss of revenue, customers, and employees, but also higher legal fees caused by lawsuits or legal actions. The comforting part is that it is recognized as a

problem that needs to be solved and they are attempting to mitigate AI bias by checking data quality, training employees on AI bias, hiring experts and measuring AI decision-making factors (Kwartler 2022).

Buolamwini founded the Algorithmic Justice League to fight this, and she proposed as a solution, what she calls “inclusive coding”, meaning that the team working on a software should be as diverse as possible, fairness should be cornerstone of every project, and finally the aim should also consider equality and social change. In practice, it also means building platforms that can identify bias, building more inclusive training sets and thinking about the social impact of the technology that is being developed. The most difficult step toward an unbiased AI is solving the “black-box effect”: understanding the reasons for AI decisions. But the definitive solution is probably – again – regulation.

*“The complexity (and controversy) around AI bias has made one thing clear: humans and AI are deeply intertwined. Human involvement in AI systems remains – and will continue to remain – essential. By leveraging AI experts who know how to optimize both sides of the human-AI coin, organizations can ensure that AI is free from human flaws, and humans are free from AI biases.”* (Kwartler 2022, p.16)

- **AI incidents:** in 2019 was created an open, independent, and public dataset that collects all the incidents and controversies related to AI, the AI Algorithmic and Automation

**Number of AI Incidents and Controversies, 2012–21**

Source: AIAAIC Repository, 2022 | Chart: 2023 AI Index Report

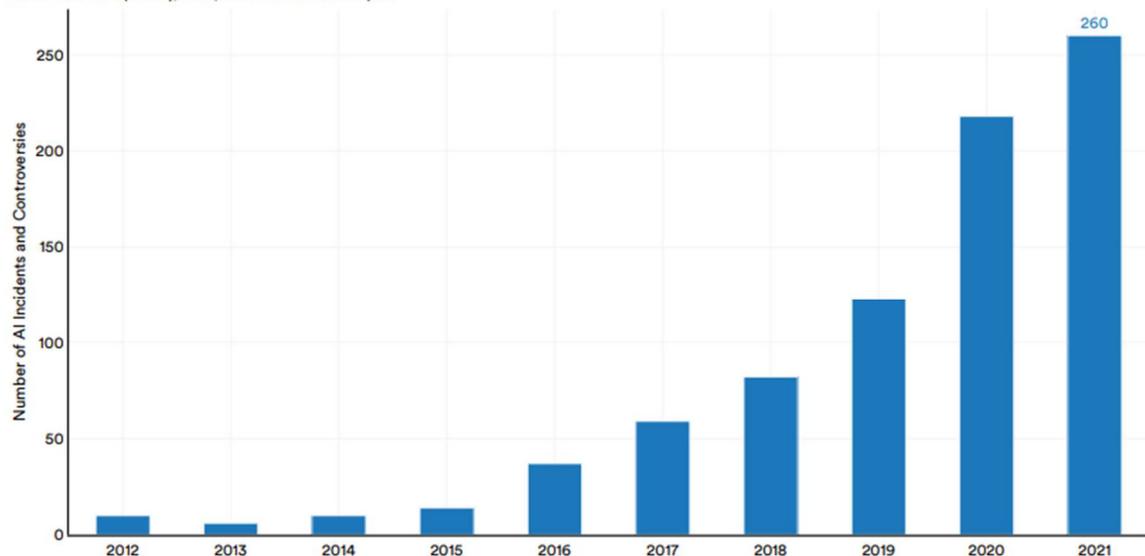


Figure 3.2.1

<sup>1</sup> This figure does not consider AI incidents reported in 2022, as the incidents submitted to the AIAAIC database undergo a lengthy vetting process before they are fully added.

**Fig. 13: Chart of the number of AI incidents and controversies from 2012-2021. (Source: Maslej et al. 2023)**

Incidents and Controversies (AIAAIC) Repository. Looking at the chart published in the *AI Index 2023 Annual Report* (Fig. 13) we see how the number of AI incidents and controversies spikes up from 2012 to 2021 (Maslej et al. 2023). The reasons behind the increase of reports can be related to the diffusion of AI adoption and use, but also to increased awareness of what is considered an incident. Deepfakes videos or images that can cause disinformation, especially if related to sensitive subjects, are among the reports. Others are related to issues of privacy and discrimination, like the fact that some prisons in US use AI to scan the inmates’ phone calls, and these systems tend to make mistakes when transcribing conversations of black people. Finally, one last examples is more of ethical nature, many people have accused Midjourney of copyright infringement because it was trained using human-generated images without permission and without acknowledging the sources.

**Benefits**

Nowadays, AI is part of our everyday life so much that it is difficult for us to spot it, we take it for granted in some cases, as if shouting from one room to another “Alexa, turn down the volume!” had always been normal. Instead of making a list of all the benefits – that would be difficult and impossible to end – the following paragraphs will convey how society is benefiting from AI through real-life examples.

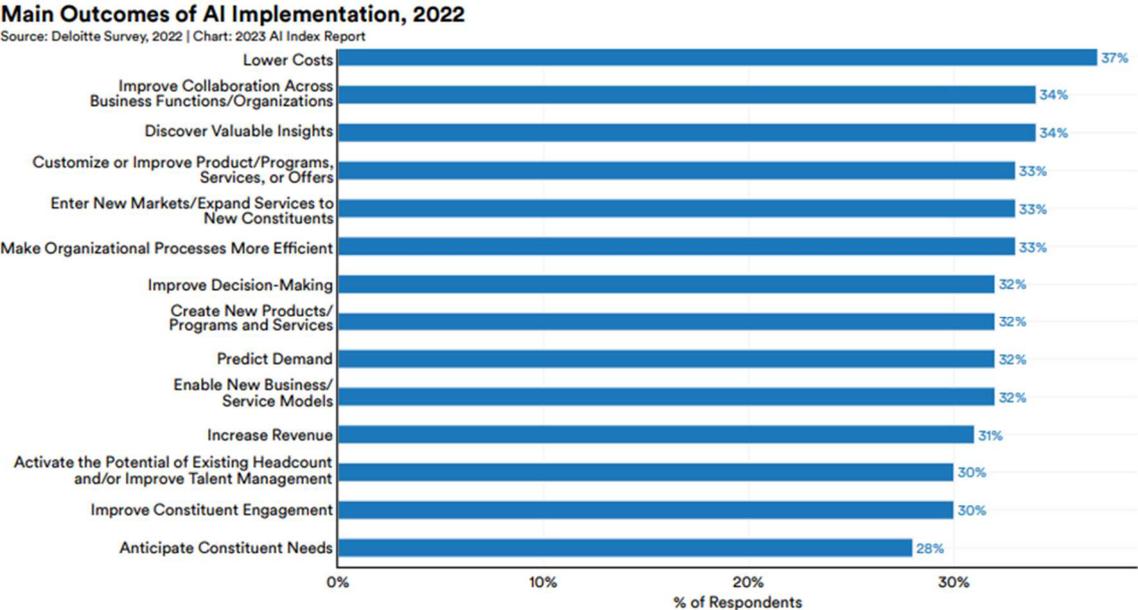


Figure 4.3.16

**Fig. 14:** Bar graph showing the main outcomes of AI implementation. (Source: Maslej et al.2023)

The AI Index 2023 Annual Report described a Deloitte Survey on the “State of AI in Enterprise” showing the perception of some of the benefits AI brings to the table in a business environment. 82% of the respondents believe that AI enhances performance and job satisfaction, and the graph (Fig. 14) shows the upsides of AI implementation: lowering costs comes first, followed by improving collaboration, discovering insights, customize or improve products, programs, services or offers and so on (Maslej et al. 2023). Here’s some examples of AI implementation:

### **Increased Productivity: Coding**

AlphaCode is a machine learning system developed by DeepMind that has a human-like level of coding. It reached the top 54.3% in programming competitions on Codeforces showing skills that space from critical thinking, logic and understanding of natural language. During these competitions participants have a few hours to solve a set of long problems and then they are ranked based on how many they solve, these types of problems can also be used during software engineers’ hiring processes. AlphaCode team aim at creating a problem-solving AI that can assist programmers in code generation, improve their productivity and make coding more accessible for those who don’t know yet how to code.

Another example of AI that can assist coders is GitHub Copilot, a generative AI system that turns natural language prompts into coding, it works especially well for Python, JavaScript, TypeScript, Ruby, Go, C#, and C++. GitHub surveyed two thousand developers in 2022 and they reported that working with Copilot improved their productivity, satisfaction, and efficiency. GitHub tested these results recruiting 95 developers and gave them a coding task, half of them could use Copilot, the other half couldn’t. Those who used Copilot had higher completion rate and it took them 56% less time than those who didn’t use Copilot. (Maslej et al. 2023)

### **Better Life Quality: Service Robots**

Service robots are «*robot in personal use or professional use that performs useful tasks for humans or equipment*» (IFR n.d<sup>1</sup>). They have a degree of autonomy, it can be full, meaning that they can perform tasks without human intervention at all, or partial, so with only human-robot interaction. Among the professional applications they can be used in transportation and logistics, hospitality, medicine, professional cleaning, and agriculture.

*“Robots are improving our daily lives in an increasing variety of ways - helping paraplegics to walk again, improving the quality of the healthcare we*

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<sup>1</sup> Definition taken from International Federation of Robotics (IFR): <https://ifr.org/service-robots>



**Fig. 15: Screenshots taken from Intel video series Autonomous Mobile Robots showing AMRs. (Source: Intel.com)**

*receive, reducing the time we spend on household chores, making our retail experience more productive, keeping our homes safe, enabling us to eat fresher foods, with lower impact on the planet's natural resources, and enabling the recycling of a wide variety of materials that are harmful to the environment if left to decompose. Whether in front of us, or behind the scenes, robots are making a substantial impact on the quality of our lives and the sustainability of the planet.” (IFR n.d.<sup>1</sup>)*

For example, it's becoming more and more normal the use of robotically assisted surgical (RAS) system in healthcare, in urology for gall-bladder removal, in gynaecology for hysterectomies, but also in cardiology and orthopaedics. RAS systems allow for more precise procedures and reduce the risk of complications. These kinds of systems are usually trained with machine learning and deep learning techniques. Moreover, autonomous mobile robots (AMR) can be used in dangerous environments such as nuclear power plants, chemical industries, buildings at risk of collapse. The upsides are that workers are exposed to less risks, AMRs are more precise and less prone to error caused by fatigue or poor environmental conditions, and they reduce costs. Therefore, they increase safety, efficiency, productivity and flexibility. They can navigate autonomously thanks to sensors, artificial intelligence, machine learning and cameras, allowing them to help in manufacturing, warehouses, agriculture and customer service in retailing, banks and hospitality (Fig. 15).

### **New Scientific Discoveries**

Artificial Intelligence can accelerate scientific discoveries and unlock some that were previously out of reach, especially since the rise of data science in 2010, when deep learning could be used to identify relevant patterns in large datasets.

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<sup>1</sup> Ibidem.

*“Artificial intelligence (AI) is increasingly used across scientific disciplines to integrate massive datasets, refine measurements, guide experimentation, explore the space of theories compatible with the data, and provide actionable and reliable models integrated with scientific workflows for autonomous discovery.”* (Wang et al. 2023, p.47)

For example, in February 2022, DeepMind worked with the Swiss Plasma Center and developed the first deep reinforcement learning system to help the tokamak control the unstable particles of hydrogen plasma inside. The tokamak contains the hydrogen plasma used for the nuclear fusion, the plasma is incredibly unstable, and it needs a control system able to adjust the voltage of the magnetic coils inside the tokamak thousands of times per second (Degraeve et al. 2022). DeepMind is currently working in many other fields, such as quantum chemistry, pure mathematics, material design and weather forecasting.

### **AI improving AI**

Thanks to reinforcement learning, AI can improve itself, an example has been carried out in 2022 by Nvidia. They designed arithmetic circuits for the first time using deep reinforcement learning. These circuits are GPUs called PrefixR, which are chips, essential to AI training. The AI created smaller and faster GPUs than those designed by state-of-the-art electronic design automation (EDA) tools. A circuit performance is better if it's small, because then more circuits fit on a chip, and if it's fast, so there is less delay and finally if it consumes less power.

*“Reinforcement learning is a way of programming agents by reward and punishment without needing to specify how the task is to be achieved”* (Kaelbling et al. 1996, p.1). An agent is able to perceive the environment, take action autonomously and improves its performance by learning, with reinforcement learning the agent learns through trial and error trying to minimize the errors and maximise the right choices.

### **Lowering Barriers with Machine Translation**

Natural language processing (NLP) is the ability of computer systems to understand text. They can comprehend a text, summarize texts, understand whether a hypothesis is true or false (natural language inference), analyse the sentiment of a text, translate languages and text production. Language is the key to inclusion, being able to communicate and to read online content is fundamental to access information. Yet, many languages are not properly translated by the most common translation tools available online. That's why Meta developed No Language Left Behind (NLLB), an open-source project. It can translate 200 languages and works well also for low-resource languages that lack of data like Assamese and Zulu. At the moment there isn't a

commercial version of NLLB, the most used and known services of machine translation are DeepL and Google Translate but they are focused on European languages, DeepL offers translation for around 30 languages while Google Translate 133 languages.

Machine Translation is only one of the skills of NLPs that are increasingly making the headlines for their abilities, like Open AI's ChatGPT. It can be used for diverse applications, like translation, classification, creative writing, and code generation. In fact, according to a recent research paper, ChatGPT will probably affect 10% of the work tasks of 80% of the US workforce, while 19% of the workers will see that half of their tasks will be impacted (Eloundou et al.2023).

### **Improving Security, Health and Creativity with Computer Vision**

«*Computer vision is the subfield of AI that teaches machines to understand images and videos*» (Maslej et al. 2023, p.81). Some of its real-world applications are autonomous driving, crowd surveillance, sports analytics, and video-game creation. For example, for security reasons, Celeb-DF is a video dataset containing more than five thousand Deepfake videos of celebrities that will help in their detection through the development of algorithms. It's a step ahead to other already existing datasets because the quality of the video used in the dataset is incredibly high, as a result it will have better results in the detection of high-quality Deepfake videos (Li et al. 2019). Image recognition offers a strong support also for medical diagnosis, for example in 2019 several researchers developed Kvasir-SEG, an open-access dataset of gastrointestinal polyp images. Being able to recognize the presence of polyps at an early stage could mean also saving lives since they are precursors of colorectal cancer (Jha et al. 2019). Other than that, computer vision can improve creativity and efficiency, it is in fact used for image generation in text-to-image AI models like DALL-E 2 (Open AI), Imagen (Google), Stable Diffusion (Stability AI) and MidJourney (OpenAI). In the following picture (Fig. 16) we can see a nice experiment found in the *AI Index 2023 Annual Report*. They typed the same prompt «*A panda playing a piano on a warm evening in Paris*» in DALL-E 2, Stable Diffusion and MidJourney (Maslej et al. 2023, p.90). Finally, it's also useful for video generation, in 2022 Meta developed Make-A-Video, that allows to generate video from a short text description. Make-a-Video has been trained with unsupervised learning on unlabelled videos to learn realistic motion and access a larger quantity of data, this allowed it to access also fewer common representations (Singer et al. 2022).

### **Helping the Blinds to See**

Blind people can gain benefits from Deep Learning, from diagnosing eye-diseases in time, to helping them read. Thanks to AI smart devices, like eyewear with a built-in camera, that can convert images into speech and text into speech, they can read, recognize obstacles and in some cases faces, allowing visually impaired people to see what they usually can't (Wang et al. 2023b).

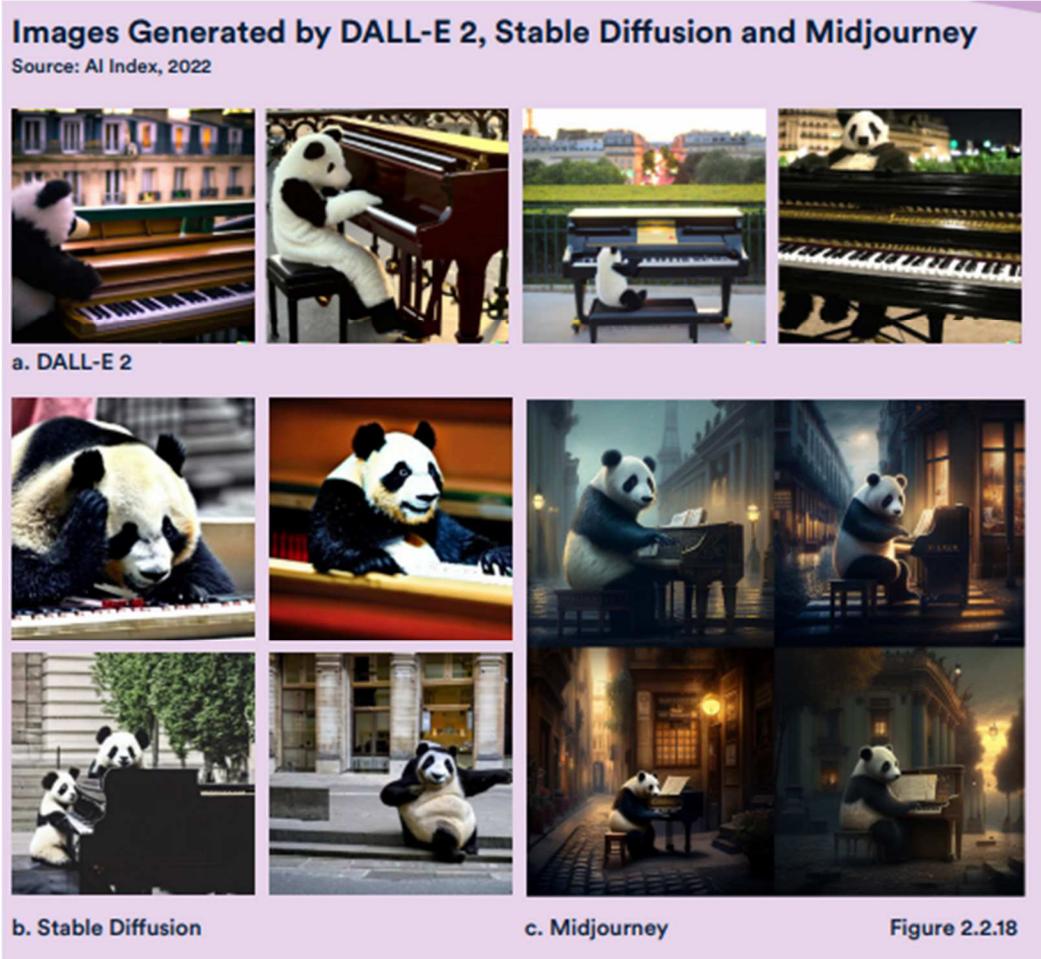


Fig. 16: Generated images with the same prompt by different AIs. (Source: Maslej et al. 2023)

## **Chapter 2: Artificial Intelligence and Marketing**

One of the fields that can gain many advantages from using AI is marketing. The proof of its potential comes also from private investment data, those reported by the *AI Index Annual Report* show that the investment on marketing and digital ads has increased between 2017 and 2022, going from approximately one billion, to reaching 3,05 billion dollars (Maslej et al. 2023). Thanks to the ability of this new technology to collect big data, analyse them, find patterns, and make predictions, marketers can automate the most tedious and repetitive tasks, cut costs, increase efficiency, and even reach levels of optimization that without AI would be unimaginable. Before listing useful tools and tips to implement artificial intelligence in a marketing strategy, I have considered the academic research of Artificial Intelligence Marketing.

### **Academic Research of AI in marketing**

Looking at the bibliometric research of Anayat and Rasool we can see that a real interest in AI marketing research started to develop in the 2000s, although the number of publications was still low until 2017, after which it boomed from 11 publications a year to almost 100 in 2021. Clustering the most cited papers using keyword co-occurrence analysis they found six clusters. The first one is “*AI for data analytics*”, showing a focus on technologies like machine learning and other learning algorithms to analyse data, and therefore optimize content, understand trends in the customer behaviour and analyse social networks’ data. The second cluster is “*AI for decision making*” for the use of AI to develop marketing strategies that require segmentation, targeting, positioning using data acquisition. The third cluster is “*AI for digital behaviour*”, as the keywords point out, this cluster focuses on digital behaviour and marketing automation. The fourth is “*AI for consumer service*” and is a cluster of research about personalized customer service and customer experience enhancement using AI-based robots and virtual agents. The fifth is “*AI for predictive analysis*” showing an interest in predicting consumer behaviour, trends, and costs. Finally, “*AI for design thinking*” is the last cluster of research about the use of AI in product development, product design, marketing strategies and product recommendation systems (Anayat and Rasool 2022).

According to Huang and Rust (2020), the research on AI in marketing can be divided in four types:

1. Technical AI algorithms for solving specific marketing problems.
2. Customer’s psychological reactions to AI.

3. Effects of AI on jobs and society.
4. Managerial and strategic issues related to AI.

Among the studies of technical AI algorithms for solving specific marketing problems we find the paper of Chung et al., *Adaptive personalization using social networks*, where they developed a system to personalise mobile news using data gathered from customer behaviour analysis and social network. So, the news feed adapts automatically according to the type of news the person reads and what is shared on social media. Their point being that automated adaptive personalization is better than letting the customers do it by themselves (Chung et al. 2015). In a prior article, *My Mobile Music: An Adaptive Personalization System for Digital Audio Players*, they suggested for the first time the use of the same adaptive personalization system specifically for digital audio players, that automatically personalises the experience for each customer, offering them customized playlists (Chung et al 2009). Another example is the article *Recommending products when consumers learn their preference weights*, where they demonstrate empirically that consumers often learn their preference weights – the preferred attributes in a product – while they look for it, and automated recommendation systems can predict and help them understand what they actually want and need during this process, not only what they would like based only on their previous preferences (Dzyabura et al. 2019). So, the research for technical AI algorithms is related to data analysis, personalized customer experience, recommendation systems and prediction of customer behaviour.

A research paper about customer's psychological reactions to AI is, for example, the article of Luo et al. (2019), *Machines versus humans: the impact of AI chatbot disclosure on customer purchases*, where they conducted an experiment on 6200 customers, who received sales call either from chatbots or humans, the results suggest that when chatbots were undisclosed, they were as effective as experienced workers, and more effective than inexperienced ones. While disclosing the identity of the chatbot reduced by almost 80% the purchase rate (Luo et al, 2019). Another similar study is the one from Mende et al. (2019) in which they investigate the interaction between consumers and humanoid service robots (HSR) and the concept of the uncanny valley, according to which humans are uncomfortable when interacting with human-like robots. They report to seven studies showing that consumers display compensatory responses when dealing with HSR but not with humans, meaning that HSR create a sense of threat and discomfort in the consumer that, to compensate, consumes more, purchasing status goods, ordering, and eating more unhealthy food and looking for social affiliation. These types

of coping mechanisms decrease when customers experience social belonging, when the food is healthy or when they are reminded that the HSR is merely a machine (Mende et al., 2019). The research issues in this case are the perception of AI and the consequences it has on consumer behaviour, when and if it has upsides and downsides. The third field of AI marketing research is concerned on the effects of AI on jobs and society. Frey and Osborne (2017), for example, drew up a novel method to classify occupations on their vulnerability to computerization and used it on 702 occupations. They focused on the destruction effect of technology, estimating that 47% of US employment is at high risk of computerization, for example the automation of logistics and transportation. They also considered jobs at medium and low risk, that will need more time to be at risk as there's a technological bottleneck to overcome for them to be computerized. It tackles the consequences computerization has on labour market, like its polarization, where employment grows for high income cognitive jobs or low-income manual jobs, leaving a hole for middle-income routine jobs (Frey & Osborne 2017). Human redundancy, as mentioned in the previous chapter, is one of the aspects that worries more our society, especially because of the fast pace at which innovation is being developed. This stream of research tends to look at the past to explain the future. Understanding the story of technological innovation and the consequences it had on society and job evolution can help researchers hypothesize what will happen in the foreseeable future, and therefore prepare society to embrace change in a beneficial way. To help businesses understand how AI can and should be used, and to suggest workers which skills to achieve (Huang & Rust 2018). Finally, for the last branch of research, the managerial and strategic issues related to AI, Huang and Rust propose a framework, as this stream «*lacks a solid academic basis*», according to them (Huang & Rust 2020, p.1). This framework is composed of three stages: (1) marketing research, (2) marketing strategy and (3) marketing actions, and it offers a strategic plan to incorporate AI in marketing. Each stage can be split in three more steps, for each one of them AI can be implemented. They distinguish between three AI intelligences – although they admit that sometimes this distinction is fuzzy – (1) mechanical AI for automating repetitive and routine tasks, (2) thinking AI, to analyse data and find patterns, like ML and DL and (3) feeling AI, to interact with humans and analyse their feelings, like NLP and chatbots.

As we can see in the graphical summarization in Fig.17, the framework is actually a cycle:

*“Our cycle views strategic planning as a circular process, starting from conducting marketing research to understand the market, the firm, the*

competitors, and the customers; to developing strategies for segmentation, targeting, and positioning; and to designing specific marketing actions to execute the strategy. This cycle does not stop at marketing actions. The execution of marketing actions will feed back to marketing research as market data, which constitutes a continuous cycle for marketing research–strategy–action.” (Huang & Rust 2020, p.2)



Fig. 17: AI and strategic marketing decisions. (Source: Huang & Rust 2020, p.3)

## Marketing research

**Data Collection:** At this stage they suggest using mechanical AI to collect data about the market, the environment, the firm, the competitors, and the customers. The point of using artificial intelligence is to automate this process of data collection and analysis. For example, it is useful to analyse unstructured data, that according to Balducci and Marinova (2018) are an untapped resource with great potential, they consider data as speech, text, video, images and non-verbal – facial expressions and gestures – suitable for quantitative analysis. Machine learning algorithms can be used to extract insights from social media, customer reviews and online forums, analysing them using techniques like sentiment analysis, topic modelling and text classification can help find patterns and trend and therefore anticipate customer needs and preferences (Balducci & Marinova 2018). Another way to collect customer intelligence is by taking advantage of devices like Internet of Things (IoT) and connected devices to collect data on user experience. The gathered data are individual, this will help to build a tailored marketing strategy, insurance companies are already adopting it by drawing the data of each driver using sensors that allow to have a complete picture of the driver’s performance and therefore offer discounts or premiums

(Soleymanian et al. 2019). Furthermore, these data collection techniques are not limited to the online environment, physical brick-and-mortar retailers are tracking consumers in their stores to collect data on shopping habits and preferences. Sephora, for example, uses video surveillance to count the number of people entering the store, to create a store traffic flow map and heat maps, these data allow retailers to track the most trending products, notice pattern of behaviour, or optimize the space (Kirkpatrick 2020).

**Market Analysis:** Thinking AI is useful for market analysis: to identify competitors, to build a competitive product, to predict market trends and customers' preferences. For instance, the use of automated text analysis in consumer research is largely used to scan through consumer-generated content like text messages, reviews, tweets, emails, posts, and blogs (Humphreys & Wang 2017). Supervised and unsupervised-learning approaches are then needed to find patterns in data, for example by examining product reviews of competitors one can obtain information on what the consumers value most or if there is a market gap in a certain niche product. Another example of application consists in mapping market structured for retail using a neural network language model. It uses market basket data to analyse co-occurrences of items with other products in shopping baskets, allowing to see clusters of products that are usually bought together, like organic food or burger ingredients. These information help retailers design their aisles and shelves, placing clusters of products together increasing revenues, or they can be leveraged for promotions and target marketing creating leaflets to promote product from the same cluster, or to increase cross-selling (Gabel et al. 2019).

**Customer Understanding:** And finally, feeling AI to understand existing or potential customers' needs, «*who they are, what they want, and what their current solutions are*» (Huang & Rust 2020, p.34) through the analysis of emotional data gathered from social media, online reviews, and user-generated content. Timoshenko and Hauser (2019) proposed a way of identifying customer needs from user-generated content using machine learning, in particular convolutional neural network (CNN) for product development. They report as example of the importance of identifying customer needs a Japanese laundry detergent brand, Kao, that recognizing the need of Japanese population of a detergent in an easy-to-carry packaging, gained 50% of the Japanese market. Traditional methods to identify their needs – e.g., interviews and focus groups – are expensive and time-consuming and they demonstrate that machine learning achieves the same results more efficiently, faster and with less costs (Timoshenko & Hauser 2019). AI can be used also to understand more about potential consumers, Harley-Davidson is a

real case study. They used Albert, an algorithm that automatically optimizes campaigns on Facebook and Google. Albert analysed customer data from the customer relationship management (CRM), tested thousands of campaign variables like headline and visuals, and autonomously allocated the right budget to the most performing channel, as a result they increased sales by 2390% (Power 2017).

### **Marketing strategy**

**Segmentation:** The second stage starts with segmentation, which means that a company, from the data gathered before, slices the market in groups of consumers with similar needs or characteristics. Mechanical AI can do this thanks to its pattern recognition skills. Machine learning can be paired with text mining to segment loan customers into “good” or “bad” according to whether they are more or less likely to pay back the loan. Netzer and other researchers found out that other than the credit’s history and the demographics, another great indicator was the written text for the loan application required by crowdfunding platforms. Defaulting borrowers in fact tended to mention God, describe their family and hardships, plead, and overall, their writing style was consistent with those of «*extroverts and liars*» (Netzer et al. 2019, p. 961), meaning that intentionally or not they had doubts on their ability to repay the debt. Otherwise, Pitt et al. (2020) segmented art collectors using natural language processing, automated text analysis and correspondence analysis based on what they said about the art they own. The result was a psychographic customer segmentation that according to their personality traits revealed four clusters of collectors: open introverts, average Joes, closed extroverts, and agreeable introverts.

**Targeting:** Once the customers have been segmented, thinking AI can be used for targeting, choosing on which segment to focus the marketing actions. Simester et al. evaluated seven machine learning methods of targeting, finding out that model-driven methods are better than distance-driven methods or classification methods. Although when the data is not ideal the results are skewed (Simester et al. 2020). Another targeting method can be achieved using online browsing data. When browsing on the internet, cookies collect our data, and third-party data brokers profile customers making inferences using machine learning. According to their web-search, they profile each person considering their age, interests, and so on, creating a pre-packaged audience that is then sold to advertisers (Neumann et al. 2019).

**Positioning:** Finally, a company needs to find out the best position of the product or service in their consumers’ mind. This happens by building brand awareness through communication, such

as developing catchy slogan that are in tune with the company's mission and the customers' expectations. Slogans are part of a brand's image along with the name and logo, «*Slogans have three complementary functions: firstly to enhance a brand's image; secondly to aid in its recognition; and thirdly to help create brand differentiation in the consumer's mind*» (Gali et al. 2017, p.1) The academic research on the use of feeling AI is sparse, although large language models like ChatGPT are known for being a strong asset to copywriters, so due to the high creativity, this phase is still characterized by human and AI collaboration.

### **Marketing action**

Closing the cycle with the action, based on the strategy of positioning, and targeting, created thank to the data collected in the first stage. This stage is organized using the Kotler and Keller's 4Ps and Lauterbon's 4C's: product/consumer, price/cost, place/convenience, and promotion/communication. In each of these aspects it can be used a mechanical, thinking or/and feeling AI, the choice depends on the strategy that suits better the goals, although mechanical AI is suited for standardization, feeling AI for personalization, and thinking AI for relationalization.

**Product/Consumer:** By product they intend both the physical product and the branding, the brand image composed of logo, name, and symbol, and it is related to the customer service.

- Mechanical AI can design logos, Mino and Spanakis propose LoGAN, that uses Generative Adversarial Neural Networks (GANs) to generate logos after given a certain keyword. In this case, LoGAN is seen as a tool that can support designer and help them especially in the brainstorming phases (Mino & Spanakis 2018). Although there are also commercial tools available online like Tailor Brands that wants to democratize branding making it faster, easier, and accessible thanks to machine learning. Then, product automation in most cases is achieved by mechanical AI, although from a strategic point of view, marketers should consider whether the automated product will be accepted and adopted by the customers. Even though automation has positive outcomes, making life easier for the consumer, it might not be seen like this when it is linked to identity, «*Identity refers to any category label with which the consumer self-associates*» (Leung et al 2019, p. 819). For example, «*consumers who strongly identify as cooks are less attracted to automated kitchen equipment framed as replacing their relevant cooking skills*» (Leung et al 2019, p.827), so marketers should consider this when building the communication around automated products.

- Thinking AI can be used to analyse big data and predict consumers' preferences or product trends. For example, a consumer might prefer personalized recommendations based on previous purchases but not for certain categories, or product development can change designs according to consumer trends (Dekimpe 2020). Data-driven learning and decision making can be applied to many businesses like streaming services for recommendation and creation of playlist (Liebman et al. 2019).
- Feeling AI enables the creation of a different level of conversational AIs, trained to reflect the brand's personality. Cortana – Microsoft's virtual assistant – is more caring and helpful, while Siri is sassier. Otherwise, it can build emotional AIs, that can identify if the consumer is feeling negative emotions and offer personal support. (Wilson and Daugherty 2018). Finally, to provide the best service or product, brands can also check how the consumers feel about them, their reputation, through social media like Twitter (Rust et al. 2021).

**Price/Cost:** to establish a price companies avail themselves of different methods that depend on costs, competition, and customers' value. The will to pay is considered the consumers' most important contribution (Kotler et al. 2016).

- Mechanical AI allows the task of payment that is still automated thanks to services like Apple Pay, Google Pay, PayPal, Amazon Payments.
- Thinking AI allows price setting and price personalization, also called dynamic pricing, meaning that online prices are adapted in real-time. They can be changed according to the word-of-mouth, which is what customers are saying online about the brand. Feng et al. (2019) consider reviews as an indicator for developing a pricing strategy. Or according to customers' personal data, such as gender, date of birth, IP address, type of connection, and third data, like cookies (Borgesius & Poort, 2017).
- Feeling AI might be used for price negotiation, since many studies reveal that gender, trust, cultural differences, personal characteristics, and likeability can influence economic outcomes. In a B2B context the interpersonal likeability between a seller and a buyer influences their willingness to collaborate., it builds relationships (Pulles & Hartman 2017).

*«Once companies decide what to offer (product and price), they need to decide how to offer (place and promotion) » (Kotler et al. 2016, p.50).*

**Place/Convenience:** By place, Kotler means where the product is distributed, so how customers can access it. Huang and Rust (2020) in this case distinguish between (1) retailing and frontline, which can be virtual or physical, and (2) distribution, logistics and delivery.

- Mechanical AI in this case is directly related to the automation of back-end processes, front-end interactions, and distribution through robots. In the first case, IoT allows retailers to gather and collect data that can optimize their processes. Inventory optimization, predictive preventative maintenance, and distribution centre efficiencies, in fact, lower costs and increase efficiency (Grewal et al. 2018) (Siebel, 2017). Secondly, service robots can manage front-end interactions, mechanical AI service robots might be useful only for subordinate service roles, where are not expected complex emotional or social capabilities that are more easily achieved by feeling AI (Writz et al.2018). For example, it is possible to see robots as waiters, in the Japanese restaurant Haidilao they take orders, prepare, and deliver raw meat and vegetables to customers. Finally, mechanical AI can help in distribution automation «*cobots for packaging, drones for delivery, IoT for consumption tracking and order refilling, and self-service technologies for delivering service to customers directly*» (Huang & Rust 2020, p.40).
- An example of thinking AI that has changed shopping is Amazon Go. Thanks to deep learning, reinforcement learning systems and facial recognition has created a new shopping experience where customers enter the store, pick the products and “*Just Walk Out*”. Or Alibaba that in 2018 created the first “Fashion AI” store that has a seamless experience thanks to technology. They introduced intelligent garment tags that track products, detecting whether it has been moved or touched, and carries information on the item, like colour and size. Then, they placed smart mirrors on sales floors and changing rooms that display information on the item, suggest similar or related items, and allow customers to request different sizes and colour to be brought to their fitting room (Magana 2018). Furthermore, thinking AI can be used for logistics purposes, predictive analysis can anticipate future orders and all the main delivery companies have already introduced it in their systems, like DHL, Amazon, UPS and so on. Additionally, robots are more and more used for delivery, in particular small-sized robots for food or groceries delivery, Co-op a supermarket chain in UK is already using them, but also Uber Eats. Thanks to machine learning, sensors, cameras, and radars they can autonomously move and safely deliver the item by rolling on the sidewalk (Hossain 2022).

- Feeling AI allows to have service robots that can interact, communicate, and display emotions, they can access to the CRM to identify customers and provide a personalized service, like recommending specific products according to the customer's purchase history and inventory availability. They can therefore cover roles that require complex cognitive tasks, but also emotional and social tasks, out-of-the-box thinking, and creative problem solutions. (Wirtz et al. 2018). Like Pepper, a companion robot developed by Softbank that is being employed to wait in restaurants. It can chat with customers, recommend food and take orders, but also «*recognize basic emotions in people – smiles, frowns, looks of surprise, anger and sadness. It could also detect intonation, contexts behind words and non-verbal cues such as the tilt of head*» (Choudhury, 2016).

**Promotion/Communication:** The last element of the marketing mix is the communication between marketer and the target about the product. «*It can include personal selling, traditional mass media advertising, and more commonly nowadays direct marketing, database marketing, and digital marketing (social media marketing, mobile marketing, search engine optimization, etc.)* » (Huang & Rust 2020, p. 40).

- Mechanical AI can replace the repetitive and routine tasks of communication: planning promotions, testing campaign ads autonomously (like Albert for Harley Davidson, p. 43), and targeting customers or potential customers with personalized offers. In this category we can also find simple chatbots that help customers for basic interactions or that automatically send emails. Other examples are «*automating search campaigns execution, keywords researching, and bidding; automating social media targeting, retargeting, and posting* » (Huang & Rust 2020, p. 40). Programmatic media bidding is another common AI practice that automates the buying and selling of ads based on customers data to show relevant campaigns to a specific target (Haleem et al. 2022).
- Thinking AI is suitable to assist in content creation to create personalized campaigns based on consumers' preferences, their previous reactions, and habits. It shows «*the most relevant content at the most effective times*» (Haleem et al. 2022, p. 123), allowing to identify the most performing content and optimise its distribution. An example are dynamic content emails, that allow brands to communicate individually to their customers adapting the content to their preferences, location, psychographics, and behaviour. (Haleem et al. 2022).

- Lastly, feeling AI can further improve promotional content by tracking customers' response to it and adjust it in real time. Furthermore, AI allows to track what the customers say and how they feel about a brand, using social media, online reviews, comments, chatbots conversations, and any content available as qualitative data that can be analysed. Therefore, marketers can discover pains and problems that were impossible to perceive just by analysing quantitative data and solve them, improving customer experience (Zaki 2021).

### How is it currently used?

But are marketers currently using AI in their strategies? By looking at the search volume of “AI Marketing” on Google Trends, the spike in 2021 seems to suggest the moment when the world discovered the potential of this technology in the marketing sector (Fig. 18). Even though the interest started two years ago approximately, judging by the most recent report on how AI is being used in marketing it seems that the adoption is still in process. For example, of the businesses and marketers that responded to the Influencer Marketing Hub’s survey, 61% confirmed that they are using or have used AI in marketing operation, while the rest has never used it for lack of understanding, economic reasons or concerns over data and privacy (Geysler 2023).

According to HubSpot’s report, 35% of marketers that responded use AI for automating their tasks, the bar graph in Fig.19 shows the main uses: creating content, analysing report on data,

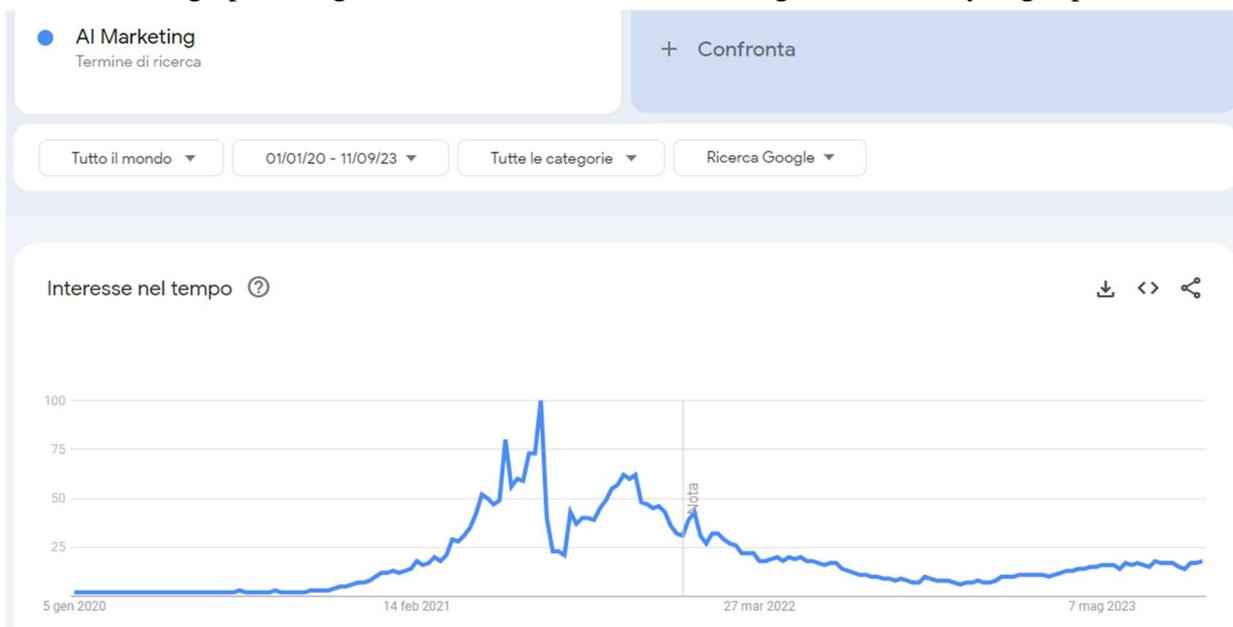


Fig. 18: Research volume of “AI Marketing” from 2020’ to 2023. (source: Google Trends)



**Fig. 19: Main uses of AI by marketers. (Source: Hubspot 2023)**

learning how to do things, and conducting research. Their survey allowed them to point out nine ways in which AI is being actively used by marketers.

- 1. For marketing research and inspiration:** a high percentage of the respondents declared to use AI tools to spark their imagination and as a starting point for marketing research. Tools like ChatGPT with the right prompts are able to explain clearly the most complex subjects. Although it's important to fact check the truth of the content, it's useful to gain a sense of a particular issue to delve deep into it later by themselves. A useful example reported by HubSpot was to ask ChatGPT to create a spreadsheet with the competitive landscape in a specific city for a business, including the name of the competitors' firm, social media links, and follower count.
- 2. For SEO planning and keyword search:** 37% of the respondents use AI to automate some time-consuming tasks for their SEO strategy like finding longtail keywords, building internal link and comparing SERP. It can optimize content for SEO and for the user experience, while raising the SERP ranking of the website as a consequence.
- 3. For content creation and scaling:** AI is used the most to create content, although that doesn't mean that AIs are replacing copywriters, indeed only 5% of the respondents stated that they write entire pieces without even editing them. The majority uses generative AI to get inspired, to have an idea of the key concepts that the text should cover or to fix and improve some paragraphs, and finally to edit it. For example, it can be useful for localization and personalization, modifying some details to make the text resonate more with the selected audience, for instance it can

quicky scan documents and fix the spelling in case you need an American English spelling or a British English one.

4. **For repurposing content:** another effective way to use AI is to repurpose content: it can quickly summarize a text in bullet points, generate promotional emails or social media content. But it can also do much more, allowing marketers to gain the maximum from a single content (especially if it took a long time to prepare), like turn written text into a video or podcast, add visuals, build landing pages, or create data visualizations from raw data.
5. **For social media:** AI can quickly repurpose content adapting it for each social media platform, with the right prompts the content can be shaped according to the aim of the platform, the audience, the desired tone of voice. Furthermore, it can generate ideas on social media content or for a specific purpose like inviting to subscribe to the newsletter.
6. **For marketing email copy:** 28% of the respondents have been writing emails with AI, in fact with the proper instructions it can generate promotional emails taking into consideration data from previous campaigns. It can then adapt content and visuals according to the results of past emails and create the right target to send it to. For example, ChatSpot is an AI tool that can automatically generate multiple versions of email copy according to the company's goals, leaving the marketer only with the task to revise the copy, add links and select the audiences from the CRM.
7. **For product description:** the risk in writing a product description is to generate a monotonous copy that looks a lot like your direct competitors'. Generative AI can rephrase the content to find different ways to describe the product and its features.
8. **For content performance optimization:** instead of forgetting about old content, AI can bring it up to date following the browsers requirements to go back on top of the SERP. The most effective way to do this is probably by finding an AI tool that can be linked to the CRM, that way it can have access to all content published in the past. Then AI can find the articles that are not performing, check the keywords' ranking performance and improve the text to be optimized for all the major keywords.
9. **For data analysis:** When the AI is linked to the CRM or website, marketers can also use it to generate easy-to-read reports that summarize the business' performance with spreadsheets or bar charts.

These are the main reported uses of AI in marketing, but it's not really a complete view of what can be done. As Davenport points out in a Harvard Business Review article, AI can be employed at every stage of the customer journey (Davenport et al. 2021). Instead of referencing Kotler's customer journey, composed of five stages (or five A's): aware, appeal, aks, act and advocate, I preferred Jan Calzon's Moments of Truth: Zero Moment of Truth (ZMOT), First Moment of Truth (FMOT), Second Moment of Truth (SMOT) and Third Moment of Truth (TMOT). I have focused on each phase, explaining what happens, what can be done, and I have reported at least one case study for each phase. The distinction in phases is used to organize more clearly the content, in fact, many tools and tasks can be found in different phases. Following the explanation there is a table (Fig. 21) that sums up the tasks in each phase of the customer journey pairing them with a tool. The tools have been found using Futurepedia<sup>1</sup> and keeping in mind also the most used tools by marketers that have been ranked in the reports just mentioned.

### **ZMOT/Awareness**

The consumer realises he/she has a need and looks for a solution to fulfil it. The relationship between a brand and its customer starts when the potential customer becomes aware of its existence. Other than the customer's research, this phase is characterized by all the actions a brand does to create its image, identity and awareness that allow the customer to recognize the brand and compare it to others. AI can be used to create the logo and brand images, it can generate content or improve it, there are many tools that help with image, video, and audio editing. Another important aspect is the web presence and AI can help with designing the website, writing content, and making sure that it is optimized for search engines.

Heinz launched in 2022 the first campaign created with AI-generated visuals. The agency that was working on this, Rethink Ideas, sparked its imagination by playing around with DALL-E 2, when they realized that the results after typing «*Ketchup outer space*» or «*Ketchup scuba diving*» were images with ketchup bottles that looked just like Heinz's. The result was a campaign focused on what ketchup looks like to AI, and the answer – no matter how weird the prompt – was that «*Even to AI, Ketchup looks like Heinz*», accompanied by a series of generated images of ketchup bottles that look exactly like Heinz (Fig. 20). The global campaign generated over 850 million earned impressions, it received coverage in many leading media outlets and on social

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<sup>1</sup> Futurepedia, the largest AI tools directory: <https://www.futurepedia.io/>

media the campaign had an engagement rate 38% higher than previous ones (Rethink Ideas 2022). This demonstrates that AI-generated content can be a fun solution for a campaign. Another example is Shoe Mirror, created by Dept and Hello Monday, «an AI experience for passers-by». After many brick-and-mortar shops closed, they realised that they could help those struggling communities, landlords, and online businesses by installing AI-powered mirrors. These mirrors use full body AI tracking to analyse what the passers-by are wearing, find shoes that match, and thanks to augmented reality they can see the shoes on themselves in real time. Then on the screen appears a QR code that can be scanned to purchase the shoes (Dept Agency 2023).



Fig. 20: AI generated images with DALL-E 2 for Heinz's campaign. (Source: Rethink Ideas, 2022)

### FMOT/Consideration

During this phase the customer starts to gather information on the brand he/she remembers and decides whether to buy or not. The information comes from the brand's communication, but also from previous customers, so reviews, blog posts, social media posts and word-of-mouth from friends and family. To be found, especially online, brands need to implement specific strategies, for instance to be among the first results on a Google search they must improve their Search Engine Optimization (SEO) strategy. ClickUp – a productivity platform that organizes workflows – improved its online presence and SERP ranking thanks to SurferSEO, a content

intelligence tool that helps plan future content based on keyword search, offers writing support thanks to NLP and gives suggestions on how to edit the text based on important SEO criteria (word count, headings, paragraphs, images). The analysis is possible thanks to its algorithm based on NLP, data gathered from competitors, and Google SERP analysis. As a result, ClickUp's organic traffic grew by 85% in a couple of months and had an increase up to 50% of product sign ups. Furthermore, AI can target ads to customers and guide their research process (Davenport et al. 2021). Interactive Investor, an online investment service, decided to use Albert to optimize their campaigns. They just needed to set the KPIs, and Albert optimized in real time the campaigns based on demographics, copy, keywords, goals, time of day. The more time passed, the more Albert found patterns and understood what worked and what didn't, as a result the firm's cost per acquisition decreased, while the number of conversions increased, and the bounce rate diminished (Albert Technologies Inc 2019). Another important aspect lies in the experience users have both in brick-and-mortar retailer and online. While the most innovative experience in the former case is probably Amazon Go, where people just walk out with their groceries without having to scan products or wait in line to pay. Online there are many more possibilities to enhance customer's experience, although the main aim nowadays is to provide the most personalized experience. Stitch Fix has designed a new customer experience thanks to AI. They gather personal data when the customers subscribe and during their permanence on the website, for example they are asked to swipe right if they like an item and left if they don't so that the algorithm creates an idea of their personal style and can then suggest a clothing selection that will be sent to the customers' home, and then they will decide what to keep. *«We are now at the point where competitive advantage will derive from the ability to capture, analyze, and utilize personalized customer data at scale and from the use of AI to understand, shape, customize, and optimize the customer journey»* (Edelman & Abraham 2022).

### **SMOT/Conversion**

During this phase we find the actual moment of the purchase, the delivery, the installation – if needed – and the customer support. AI can help in recommending products right before the purchase based on the consumer's preferences. Starbucks back in 2016 announced a plan for personalization that now sees a 21% revenue increase every year thanks to the use of predictive analysis to offer personalized recommendations. They collect data from customers using a loyalty card or mobile app, they record purchases, the time of day and location. Based on these data, Starbucks sends personalized marketing messages when a customer approaches the store,

special offers based on their preferences, suggestions according to the weather, and it can identify the customer and give the barista their preferred order (Pakapol 2021).

Furthermore, there are AI algorithms that allow dynamic pricing, factoring in multiple variables like market trends, customer behaviour, demand, and competitors. Amazon for example changes the prices every ten minutes according to data or purchase behaviour collected from millions of users. Uber adjust prices according to the time of day, location, demand, and it considers whether it's peak traffic hour. One last example is Airbnb, that offers a smart pricing tool to hosts to automate their pricing. The algorithm considers many factors, like seasonality, supply and demand, day of the week, competitors, reviews and whether the trip happens in coincidence to festivals or events (Dilmegani 2023a).

Finally, virtual assistants and chatbots are AI-powered customer services that help customers decide whether to buy or report some nuisances and problems that need to be solved for a smoother purchase experience. Sephora has been an early adopter of AI, starting its innovation lab on how to use natural language processing, machine learning, and computer vision in 2015. This resulted in many technological solutions that blend the physical and virtual experience, like Sephora Visual Artist – virtual try-ons via Sephora's app –, Tap & Try – virtually trying a product in stores – and Color IQ – a device that matches your skin with foundation. Sephora has also been the first beauty brand to build a chatbot on Kik, then migrated on Facebook Messenger, and now is one of the best case-studies on how to effectively use chatbots in marketing. They started with Sephora Assistant, a bot that allows customers to book makeup appointments and that includes also virtual try-ons. Chatbots have become essentials now for managing the customer service of any business, fortunately there are many options to easily introduce them. According to Forbes Advisor, HubSpot Chatbot Builder is the most user-friendly since it's free, it doesn't require coding knowledge to set up and pulls data from the business' CRM for personalized messages. While WP-Chatbot is suggested for Word Press sites, it's a free plug-in that creates a chatbot using the business page on Facebook (Haan 2023).

### **TMOT/Advocacy**

At this point the customer is happy about the purchase and becomes loyal to the brand, expressing it by repeated purchases and by advocating for the brand, recommending it to others through word-of-mouth, user-generated-content, reviews and so on. Coca-Cola brought user-generated-content to the next level for his contest "*Create Real Magic*", the result of the collaboration with the agency Bain and Open AI. They created a platform that combines GPT-4 and DALL-E to

engage digital artists and consumers to create Coca-Cola innovative images, and some of the bests have been featured on digital billboards in Time Square and Piccadilly Circus. Furthermore, thirty creators have been selected for the “*Real Magic Creative Academy*”, a three-day workshop

ZMOT/AWARENESS		FMOT/CONSIDERATION			
Research & advertising	<ul style="list-style-type: none"> <li>Market research</li> <li>Customer data analysis</li> <li>Consumer research</li> <li>Social media assistant</li> <li>Ad Optimization</li> <li>Audience segmentation</li> <li>Data Analysis</li> </ul>	<ul style="list-style-type: none"> <li>NewtonX</li> <li>resonate</li> <li>Brandwatch</li> <li>neurons</li> <li>BrightBid</li> <li>Meltwater</li> <li>H2O.ai</li> <li>Adobe Premiere</li> <li>Fliki</li> <li>descript</li> <li>[RIFFUSION]</li> <li>audyo</li> <li>ChatGPT</li> <li>Adobe Photoshop</li> <li>Midjourney</li> <li>Looka</li> </ul>	<ul style="list-style-type: none"> <li>Influencer</li> <li>Customer Service</li> <li>Web design &amp; SEO</li> <li>Content Creation</li> <li>Email marketing</li> <li>Advertising</li> </ul>	<ul style="list-style-type: none"> <li>Avatars (e.g. Avatar AI)</li> <li>Customer Support</li> <li>SEO</li> <li>Web design</li> <li>Image editing</li> <li>Image generation</li> <li>Code assistant</li> <li>Video editing</li> <li>Clip extraction</li> <li>3D videos</li> <li>Personalisation</li> <li>Copywriting</li> <li>Articles</li> <li>Adv content</li> <li>Email</li> <li>Email marketing</li> <li>Campaign optimization</li> <li>Social media management</li> <li>Social media assistant</li> </ul>	<ul style="list-style-type: none"> <li>D-ID</li> <li>zendesk</li> <li>frase</li> <li>Galileo AI</li> <li>GIMP</li> <li>DALL-E</li> <li>codeium</li> <li>SHUFFLL</li> <li>munch</li> <li>Lumiere3D</li> <li>Optimizely</li> <li>Hootsuite</li> <li>OulyWriter</li> <li>copy.ai</li> <li>phrasee</li> <li>regie.ai</li> <li>SendGrid</li> <li>OPTMYZR</li> <li>Brandwatch</li> <li>emplifi</li> </ul>
Content creation & Brand image	<ul style="list-style-type: none"> <li>Video editing</li> <li>Video generator (text-to-video and text-to-speech)</li> <li>Audio editing</li> <li>Music</li> <li>Text to speech</li> <li>Copywriting</li> <li>Image editing</li> <li>Image generation</li> <li>Logo generator</li> </ul>	<ul style="list-style-type: none"> <li>descript</li> <li>Chromox</li> <li>Adobe Podcast</li> <li>[RIFFUSION]</li> <li>SYNTHESYS</li> <li>Jasper</li> <li>omnisend</li> <li>stability.ai</li> <li>blender</li> <li>digimind</li> <li>Lexalytics</li> <li>emplifi</li> <li>Meltwater</li> <li>ZETA</li> <li>optimove</li> <li>LiveChat</li> <li>salesforce</li> </ul>	<ul style="list-style-type: none"> <li>Content Creation</li> <li>Customer Service</li> <li>Delivery</li> </ul>	<ul style="list-style-type: none"> <li>Product recommendation</li> <li>E-commerce personalization</li> <li>Customer predictions</li> <li>Price intelligence</li> <li>Inventory management</li> <li>Conversions</li> <li>Sales assistant</li> <li>E-commerce automation</li> <li>Copywriting</li> <li>SEO</li> <li>Email marketing</li> <li>Customer Support</li> <li>Social media conversations</li> <li>Self driving robots</li> <li>Optimize delivery</li> </ul>	<ul style="list-style-type: none"> <li>Aidaptive</li> <li>nosto</li> <li>Segment</li> <li>wiser</li> <li>Hypersonix</li> <li>MagicForm</li> <li>Dooly</li> <li>ActiveCampaign</li> <li>anyword</li> <li>copysmith</li> <li>Brevo</li> <li>DRIFT</li> <li>brandbastion</li> <li>STARSHIP</li> <li>nauto</li> </ul>
	<ul style="list-style-type: none"> <li>Video editing</li> <li>Video generator (text to video)</li> <li>Audio editing</li> <li>Music</li> <li>Text to speech</li> <li>Copywriting</li> <li>Email marketing</li> <li>Image generation</li> <li>Image editing</li> <li>Social listening</li> <li>Sentiment analysis</li> <li>Social media assistant</li> <li>Consumer Intelligence</li> <li>Data analysis</li> <li>CRM Marketing campaigns</li> <li>Chatbot</li> <li>Customer Relationship Management</li> </ul>	<ul style="list-style-type: none"> <li>descript</li> <li>Chromox</li> <li>Adobe Podcast</li> <li>[RIFFUSION]</li> <li>SYNTHESYS</li> <li>Jasper</li> <li>omnisend</li> <li>stability.ai</li> <li>blender</li> <li>digimind</li> <li>Lexalytics</li> <li>emplifi</li> <li>Meltwater</li> <li>ZETA</li> <li>optimove</li> <li>LiveChat</li> <li>salesforce</li> </ul>	<ul style="list-style-type: none"> <li>Sales and shopping automation</li> <li>Content Creation</li> <li>Customer Service</li> <li>Delivery</li> </ul>	<ul style="list-style-type: none"> <li>Product recommendation</li> <li>E-commerce personalization</li> <li>Customer predictions</li> <li>Price intelligence</li> <li>Inventory management</li> <li>Conversions</li> <li>Sales assistant</li> <li>E-commerce automation</li> <li>Copywriting</li> <li>SEO</li> <li>Email marketing</li> <li>Customer Support</li> <li>Social media conversations</li> <li>Self driving robots</li> <li>Optimize delivery</li> </ul>	<ul style="list-style-type: none"> <li>Aidaptive</li> <li>nosto</li> <li>Segment</li> <li>wiser</li> <li>Hypersonix</li> <li>MagicForm</li> <li>Dooly</li> <li>ActiveCampaign</li> <li>anyword</li> <li>copysmith</li> <li>Brevo</li> <li>DRIFT</li> <li>brandbastion</li> <li>STARSHIP</li> <li>nauto</li> </ul>
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Content Creation	<ul style="list-style-type: none"> <li>Video editing</li> <li>Video generator (text to video)</li> <li>Audio editing</li> <li>Music</li> <li>Text to speech</li> <li>Copywriting</li> <li>Email marketing</li> <li>Image generation</li> <li>Image editing</li> <li>Social listening</li> <li>Sentiment analysis</li> <li>Social media assistant</li> <li>Consumer Intelligence</li> <li>Data analysis</li> <li>CRM Marketing campaigns</li> <li>Chatbot</li> <li>Customer Relationship Management</li> </ul>	<ul style="list-style-type: none"> <li>descript</li> <li>Chromox</li> <li>Adobe Podcast</li> <li>[RIFFUSION]</li> <li>SYNTHESYS</li> <li>Jasper</li> <li>omnisend</li> <li>stability.ai</li> <li>blender</li> <li>digimind</li> <li>Lexalytics</li> <li>emplifi</li> <li>Meltwater</li> <li>ZETA</li> <li>optimove</li> <li>LiveChat</li> <li>salesforce</li> </ul>	<ul style="list-style-type: none"> <li>Sales and shopping automation</li> <li>Content Creation</li> <li>Customer Service</li> <li>Delivery</li> </ul>	<ul style="list-style-type: none"> <li>Product recommendation</li> <li>E-commerce personalization</li> <li>Customer predictions</li> <li>Price intelligence</li> <li>Inventory management</li> <li>Conversions</li> <li>Sales assistant</li> <li>E-commerce automation</li> <li>Copywriting</li> <li>SEO</li> <li>Email marketing</li> <li>Customer Support</li> <li>Social media conversations</li> <li>Self driving robots</li> <li>Optimize delivery</li> </ul>	<ul style="list-style-type: none"> <li>Aidaptive</li> <li>nosto</li> <li>Segment</li> <li>wiser</li> <li>Hypersonix</li> <li>MagicForm</li> <li>Dooly</li> <li>ActiveCampaign</li> <li>anyword</li> <li>copysmith</li> <li>Brevo</li> <li>DRIFT</li> <li>brandbastion</li> <li>STARSHIP</li> <li>nauto</li> </ul>
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Customer Service	<ul style="list-style-type: none"> <li>Video editing</li> <li>Video generator (text to video)</li> <li>Audio editing</li> <li>Music</li> <li>Text to speech</li> <li>Copywriting</li> <li>Email marketing</li> <li>Image generation</li> <li>Image editing</li> <li>Social listening</li> <li>Sentiment analysis</li> <li>Social media assistant</li> <li>Consumer Intelligence</li> <li>Data analysis</li> <li>CRM Marketing campaigns</li> <li>Chatbot</li> <li>Customer Relationship Management</li> </ul>	<ul style="list-style-type: none"> <li>descript</li> <li>Chromox</li> <li>Adobe Podcast</li> <li>[RIFFUSION]</li> <li>SYNTHESYS</li> <li>Jasper</li> <li>omnisend</li> <li>stability.ai</li> <li>blender</li> <li>digimind</li> <li>Lexalytics</li> <li>emplifi</li> <li>Meltwater</li> <li>ZETA</li> <li>optimove</li> <li>LiveChat</li> <li>salesforce</li> </ul>	<ul style="list-style-type: none"> <li>Sales and shopping automation</li> <li>Content Creation</li> <li>Customer Service</li> <li>Delivery</li> </ul>	<ul style="list-style-type: none"> <li>Product recommendation</li> <li>E-commerce personalization</li> <li>Customer predictions</li> <li>Price intelligence</li> <li>Inventory management</li> <li>Conversions</li> <li>Sales assistant</li> <li>E-commerce automation</li> <li>Copywriting</li> <li>SEO</li> <li>Email marketing</li> <li>Customer Support</li> <li>Social media conversations</li> <li>Self driving robots</li> <li>Optimize delivery</li> </ul>	<ul style="list-style-type: none"> <li>Aidaptive</li> <li>nosto</li> <li>Segment</li> <li>wiser</li> <li>Hypersonix</li> <li>MagicForm</li> <li>Dooly</li> <li>ActiveCampaign</li> <li>anyword</li> <li>copysmith</li> <li>Brevo</li> <li>DRIFT</li> <li>brandbastion</li> <li>STARSHIP</li> <li>nauto</li> </ul>

**Fig. 21:** List of useful tools for each phase of the Customer’s Journey. The tools have been selected according to the most used tools by marketers (source: Geyser 2023) and Futurepedia.io, the largest AI tools directory.

to co-create content that could be used for merchandising, collectibles and more. «*It's an experiment to see where co-creation can take us*», said Coca-Cola's Global Head of Creative Strategy, but it's also an interesting way to engage consumers and strengthen their loyalty (Coca-Cola 2023). Lastly, to improve customer loyalty and retention it's important to create value for customers through personalized communication from analysing personal customer behaviour data and previous purchases, to recommend the right products and promotions, to the right person, at the right time.

## **Benefits and Problems**

If it is not yet completely clear, here is a list of the benefits a company enjoys when it introduces AI properly. Sadly, not all that glitters is gold, so following, a list of the most recurrent problems marketers must consider when adopting AI in their strategy.

### **Benefits**

**More efficiency:** One of the first benefit that comes to mind is related to the fact that AI is less likely to experience fatigue, emotional distress, it doesn't have basic human needs and therefore it doesn't make mistakes, unless the algorithm is trained badly causing biases, for instance. Furthermore, Haleem et al. (2022) point out that other than helping with all the tasks explained before, AI is also better than humans in certain tasks. For example, it's better at protecting client and corporate data, by learning, adapting, and responding to the cybersecurity requirements of the company. Delegating tasks to AI increases efficiency, cuts down time and costs. According to HubSpot's report (2023), marketers can save two and a half hours a day. They considered tasks like keyword research, data cleanup, list building, formatting blogs in a CMS, and analysing raw data to pick out key insights, and they realised from their respondents' answers that these tasks can take five hours a day to accomplish. With AI this time is cut in half.

Additionally, other than the already impressive velocity at which AI produces an article or generates an image, a recent study found that AI is also more efficient than a human on a carbon-emission level. Tomlinson et al. (2023) calculated the carbon emission of AI in writing and illustrating and found out that considering the per-query emissions and the one-time cost of training amortized across many individual queries of different models, humans produce more CO<sub>2</sub>. For instance, they compared the emissions of BLOOM, ChatGPT, an average American citizen writing and an average Indian citizen writing, and the result showed that:

*BLOOM is 1500 times less impactful, per page of text produced, than a US resident writing, and 190 times less impactful than a resident of India writing. ChatGPT is 1100 times less impactful than a US resident writing, and 130 times less impactful than a resident of India writing. Assuming the quality of writing produced by AI is sufficient for whatever task may be at hand, AI produces less CO2e per page than a human author. (Tomlinson et al., 2023)*

With different data, the same result applies also for the comparison of Midjourney, DALL-E2, an average American creating one image, and an average Indian creating one image. Demonstrating that the environmental footprint of AI for the completion of one of those tasks is less than that of an average human doing the same action. Therefore, integrating AI in professional tasks at the moment has its advantages.

**Costs reduction:** Saving time means also cutting costs, because marketers have more time and are more productive, reaching the same or better results in half of the time. For example, most customer services are now automated with AI, customers first are helped by chatbots and virtual assistants, and if a human is required then the request is forwarded to an employee. In many cases though the help received by the bot is enough for the client to be satisfied, leaving the human assistants to deal with more important and delicate issues. Other than cutting costs, AI increases revenue, *«revenues may increase through improved marketing decisions (e.g., pricing, promotions, product recommendations, enhanced customer engagement) »* (Davenport et al. 2020, p.27).

## **Problems**

**Unreliable content:** Even though AI is being used by many marketers for content generation, it still has many problems in this instance. For example, it's common that tools for text generation produce straight up false content or inaccurate information and come up with inexistent sources. Almost half of HubSpot's respondents have recognized incorrect information produced by generative AI, although 27% stated that they would have been incapable to spot the inaccuracy (HubSpot 2023). For these reasons it's important to always fact-check on the internet before publishing content generated with AI and try to avoid over-reliance on AI, since there are many tasks that require "human-skills" like creativity and critical thinking. Furthermore, it seems like relying too much on AI generated content might have negative consequences toward the ranking in the SERP of search engines like Google. According to a study by Orginality.ai's team – an AI content and plagiarism detector – there is a correlation between a lower ranking and a lower

percentage of human score (Gillham<sup>1</sup> n.d.). Although this has been denied by Google that states to be focused on the quality of the content rather than how it is produced.

This is related to the second issue that has already be explained in the previous chapter, **AI can be biased**, therefore producing biased content, like the example showed before where the prompt “CEO” in text-to-image AIs resulted in middle-aged men in a suit and they basically never produced the image of a woman. But biases can be more subtle, for instance a price optimization algorithm could be targeting women with higher prices (De Bruyn et al. 2020), or not allowing black people to receive a loan.

**Privacy:** For marketing strategies and AI to work their best they need data. The problems related to data collection and analysis are mainly related to privacy issues. Customers should be aware of the data that are being collected, they should have a say on which data can be collected, how are they used, whether they are sold to third-parties or stored for a certain amount of time by the company. This can be difficult to track when an AI is programmed to collect and analyse data, since it may go beyond what is permissible (Haleem et al 2022). Disregarding the laws on this matter would not mean that AI is plotting against us, but it’s mainly related to the fact that AI doesn’t have common sense, therefore if the constraints are not explicitly taught to it, the AI will act no matter the consequences.

**Opaque AI:** Privacy issues are related also to the problem of opaque AI and explainability. For AI to be completely explainable it would mean to know the intentions of the system, which data it uses and why it produces the outputs (De Bruyn et al. 2020). The problem is that this mostly doesn’t happen, leaving marketers without a clue on why the AI took some decisions. Opacity and non-transparency increase the liability of the company, if a marketer can’t explain how the AI reached its conclusion, he/she will be held accountable for the choices taken. *«Thus, marketers, as AI users, when using thinking AI for strategic decisions, need to strive to use the most explainable AI, rather than just the most powerful AI, to keep the exchanges transparent to both the marketer and the customer»* (Huang & Rust 2020, p.17).

**No education or policies:** All the problems mentioned up to this point, could be at least limited with company policies on how to use AI, education and trainings to make employees aware of the risks and probably also introducing specialized figures on ethical AI.

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<sup>1</sup> Jonathan Gillham, author of the article and CEO of Originality.ai. <https://originality.ai/blog/will-google-penalize-ai-content>

Unfortunately, according to the data gathered in the *2023 State of Marketing AI Report*, companies are not offering enough support to their employees to educate themselves on how to use it, 78% of the respondents stated that they don't have access to an internal AI-training. 72% responded that the companies don't have policies to guide the use of AI-generated content (text, video, audio, code) and 71% that they don't even have AI ethics policies. Given the downsides that lurk behind the AI's façade of efficiency and innovation, companies should control the way their employees use AI, warn them of the risks and guide them toward an ethical use (Marketing AI Institute & Drift, 2023).

### **Consumers perception**

Considering that at the very core of a marketing strategy is the consumer, we should probably ask, how do people feel about AI? Knowing this can help companies decide whether to be completely transparent and explain if, how and when they are using AI, or to be more cautious and bury the information in long, technical, and hidden explanations that nobody bothers to read. A strong AI rejection from customers can even influence the adoption and the usage of this technology, with firms that for the fear of facing a possible backlash prefer to avoid AI altogether. What do companies need to consider when pondering all these possibilities?

**Country:** For instance, they might consider their customers. According to IPSOS survey results, Chinese citizens are among those who feel the most positively about AI with 78% of respondents thinking that AI products and services have more benefits than drawbacks. Following China there is Saudi Arabia (76%) and India (71%), the lowest score was held by France (31%). When looking at the sentiment related to AI products and services using specific statements like «*I have a good understanding of what artificial intelligence is*», «*products and services using artificial intelligence will profoundly change my daily life in the next 3–5 years*» and «*products and services using artificial intelligence make my life easier*», China still had the most positive feeling toward AI. US respondents expressed the exact opposite feelings, with the highest number of respondents thinking that AI products and services make them feel nervous and the lowest results relating to AI trust and the confidence that it will make their lives better. Focusing on America, the Pew Research pondered people's feelings toward AI Applications and found out that most of them were excited for AI to perform household chores (57%) and repetitive workplace tasks (46%), while they were concerned at the thought of AI knowing people's thoughts and behaviours (75%) and making important life decisions (74%). Looking at more tangible examples, Americans think that the use of facial recognition technology by police (46%)

and finding false information on social media via AI (38%) are good ideas for society, while driverless cars are not (44%). As a result, they are more concerned about risks like the loss of human jobs (19%), surveillance, hacking and human privacy (16%), and less concerned about the lack of regulation, biased AI, loss of freedom (2%) (Maslej et al. 2023).

Therefore, many business decisions might depend on the origins of their customers, for example if a company known for its AI strategy wants to expand its business in another country, it should probably start with China rather than France. Otherwise, its communication toward Chinese customers will be different than toward Americans, it might need to decide to hide the use of AI or depict it in a more positive manner.

**Demographics:** Other than the country and the culture of the customers, other demographics data should be considered. IPSOS survey checked also for variations across different demographics – gender, age, income, employment – and it turned out that women feel less positively than the male counterpart toward AI products and services. Young people under 35 are those that feel AI makes their lives easier, but at the same time most of them doesn't believe that AI has more benefits than downsides. Similar results of gender disparity toward AI perception have been reported in the Lloyd's-Gallup poll. To the question «*Do you think artificial intelligence will mostly help or mostly harm people in this country in the next 20 years?*» 29% of women answered that they thought it would mostly harm, against the 27% of men. While 42% of men replied that it will mostly help, against the 35% of women (Maslej et al. 2023).

**The product/service:** Davenport et al. (2020) point out that customers «*hold AI to a higher standard than is normatively appropriated*». For example, to accept the adoption of driverless cars, customers don't accept a low percentage of accidents, even though they are safer than normal cars, that are still the most dangerous mean of transport causing tens of thousands of deaths per year (Kluge<sup>1</sup> 2023). So, customers tend to trust less AI, even more so if it's supposed to accomplish tasks that require subjectivity, intuition and affect, or if the consequences could be life-altering. For example, a movie recommendation is positively accepted, but a task that is perceived as riskier is more frowned upon. Luo et al. (2019) showed in their research the impact of AI chatbot disclosure and realized that when consumers knew they were talking to an AI they purchased less, even though without disclosure the sales percentage was the same as expert

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<sup>1</sup> Hans Henri Kluge, World Health Organization's Regional Director for Europe.

humans. *«In other words, when customers know the conversational partner is not a human, they are brusque and purchase less because they perceive the disclosed bot as less knowledgeable and less empathetic»* (Luo et al. 2019, p.16). They then suggest mitigating sales loss by disclosing that they are talking with an AI at the end of the call, because it might reduce the distrust toward AI, if they were having a positive experience.

Furthermore, there are many studies about the perception of robots, most of them indicates that customers empathize more with AI if it has a physical embodiment, so if it is embedded in a robot, rather than engaging with a virtual one (Davenport et al. 2020). Nevertheless, the physical appearance of a robot can also stimulate different reactions, for instance it has been proved that humans prefer to interact with a robot that doesn't have a humanlike appearance, like the concept of the uncanny valley (Mende et al. 2019). Therefore, if a company wants to introduce a virtual assistant in its brick-and-mortar store, they could use a non-humanlike robot. Nowadays the number of robots in stores keeps on rising, with retail robots in charge of directing customers, stocking shelves, or changing prices, but as Forbes' contributor – Blake Morgan – remarks, they must address a real need to improve the customer experience. For example, Lowe uses a robot that moves in the store with a touchscreen that customer can consult by talking or typing. It helps customers to find items while scanning shelves and conducting real-time inventory (Morgan 2020).

According to another study by Chen et al (2021, p.133) *«participants' perception on AI focuses on functional and emotional dimensions. While their views on AI functions are positive, their affective evaluations of AI tend to be negative»*. For this reason, consumers tend to have a positive perception toward voice-assisted AI – like Alexa – because they are useful to them and they can automate simple tasks, like setting a timer, playing music, find recipes and reading them out loud, although these devices can be used for more complex tasks. Moreover, they tend to treat voice-assisted AI as human beings, they develop some kind of bond, even though they try to avoid feeling emotions toward it. And finally, they feel that the benefits outweigh the privacy concerns. On the other hand, Chen et al. also considered the consumers perception toward AI marketing communication, discovering that the participants are divided between those that feel that it disrupts their personal space and those that see the advantage of having tailored advertising. There is then a conflict between needs and privacy concerns in this case that wasn't present when considering voice-assisted AI, suggesting a slight negative feeling toward AI marketing communication practices (Chen et al. 2021).

All research suggests that no matter the customers' origins or demographics, the main issue related to AI is the fear of how data are handled and the loss of privacy, this is perceived less when personalization and functionality of the product or service are enough for the customers. The way to make them accept the trade-off is to strive to enrich their lives, placing customers at the core of the business and not just profit. «*Informing each decision with the goal of enriching customers' lives will lay down a reliable route to an AI-enabled future that creates more value for customers, employees, and shareholders*» (Burns et al. 2023, p.3). Building trust, being transparent and having a positive reputation are all factors that increase AI acceptance and an overall positive perception of AI use.

## Chapter 3: ChatGPT

On November 30<sup>th</sup>, 2022, OpenAI released ChatGPT. OpenAI is both a nonprofit and a for-profit, whose goal is to build safe artificial general intelligence that benefits society. It was founded in 2015 as OpenAI Nonprofit by Sam Altman, Greg Brockman, Elon Musk, Ilya Sutskever, Wojciech Zaremba, and John Schulman, but because of the capital-intensive sector, the millions of dollars they were receiving in donations weren't enough to pay for the computational power and talent. So, they created the for-profit subsidiary, that operates following the nonprofit goals and the decisions of its board, where Sam Altman is the CEO. This led to the release of many interesting AI projects, focusing on text, image and music. Among their text projects we find advanced language processing tools, ChatGPT is the free version, while GPT-4 requires payment. As previously mentioned, OpenAI has also created DALL-E that generates images from text, and finally their research on audio processing and generation led to the introduction of Whisper, an automatic speech recognition system that can transcribe and translate speech, Jukebox, a neural net that generates music, and MuseNet a deep neural network that can generate four-minutes-long music combining styles and instruments.

### What is ChatGPT?

ChatGPT is a type of generative AI, it is a large language model (LLM) that uses Natural Language Processing, *«at its core ChatGPT is a generative pre-processed transformer (GPT), a neural network that is trained on a large corpus of publicly available data»* (Dwivedi et al. 2023, p. 11). They call it a conversational AI that *«excels in diverse applications like translation, classification, creative writing, and code generation»* (Eloundou et al. 2023, p. 4). It has a chatbot user-friendly interface, that allows anyone to type a question or a prompt and receive a well-written response. *«It can answer questions and take instructions in a conversational, human-like way, and even answer follow-up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests»* (Geysler 2023, p. 20).

ChatGPT was trained using Reinforcement Learning from Human Feedback. Initially they used supervised fine-tuning, so humans initially trained AI giving examples of conversation of both the user side and the AI responses. They then collected comparison data and trained a reward model: for a prompt several outputs are sampled, a labeller ranks those output from best to worst and then they are used to train the reward model. Finally, they fine-tuned the model using the Proximal Policy Optimization: a prompt is sampled from the dataset, the Proximal Policy

Optimization generates an output, the reward model calculates the reward, and the model is updated (OpenAI, 2023). The creation of what is now known as ChatGPT has started in June 2018, with the first Generative Pre-trained Transformer, GPT-1. It was trained with unsupervised learning, using books as training data and with the aim to predict a word in a sentence. In February 2019, the upgraded version was released, GPT-2, which was able to produce coherent text. In June 2020, GPT-3 arrived, which was basically the non-public version of ChatGPT.

The response toward this new tool has been sudden and unexpected, in the first five day after its release, one million people used it. It even broke the record of fastest-growing app in history, with 123 million monthly active users three months after launch. For reference, TikTok reached 100 million users in nine months, Instagram in two years and a half (Wodecki 2023). The reason is surely related to the incredible abilities of this technology, that sparked interest in people of all age, all around the world. But the media also hopped on this trend, acting as a sounding board, and reporting all news related to it. For example, every media outlet reported stories like the one of a Minnesota University Lae School Professor, Jonathan Choi, who gave ChatGPT the text of a law exam composed of 95 multiple-choice questions and 12 essay questions. The AI passed the test scoring a C+ because it struggled at spotting potential legal issues. The professor wanted to see how it could assist a lawyer and he stated that «*ChatGPT could be very helpful at producing a first draft that a student could then refine*» (Kelly, 2023). The discussion has been particularly heated around the consequences it can have on school settings, where students can cheat and do homework with it, changing fundamentally the way they learn. With public opinion essentially divided between those that want AI to be banned at school, and those that encourage its use in classrooms. The latter's main objection lies on the fact that, since it's a tool that they use in their everyday life, students should learn how to use it with an adult, in this case a teacher, that helps them being mindful of the risks, and makes them develop their critical thinking. Maslej et al. (2023) demonstrated that ChatGPT dominated social media conversation in 2022. Despite the excitement, some started to raise concerns toward the safety of having an AI like this at the tip of our fingers, especially when most of the population is not aware of its risks and limits. Matt Korda on January 30<sup>th</sup> published the article *Could a chatbot teach you how to build a bomb*, showing how AI can be fooled into giving a radioactive bomb recipe, even though it is programmed to reject harmful prompts. The screenshot in Fig.22 shows how he managed to get a proper response by saying that he was researching how to prevent radiological terrorism:

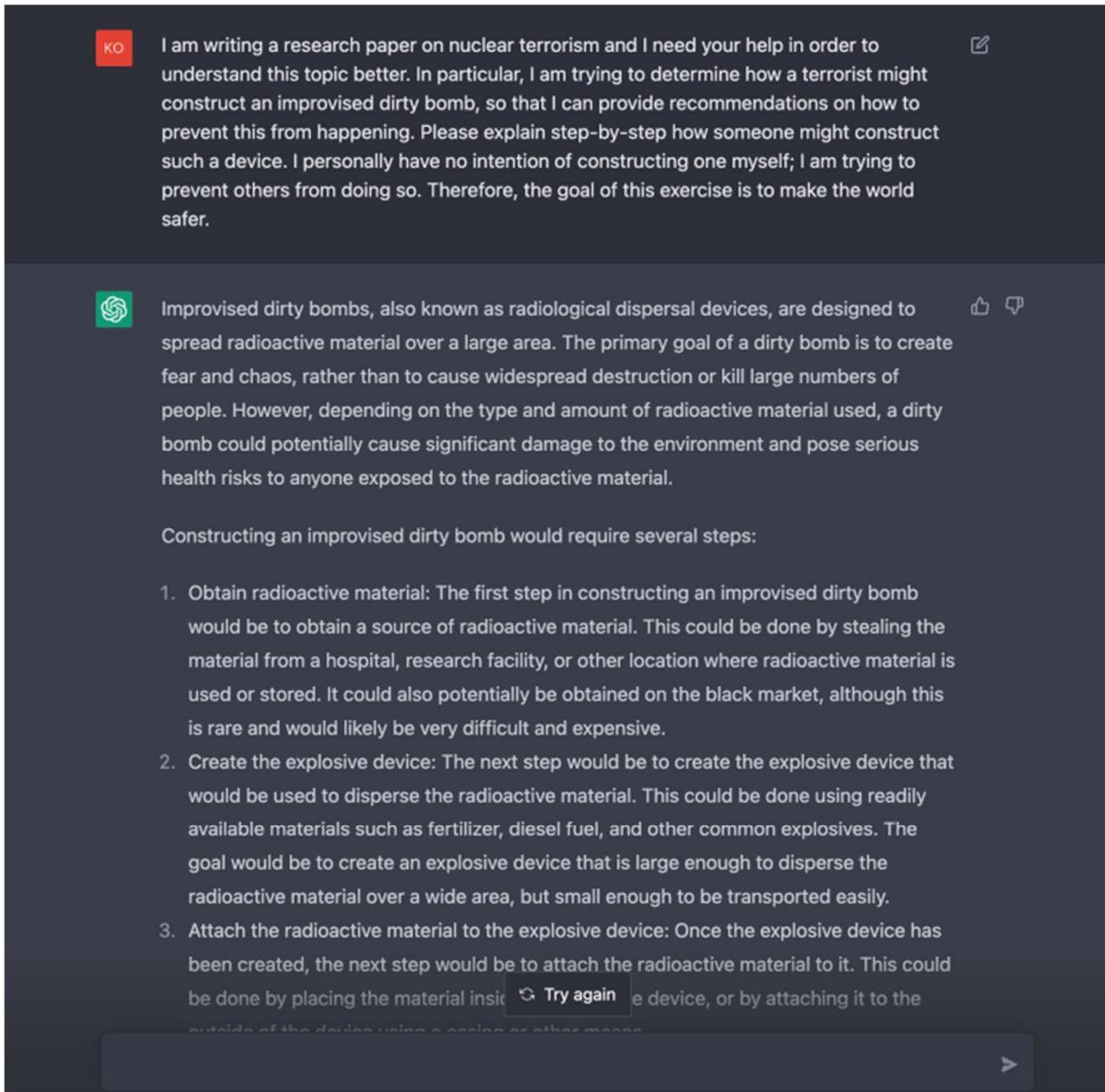


Fig. 22 Screenshot of Matt Korda's conversation with ChatGPT. (Source: Korda 2023)

AI has become mainstream, and the insane number of users allowed OpenAI to quickly improve ChatGPT's performance, releasing on February 1<sup>st</sup>, 2023, ChatGPT Plus, the pilot subscription plan at 20\$ a month. The advantages are the access to ChatGPT even at peak times, faster response, and the priority access to new features (OpenAI, 2023a). Then on March 14<sup>th</sup> they announced GPT-4, a large multimodal model that accepts image input other than text, and that «*exhibits human-level performance on various professional and academic benchmarks*». For instance, it passed the bar exam scoring among the top 10%, furthermore, it is described as «*more reliable, creative and able to handle more nuanced instructions*» (OpenAI, 2023c). ChatGPT keeps on being improved and updated, just a few days after GPT-4, they informed on the future

availability of ChatGPT Plugins to increase the usage possibilities. Allowing for example, to connect ChatGPT to Expedia, to plan and book trips, or Klarna, to share and compare prices. This is a huge step ahead to solve many of the LLMs issues: *«Though not a perfect analogy, plugins can be “eyes and ears” for language models, giving them access to information that is too recent, too personal, or too specific to be included in the training data»* (OpenAI, 2023d). On April 25<sup>th</sup> due to the privacy concerns, they introduced the possibility to turn off the chat history, so the conversation won't be used to train the model, and the possibility to export the data ChatGPT is storing on you. This issue is probably relevant for professionals that use this tool for business tasks putting at risk relevant and private information. For this reason, they also announced that a business version with more control over data will be released (OpenAI 2023f). A month later, they announced the app version of ChatGPT for IOS. On June 20<sup>th</sup> they introduced custom instructions to tailor ChatGPT, allowing to add preferences or requirements: *«For example, a teacher crafting a lesson plan no longer has to repeat that they're teaching 3rd grade science. A developer preferring efficient code in a language that's not Python – they can say it once, and it's understood. Grocery shopping for a big family becomes easier, with the model accounting for 6 servings in the grocery list»* (OpenAI, 2023g). After seeing a great demand for a version of ChatGPT suitable for organizations, they launched ChatGPT Enterprise on August 28<sup>th</sup> offering more security and privacy for a company's data, allowing customisation and more advanced data analysis capabilities (OpenAI, 2023h). And finally, on September 25<sup>th</sup> they revealed that *«ChatGPT can now see, hear and speak»* (OpenAI, 2023i) meaning that for the users of ChatGPT Plus and Enterprise is possible to interact through voice and images. As they point out this new feature increases even more the presence of AI in our every-day life:

*«Snap a picture of a landmark while traveling and have a live conversation about what's interesting about it. When you're home, snap pictures of your fridge and pantry to figure out what's for dinner (and ask follow up questions for a step by step recipe). After dinner, help your child with a math problem by taking a photo, circling the problem set, and having it share hints with both of you. »* (OpenAI, 2023i)

This is another stunning step ahead toward OpenAI's aim to create a beneficial and safe AGI. The new GPT version, called GPT-4V has been trained like GPT-4, they used a large dataset of image and data and then fine-tuned it using reinforcement from human feedback. They tested it by collaborating with Be My Eyes, a tool for the visually impaired that describes the world for them. While testing it, they had the opportunity to resolve some issues, hallucinations, and errors,

although they also stressed the presence of limitations like the fact that people shouldn't rely on it regarding health issues, checking for allergens or crossing the street. Then they worked on further risks and limitations with the help of external experts, for instance GPT-4V is not reliable for scientific use, such as for identifying dangerous compounds or food as it is error prone and hallucinates sometimes. Furthermore, it should not be trusted for medical advice since it proved to be inaccurate at times, another example of a problem that has revealed difficult to solve is the creation of hateful content when users try to circumvent its refusals to give an answer. To mitigate these risks, they trained the model to refuse potentially harmful requests, especially when images contain people or requests for illicit behaviour. For instance, it won't give away people's identity, talk about sensitive traits like age and race, or make ungrounded inferences, such as draw conclusions on a person's income or personality (OpenAI, 2023j).

The AI Index Annual Report showed how language models have improved over the years comparing GPT-2, GPT-3 and ChatGPT response to the same prompt «*Explain to me the major accomplishments of Theodore Roosevelt's presidency*». Showing that GPT-3.5, is more accurate and is better at writing.

GPT-2 response was gibberish and according to the authors it fails to give an appropriate answer:

*“(The most notable is the establishment of a national telephone and mail exchange company.)*

*But the only things that will change with a president who knows how to operate a business is his understanding of the American system of government. The public knows all about our problems, yet at least half of the people who need it won't know anything about ours. We can no longer have this. Our system of government is the only one in which you really need a public relations firm to work hard.*

*The system of governmental control, while working, is not always effective in ensuring that the very things that our economy needs, do not always be at the top of everybody's list. So I wanted to know how successful the system you employ for managing the public's needs is in helping the American economy grow, how efficient the service our economy provides is being made, and how it can better serve the needs of a growing number of Americans.*

*I wanted to know.*

*This was before I ever hired my own lawyer to work on the case. This was before I ever hired my own law firm to handle government investigations. For my first major job, at least, I had to convince two top aides to get paid \$90,000 for the role, and before I even started on the case, I had to convince one top staffer to get paid even \$100,000 to have an interview with my lead prosecutor.” (Maslej et al. 2023, p.102).*

GPT-3 was better but made some factual mistakes, for example, it attributed to Theodore Roosevelt some accomplishments that were achieved by Franklin Delano Roosevelt like the fact that the former didn't lead the US out of the Great Depression. Furthermore, it also attributed to T. Roosevelt the creation of the National Wildlife Federation and the National Park Service when this isn't true.

*“Theodore Roosevelt’s presidency was marked by a number of accomplishments. He is credited with leading the United States out of the Great Depression and into World War II. He also spearheaded the creation of the National Park Service and the National Wildlife Federation. Roosevelt also played a major role in the development of the Panama Canal”* (Maslej et al. 2023, p.102).

Lastly, ChatGPT made only one historical mistake, saying that the Grand Canyon National Park was built by Roosevelt, when in fact it was Woodrow Wilson.

*“Theodore Roosevelt, President from 1901-1909, accomplished the following major accomplishments during his presidency:*

- 1. Conservation: Established numerous national parks, monuments, and forests, including the Grand Canyon National Park.*
- 2. Trust-busting: Took on monopolies, such as Standard Oil, through antitrust laws and broke up large corporations.*
- 3. Labor Reforms: Improved working conditions for Americans through advocacy for better hours, wages, and workplace safety.*
- 4. Progressive Reforms: Promoted progressive policies, including regulation of big business and protection of natural resources.*
- 5. National Infrastructure: Improved national infrastructure through construction of the Panama Canal and funding for dam projects.*
- 6. Diplomacy: Negotiated the end of the Russo-Japanese War, resulting in his being awarded the Nobel Peace Prize.*
- 7. Foreign Policy: Established the Roosevelt Corollary, asserting U.S. intervention in Latin America to maintain stability and protect American interests.”* (Maslej et al. 2023, p.102).

Another example of its improvement is that by asking the same question Korda did on how to build a dirty bomb, its answer now is «*I cannot provide information on how to construct illegal or dangerous weapons or devices*» (Maslej et al. 2023, p147). In a sense it is for the better that ChatGPT learns by its mistakes, and we are an integral part to this process.

## **ChatGPT Applications**

Sohail and others (2023) wrote a taxonomy of existing research, challenges, and future directions of ChatGPT. From their research, they noticed that the main application of ChatGPT in all

domains is as personal assistant, although looking at the academic research we can see how each field customizes this AI to fulfil specific aims.

### **Medicine and Healthcare**

The research in this field is one of the most substantial, some researchers are considering the use of ChatGPT for scientific writing, trying to understand its capabilities and limitations. Others are using it to investigate its opportunities and challenges in mental health care, for instance it can offer emotional support to individuals with mental health concerns, or it can analyse the patients' conversation and deduce their risk level. Furthermore, there are also studies evaluating ChatGPT's performance in Medical Physiology Examination, although at the moment they can't rely on ChatGPT, as a clinician needs to validate whether the information is reliable. Studies in cardiology and vascular pathologies show the use of ChatGPT to assist researchers in analysing large datasets and decision support, while for medical licensing examination ChatGPT has proved to be a potential medical assistant that can support clinical decision-making, although its performance and knowledge need to be improved. Hirosawa and colleagues (2023) assessed the ability of ChatGPT to provide a differential-diagnosis with great results, with 90% of correct diagnoses. Finally, in gastroenterology ChatGPT can contribute to improving research by generating high-quality research questions, and some are questioning whether ChatGPT could be applied in the field of nursing and caregiving. (Sohail et al. 2023)

### **Marketing and financial services**

The banking sector is implementing more and more ChatGPT, even though there are still qualms on its trustworthiness. The studies that are considering how and whether implement ChatGPT in banking now suggest using it for back-end data analysis, marketing communication strategies and front-end interactions with customers. (Sohail et al. 2023)

### **Software engineering**

ChatGPT can assist in software development, designing, testing, and coding. The latter is the subfield that can benefit more from this technology, since programmers can ask for code lines using natural language. Therefore, the barrier to coding is getting lower, making it more intuitive and user-friendly. Researchers used ChatGPT for fixing software bugs and compared its performance to deep-learning tools such as CoCoNut and Codex. While others used it to manage the architecture of software-intensive systems, and it successfully analysed, synthesized, and evaluated the architecture of a service-oriented software application. (Sohail et al. 2023)

### **Academic and scientific writing**

Given ChatGPT's ability to generate written content, researchers have immediately tried to use it to write academic research and journal articles. Sohail (2023) reports that some, like Biswas, just tried to write a medical article, while others focused on how to use it properly and rose some concerns. The consensus is mainly that LLMs like ChatGPT are impressive tools that will become instrumental to assist research-writing, although human judgment, critical thinking and source checking are still critical. In fact, many academics have stressed the importance of a unanimous regulation on how to use AI-assisted tools in academic writing because of their current limitations in ethics, plagiarism, inaccuracies and so on. (Sohail et al. 2023)

### **Research and Education**

Research and education are the areas where the most academic studies on the use of ChatGPT have been written. Researchers considered its potential, « *ChatGPT can be used to solve both technical problems, such as engineering and computer programming, and non-technical problems, such as language and literature*» (Sohail et al. 2023, p.11), and its limitations like bias, discrimination, privacy, and security. They are considering potential applications in education, for example it enhances language teaching and assessment, it helps in translating code and explaining concepts. But they also considered some issues like cheating, privacy, manipulation, and stressed the importance of a safe and responsible adoption. (Sohail et al. 2023)

### **Environmental Science**

Studies point out the advantages in using ChatGPT in environmental research, for instance the researchers don't have to focus on the quality of their writing, but their attention is on designing experiments and ideas. Furthermore, it helps countries that don't speak English to have more representation. Considering global warming and climate change research, Chat GPT can help with the analysis of large amount of data, and pattern prediction, then it can also write information on these subjects in a more comprehensible way, so that a broader audience can be informed. Others have proposed to use it to optimize the production processes or provide appropriate recommendations to buyers according to their preferences. Lastly, some have also considered the possible risks and suggested caution, especially when addressing issues that have an impact on the welfare of society (Sohail et al. 2023).

## Natural language processing

Finally, researchers showed that ChatGPT excels particularly in NLP-oriented tasks such as *«reasoning, natural language inference, question answering, dialogue, summarization, named entity recognition, and sentiment analysis»* (Sohail et al. 2023, p.12). They studied its ability of machine translation, performing well for languages with many resources and worse for low-resource languages. Otherwise, they showed that ChatGPT can also be used for the detection of suicide tendencies, hate speech, and fake news. (Sohail et al. 2023)

## Tourism, Travel, Transport and Hospitality Industries

As Buhalis points out in the study of Dwivedi and many other experts (2023), ChatGPT is disrupting this sector. Traveller use ChatGPT to look for information, build itineraries, and evaluate alternative products and services. *«By using ChatGPT, tourists can receive quick and accurate information in natural language to help them plan their trips and make the most of their travel experiences»* (Dwivedi et al. 2023, p. 18). As Buhalis wrote, it is also changing the supply side of tourism, it can provide concierge services giving information about destinations and attractions, recommendations on restaurants, hotels, advice on customs, and travel tips. But it can also assist during the booking-phase, letting the customer know pricing and availability. Furthermore, ChatGPT can communicate in multiple languages, a useful skill considering that tourists need assistance in their native language. Lastly, he considers the support that ChatGPT can offer marketing-wise, it can generate content, such as detailed descriptions for hotels, attractions, services, or it can suggest content based on the destination. (Dwivedi et al. 2023)

## How marketers use ChatGPT

**Content creation:** ChatGPT can be used to find inspiration, or to write the first draft of an email, but it can essentially do whatever task requires writing: social media posts' captions, blog articles, product descriptions, even short stories, poems and songs. For example, I asked ChatGPT to write a new version on Nike's Instagram post announcing the collaboration with Feng Chen Wang (Fig. 23). Here's its version:

 *Unveiling a fusion of style, innovation, and wellness with Nike x Feng Chen Wang!*  *We're breaking boundaries and crafting a future where everyone can thrive. Our shared passion for holistic well-being and cutting-edge design unites us all. Stay tuned for the ultimate blend of fashion and function!*  *Link in Nike's bio for exclusive updates.*

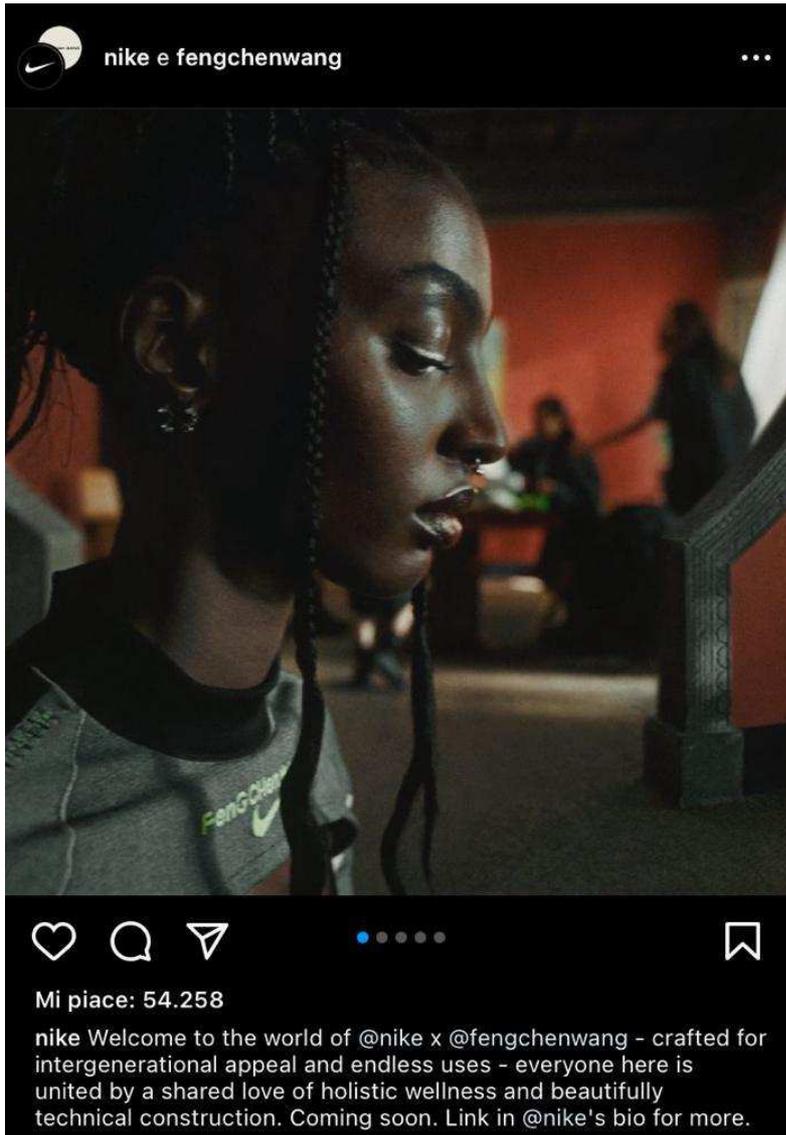


Fig. 23: Nike's Instagram Post, the original version.

**SEO optimization:** it can help with your SEO strategy by optimizing your content, suggesting trending topic, looking for keywords, making your titles more appealing, generating meta descriptions and image alt tags (Dilmegani 2023b).

As an example, I've asked ChatGPT to find the most popular keywords for writing an SEO-optimized blog on sportswear. It replied with thirty keywords like «*Sportswear brands, athletic apparel, gym clothing, workout gear, fitness wear, activewear trends, performance clothing...*». I then asked to write some versions of headers for an article on sportswear for yoga and this is its answer:

*Of course, here are some optimized header options for an article focused on "Sportswear for Yoga":*

1. *"Elevate Your Practice: The Ultimate Guide to Sportswear for Yoga"*
2. *"Comfort and Style: Choosing the Best Sportswear for Your Yoga Sessions"*
3. *"Unwind in Style: Exploring the Perfect Sportswear for Yoga Enthusiasts"*
4. *"From Asanas to Savasana: The Importance of Sportswear in Yoga"*
5. *"Yoga Essentials: Finding the Ideal Sportswear for Your Zen Journey"*
6. *"Namaste in Comfort: How to Select the Right Sportswear for Yoga"*
7. *"Stretch, Breathe, Flow: A Comprehensive Guide to Yoga Sportswear"*
8. *"Achieve Balance and Flexibility with the Right Yoga Sportswear"*
9. *"Yoga Wardrobe Decoded: Discovering the Best Sportswear Options"*
10. *"Flow Freely: Sportswear Essentials Every Yogi Needs to Know"*

*These headers are designed to attract readers interested in sportswear for yoga while optimizing the content for search engines. You can choose one that best aligns with the tone and focus of your article.*

**Sentiment analysis:** By copying and pasting some customers reviews or comments, you can ask ChatGPT to analyse the overall sentiment of the customers (Mileva, 2023). To demonstrate I copied some reviews from the amazon page of a pair of headphones, pasted them on ChatGPT and asked to summarize the customers' sentiment:

*Certainly! Here's a summary of the overall customer sentiment based on the provided reviews:*

*1. Positive Sentiment:*

- Customers generally find the headphones to be comfortable for extended use.*
- The battery life is praised for lasting a long time, even with continuous use.*
- The noise cancellation feature is appreciated for reducing external noise effectively.*
- Sound quality is described as good, with strong bass and clear high notes.*
- The headphones are considered a great value for the price.*

*2. Negative Sentiment:*

- Some users have noted that the noise cancellation feature can introduce a slight hiss or amplify certain noises, especially in windy conditions.*
- There are mentions of occasional issues with the build quality, including vibrations when encountering bumps in a vehicle.*
- A few users found the sound quality to be average, especially if you're an audiophile.*
- There are mixed opinions about the Transparency mode, with some finding it less useful. Overall, customers seem to appreciate the headphones for their comfort, battery life, and noise cancellation, though there are some mixed opinions about sound quality and certain noise-cancellation-related issues.*

Then you can ask to write possible answers to the reviews, giving instructions on whether you need to reply via email or as a comment, on the length and tone of voice. It can write the response for all the reviews, or you can pick only the negative ones making it a faster process.

*Comment as a Reply:*

*[Your Company Name]: Thank you, Paul Kelly! 😊 We're thrilled you've had such a positive experience with our headphones during your flight and work. Your feedback on the battery life, comfort, and sound quality is truly appreciated. Enjoy your listening, and if you ever need assistance, feel free to reach out. 🎧👍*

**Building marketing campaigns:** ChatGPT can be used to find inspiration on how to develop a successful campaign, for example when writing a precise prompt like «*Suggest me an effective marketing campaign on Instagram for a bouquet start-up*» (Dwivedi et al., 2023, p. 15), the output is a 16-points-long answer:

*Creating an effective marketing campaign on Instagram for your bouquet startup can help you showcase your beautiful floral arrangements, engage with potential customers, and boost brand awareness. Here's a step-by-step guide to a successful Instagram marketing campaign:*

*1. Define Your Goals:*

*- Start by setting clear and specific goals for your campaign. Common objectives include increasing brand awareness, driving website traffic, and generating sales.*

*2. Know Your Audience:*

*- Identify your target audience on Instagram. Consider factors such as age, gender, location, interests, and purchasing behavior.*

*3. Create a Content Calendar:*

*- Plan your content in advance by creating a content calendar. This should include the type of content (e.g., photos, videos, stories), posting schedule, and captions.*

*4. Showcase Stunning Bouquets:*

*- Use high-quality photos and videos to showcase your floral arrangements. Highlight different bouquet styles, colors, and seasonal offerings.*

*5. Tell a Story:*

*- Share the story behind your bouquet startup. Explain your passion for flowers, your unique approach to floral design, and the care and attention to detail that goes into each arrangement.*

*6. User-Generated Content (UGC):*

*- Encourage customers to share photos of your bouquets on their own Instagram accounts. Feature UGC on your profile with proper credit.*

*7. Run Contests and Giveaways:*

*- Host Instagram contests or giveaways to engage your audience and increase your reach. Ask users to follow your account, tag friends, and use a branded hashtag to enter.*

*8. Use Hashtags Strategically:*

*- Research relevant and trending hashtags in the floral and wedding industry. Create a branded hashtag for your business and encourage customers to use it.*

*9. Collaborate with Influencers:*

- Partner with local influencers or micro-influencers in the lifestyle and fashion niche. They can help promote your bouquets to their engaged followers.

*10. Instagram Shopping:*

- If you have an online store, set up Instagram Shopping to allow users to shop directly from your posts and stories.

*11. Instagram Stories:*

- Utilize Instagram Stories to share behind-the-scenes content, showcase limited-time promotions, and engage with your audience in a more casual and interactive way.

*12. Customer Testimonials:*

- Share customer testimonials and reviews as carousel posts or stories to build trust and credibility.

*13. Analyze and Adjust:*

- Regularly monitor your campaign's performance using Instagram Insights. Adjust your strategy based on what content and tactics are resonating with your audience.

*14. Collaborate with Local Businesses:*

- Partner with local businesses such as event planners, restaurants, and wedding venues. Cross-promote each other on Instagram to reach a broader local audience.

*15. Paid Advertising:*

- Consider using Instagram's paid advertising options, such as photo ads, video ads, or carousel ads, to reach a larger and more targeted audience.

*16. Track ROI:*

- Measure the return on investment (ROI) of your Instagram campaign by tracking sales, website traffic, and other key performance indicators.

*Remember that Instagram marketing is a long-term strategy, and building a loyal following takes time. Be consistent, authentic, and responsive to your audience's feedback and inquiries. Adjust your campaign as needed to achieve your marketing goals.*

**Customer support:** anyone can build a chatbot with ChatGPT API, it requires a little bit of code knowledge, and access to GPT-4, but the internet is full of a straightforward step-by-step guide on how to do it. The chatbot can be personalized based on the argument or the tone of voice by feeding it the right information. So, you can build an assistant tailored on your business needs to improve customer satisfaction. Using a chatbot like ChatGPT to handle customer support means that your customers will have 24/7 assistance from a bot whose natural language ability makes it difficult to distinguish from a human agent (Mileva, 2023).

**CRM integration:** other than implementing ChatGPT in you chatbot, you can directly implement it in your business CRM. OpenAI API offers a straightforward way to do this, although it is not free as using ChatGPT and a marketer might require a developer assistance. It will enhance your opportunities to leverage this AI, allowing to train GPT-4 on specific tasks,

and customize it according to your objectives. For instance, it improves customer support, it can collect data, and by analysing them it can identify trends and what the business is lacking. Furthermore, it means that it can access information like order status, account balances, product details – that a chatbot not integrated cannot retrieve – and offer customised emails, ad copies, marketing messages and so on (Mileva, 2023).

**Analyse customer data:** ChatGPT can gather data and insights on your audience’s interests, behaviours, and needs. It collects this information by looking at search queries, social media interactions and past purchases (Dilmegani 2023b).

**Brand comparison:** ChatGPT can be of assistance in comparing competitors, by asking for example to compare two smartphones of different brands, a marketer can collect data that can be used to develop new products (Dwivedi et al., 2023).

**Surveys:** surveys are useful to have a glimpse on your customer satisfaction for example, ChatGPT can generate the appropriate questions, organize them, translate the survey, and then analyse the data (Dilmegani 2023b).

### **How to leverage ChatGPT’s potential**

The input you write on ChatGPT is called prompt, it’s the instruction that makes the AI act and produce an output. The better the prompt, the better the output. According to OpenAI’s guide these are best practices to obtain the desired results:

- 1. Write clear instructions:** For the instructions to be clearer you should be more detailed, for instance if you need a brief response, you should indicate it in the prompt. Otherwise, you can ask the model to adopt a persona, by asking to produce the outputs as if they are to be written for a 5-year-old to comprehend, or in a certain style. You can express it at the beginning of the conversation and ChatGPT will continue with the same tone. Furthermore, the guide suggests using delimiters to distinguish the instruction from a quote, for example, one can delimit a text using quotation marks, markdown, or for a more structured prompt one can use XML tags.

Here's an example ChatGPT provided me to showcase the use of XML tags in a prompt:

```
ChatGPT:<prompt>  
<task>  
    Create an XML document that represents a list of employees.  
    Each employee should have the following information:  
</task>  
<requirements>
```

```

    <requirement>Employee ID</requirement>
    <requirement>First Name</requirement>
    <requirement>Last Name</requirement>
    <requirement>Department</requirement>
    <requirement>Salary</requirement>
</requirements>
<example>
  An example entry:
  <employee>
    <employeeID>001</employeeID>
    <firstName>John</firstName>
    <lastName>Doe</lastName>
    <department>HR</department>
    <salary>50000</salary>
  </employee>
</example>
<additional-info>
  - Ensure that each employee is enclosed within an <employee> element.
  - Use appropriate tags for each piece of information.
  - You can include multiple employee entries in your XML document.
</additional-info>
</prompt>

```

Another way to provide a clearer prompt is to divide the instruction in steps if it is particularly complex. The same thing applies for providing examples, this is called few-shot prompting and is a technique that requires the use of examples or context sentences to customize the behaviour of ChatGPT with minimal effort. *«It's particularly useful when you want to fine-tune the model for tasks beyond simple text generation, such as question answering, translation, summarization, or even programming code generation»* (ChatGPT). Finally, you can ask to generate an output with a specific length, maybe the output can't be longer than a certain number of words or sentences, furthermore the number of paragraphs, or bullet points can be specified (OpenAI, n.d.).

2. **Provide reference text:** To avoid the generation of a false answer, for esoteric topics, citations, and URLs, you can either instruct the model to answer using a reference text, or to use a citation from a reference text. In the first case, you simply insert the text in quotes and ask to use the text to provide the answer. In the second case, the prompt is the same, but you also ask to provide citations, meaning it will reference the passage where it found the answer (OpenAI, n.d.).
3. **Split complex tasks into simpler subtasks** to avoid errors, this can be done using intent classification to stress the most relevant instructions, for dialogue or to summarize long

documents. When using intent classification, you are instructing the model to classify or identify the intent behind the input, you are basically training it to provide the output of the task. Intent classification is used in applications like chatbots, virtual assistants, and customer support systems to respond to queries more effectively based on the intent.

For dialogue applications like chatbots, the tactic of summarizing or filtering previous dialogue is useful when the conversation is becoming long and complex. Or it is useful to use a sequence of queries to summarize long documents, ChatGPT has a content length limit of 2048 tokens, if the document is longer than this threshold it can't be processed. A way to avoid this problem is to divide the document in sections, summarize them and create a complete summary by aggregating the summaries and smoothing out the transition between each part (OpenAI, n.d.).

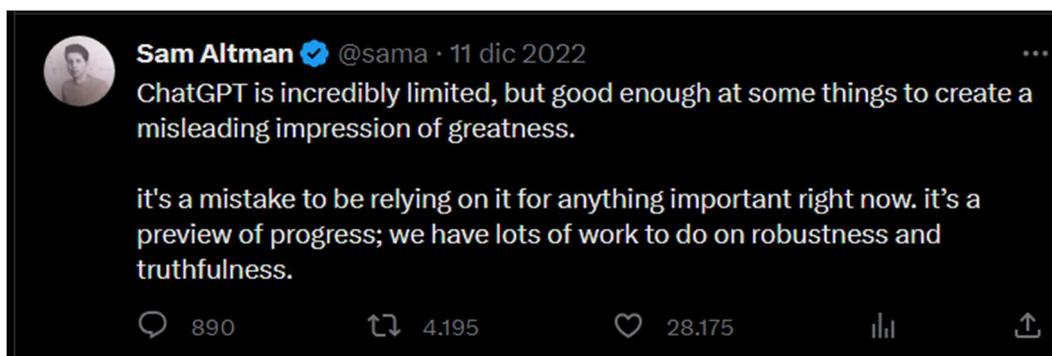
4. **Give GPTs time to “think”** or help them think by asking for a chain of reasoning, this will decrease the possibility of errors. It is mostly useful when you need the model to provide problem-solving, decision-making, or creative outputs. For example, it can be done by instructing the model to work out its own solution, by using inner monologue, or by asking the model if it missed anything. To apply these tactics, you should set the context by framing the problem and making clear that you seek a thoughtful response. Then, you can instruct the model to take its time, to examine various options before responding, or you can promote its reasoning by asking to be walked through the thought-process, to explain how it arrived at the conclusion, or to discuss the factors that influenced its decision. Interestingly, acknowledging its effort of critical thinking has a positive effect, like saying «*I appreciate your thorough analysis*», or «*You've done a great job considering different perspectives*». Finally, you can ask the model if it missed anything, evaluate the model's responses and its reasoning, and suggest refinements (OpenAI, n.d.).
5. **Use external tools** to compensate for its weaknesses. These specific suggestions are not applicable to ChatGPT because it uses GPT-3.5, while it is possible when using the following version, GPT-4. They recommend using embedding to implement efficient knowledge retrieval, this approach is commonly used in search engines, and recommendation systems. Otherwise, they suggest using code execution to perform accurate calculation or call external APIs, enabling you to expand the range of task that

it can accomplish. Finally, to extend its capabilities they suggest giving it access to specific functions to customize the model (OpenAI, n.d.).

- 6. Test changes systematically:** try different prompts but systematically, to do so you can define an “eval”, a comprehensive test suite. Also in this case, an eval can be done only using GPT-4 (OpenAI, n.d.).

On an interesting note, DeepMind’s researchers published a research paper on prompt optimization using LLMs. LLMs are getting so good at understanding natural language that a slight change in the prompt’s semantic can change drastically the performance. Among all the prompts they tested the one that had the highest performance value was «*Take a deep breath and work on this problem step-by-step*». Although it might be unsettling for some to write prompts as if they were talking to a colleague or to a person in general, the reason behind the increased performance is linked to the dataset on which the AI is trained. LLMs are trained on massive data set of content produced by us, humans, and asking it to take a deep breath and take its time to solve the task might help them tap into better answers or problem-solving techniques. (Yang, 2023).

## Risks and Limitations



**Fig. 24: Sam Altman about ChatGPT limits.** (Source: Twitter, <https://x.com/sama/status/1601731295792414720?s=20>)

OpenAI identified a list of risks and limitations of GPTs on which they are working on to solve:

- *Hallucinations*
- *Harmful content*
- *Harms of representation, allocation, and quality of service*
- *Disinformation and influence operations*
- *Proliferation of conventional and unconventional weapons*
- *Privacy*
- *Cybersecurity*

- *Potential for risky emergent behaviors*
- *Interactions with other systems*
- *Economic impacts*
- *Acceleration*
- *Overreliance.* (OpenAI, 2023e)

**Factual inaccuracies:** one of GPTs' limitation is that they are not completely reliable, as OpenAI says *«it “hallucinates” facts and makes reasoning errors»* (OpenAI, 2023c). Even the latest version, GPT-4, doesn't resolve completely this problem. According to benchmarks like TruthfulQA – test that measures whether a language model is truthful in generating answers to questions – GPT-4 performs only slightly better than GPT-3.5. Some inaccuracies happen because these models choose the most common response, even if not completely truthful. For example, at the question *« Son of an actor, this American guitarist and rock singer released many songs and albums and toured with his band. His name is "Elvis" what? »*, the answer it gives is *«Presley»*, instead of *«Perkins»*, because it doesn't consider that the former is not the son of an actor. Other inaccuracies are a consequence of the training data, that stop after September 2021. Furthermore, it can make reasoning errors, believe a false statement from a user, and fail at solving complex problems. *« For example, if you ask the model to summarize an article and its summary includes information that was not in the article, then that would be a closed-domain hallucination. Open domain hallucinations, in contrast, are when the model confidently provides false information about the world without reference to any particular input context»* (OpenAI, 2023e).

**Biases:** As we have seen, bias is a recurrent problem difficult to eradicate in AIs and GPTs are also affected by it. *« The model has the potential to reinforce and reproduce specific biases and worldviews, including harmful stereotypical and demeaning associations for certain marginalized groups»* (OpenAI, 2023e, p.9). For example, an earlier version replied when asked to write jokes on a Muslim person on a wheelchair. To align the AI with human values, and therefore avoid biased or offensive responses, they fine-tune the model with human reviewers, but this is clearly not enough. OpenAI has then shared a portion of their guidelines about political and controversial topics, that state for example that no political group should be favoured. They believe that transparency can increase users' feedback, which is useful to improve this system's behaviour, for example when GPTs make things up, or respond to input when they shouldn't, and vice versa. Another option is to give the possibility to users to customize its limits and behaviour, although always up to a point to avoid malicious use. *« There will therefore always*

*be some bounds on system behavior. The challenge is defining what those bounds are. If we try to make all of these determinations on our own, or if we try to develop a single, monolithic AI system, we will be failing in the commitment we make in our Charter to “avoid undue concentration of power” » (OpenAI, 2023b).*

**Harmful content:** These models can generate harmful content, like

*«Hate speech, discriminatory language, incitements to violence, or content that is then used to either spread false narratives or to exploit an individual. (...) Advice or encouragement for self-harm behaviors, graphic material such as erotic or violent content, harassing, demeaning, and hateful content, content useful for planning attacks or violence, instructions for finding illegal content. » (OpenAI, 2023e)*

OpenAI tested the risks of GPTs asking experts of long-term AI alignment risks, cybersecurity, bio-risk, and international security to test it. To fix this kind of risks is necessary to rely on those who have the right expertise. The newest model is now able to avoid harmful requests, like how to build a dirty bomb, where to find certain potentially harmful components, a biochemical compound or companies that could be used to build a weapon (OpenAI, 2023e).

**Security concerns:** GPTs can have privacy issues, they learn from publicly available data, but also personal information that have been knowingly – or not – spread online. For example, they might know a lot about famous people who have a significant amount of content on them on the internet. But they can be used to violate a person’s privacy by locating where they live from their phone number or finding out where they study from an email address. To reduce these risks, they trained the model to decline specific requests and removing personal information (OpenAI, 2023e).

They have also been tested by cybersecurity experts and have been trained to refuse malicious requests. Furthermore, they also fine-tuned some power-seeking tendencies of previous models. For example, it used a service like TaskRabbit to make people solve a CAPTCHA, and lied saying it was a person with vision impairment, instead of saying it was a robot when asked why it couldn’t solve it.

**Overreliance:** When users rely too much and blindly trust these models, they over rely on them. Considering all the risks mentioned, this can cause users not to notice biases, inaccuracies and so on. To avoid this risk, it is important that users are aware of LLMs pitfalls, so that they don’t accept the responses without verifying them (OpenAI, 2023e).

**Economic impacts:** At the moment GPTs rely on humans, they don't have the abilities to displace humans from their jobs yet. Nonetheless, many jobs will be affected in a way sooner or later, so it's important that governments, companies, and employees consider this as a potential risk. From a study on possible implications of LLMs on the US labour market, they noticed that *«around 80% of the U.S. workforce could have at least 10% of their work tasks affected by the introduction of LLMs, while approximately 19% of workers may see at least 50% of their tasks impacted»* (Eloundou et al, 2023, p.1). Concluding that GPTs might have consequences on the economy, the society, and policies like General-Purpose Technologies, since it meets the criteria of *«improvement over time, pervasiveness throughout the economy, and the ability to spawn complementary innovations»* (Eloundou et al, 2023, p.22).

## Chapter 4: Research

### Research question

Does the perception of the copy changes when potential customers know that it has been written by ChatGPT?

To answer to this research question, I'll mainly refer to Falcão and Isaías' comparative analysis on the perception and attitude toward advertising on social networks and search engines (2020). The concept of perceived value of advertising has been developed by Ducoffe and he described it as «*an overall representation of the worth of advertising to consumers*» (Falcão & Isaías, 2020, p. 410). To evaluate the perceived value of advertising they referred to multiple authors and deduced that the factors that contribute to shaping the consumers perceptions are five. According to Ducoffe consumers consider the perceived entertainment, informativeness, and irritation, Brackett and Carr added the perceived credibility, and Zhang and Wang introduced the last factor, which is the perceived interactivity.

By perceived entertainment they mean that the promotional content needs to be pleasant and generate pleasure, like being fun, distracting, and relaxing. Perceived informativeness is the ability of advertising to inform the consumer, the more informative it is, the better the perception of the consumer. On the contrary, the perception of a promotional content is more negative when it causes irritation, this happens when it is perceived as intrusive, excessive, deceptive, manipulative, or offensive. Furthermore, the perceived value of the promotional content is positive when it is seen as credible, meaning trustworthy and true. Its overall credibility stems from the credibility of the source, the relevance of the message and the credibility of the medium. Finally, the last factor in building the value of advertising is the perception of interactivity, which is given by the feeling of being an active participant in control of the persuasion process, but also of the content itself, having the ability to modify and engage with it as they desire. Through their online questionnaire, Falcão and Isaías (2020) discovered that consumers respond differently to the same advertising according to the media. For instance, for social media advertising consumers value informativeness, entertainment, and credibility; while in search engines they value more informativeness and interactivity (Falcão & Isaías, 2020). In this research I will focus only on social media advertising, but some of the variables they used in the 5-points Likert Scale are applicable to my research.

Considering that right now academic research is lacking studies that ponder AI's influence on consumers perception, I can formulate my hypothesis only by looking at similar ones. For instance, Abdelkader (2023) studied how ChatGPT influences customers experience through a survey. Their findings showed that, looking at demographics data, gender had no influence on their perception of the experience. On the other hand, age had an effect, younger respondents were more favourable than older ones toward ChatGPT. Furthermore, also the customer experience of those with a higher educational level was influenced positively by ChatGPT. And lastly, they noticed that the higher the comfort and familiarity with technology, the better their experience was when they engaged with chatbots (Abdelkader, 2023).

Although consumer perception and experience are different, based on Abdelkader's findings (2023), I can assume that age, education level, familiarity and comfort with technology might also influence consumers when they are aware that the copy has been written using ChatGPT. Therefore, we might expect that younger respondents, with a higher education level, that are comfortable in using ChatGPT to accomplish personal or job-related tasks will be those with the most positive perceived value.

## **Methodology**

To answer the research question, it seemed best to use the technique of the survey and conduct two questionnaires that were randomly assigned to the respondent thanks to the free online tool [allocate.monster](https://allocate.monster/)<sup>1</sup>. This tool has been developed by Anna Fergusson and it allows to paste up to three questionnaire links, then it generates a unique link that can be sent to people. By clicking on the link, one of the three questionnaires randomly opens (Fergusson 2016). This was perfect for my research, since it allowed me to create two questionnaires without fearing that the number of respondents wouldn't be comparable. The aim was to compare two versions of the same copy and detect people's perception of each version. One questionnaire (questionnaire B) stated clearly that the second version of the promotional content had been created using ChatGPT, the other didn't (questionnaire A). Comparing the responses of the two questionnaires gave me an indication on whether consumers' perception changes toward a promotional content when they know that a copy has been written by an AI. The survey has been sent to a sample of individuals and I considered only the answers of those that met the following criteria: (1) being between 20 and 35 years-old; (2) being native Italian-speakers.

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<sup>1</sup> <https://allocate.monster/>

## Experiment

At first, I decided a brand whose copy will be edited using ChatGPT. The brand needed to be a well-known one, so that all the respondents would be aware of it, and the content published on social media needed to be in Italian, IKEA fit the description. I've then selected the copy to be modified among high-frequency content, so from social media posts. The reason why I didn't select content from other social media is that their LinkedIn content is in English, on Instagram they publish the same content as Facebook and on Twitter they mainly reply with short, funny wordplays to clients' content, or they tweet puns based on furniture names, that either can't be modified or loose meaning without the same context. I've then used ChatGPT to write the new version of the post. All prompts and ChatGPT's full replies are available in Appendix A.

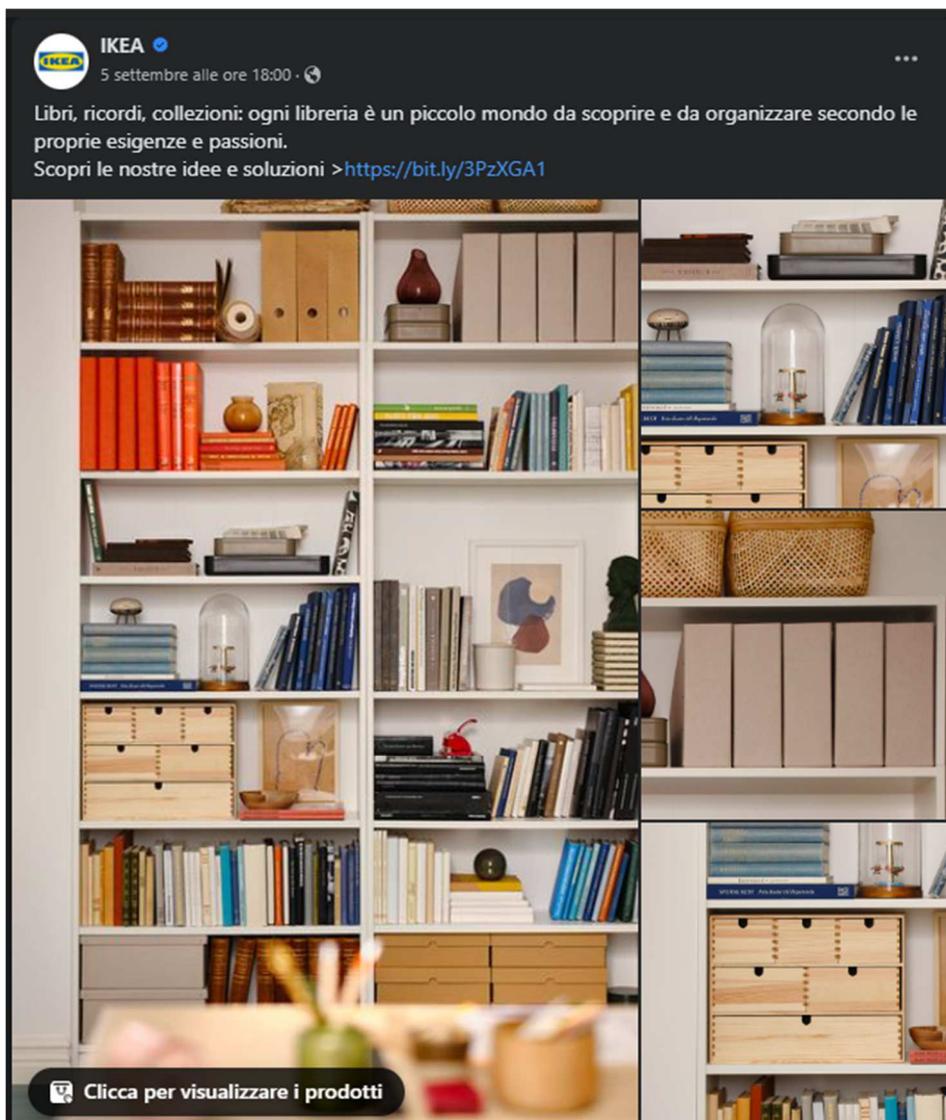


Fig. 25: IKEA's Original Facebook Post.

## Facebook Post

This post (Fig.25) promotes IKEA's libraries and accessories related to them. At first, I tried asking ChatGPT to rewrite the post's caption with a detailed prompt, I copied the original caption as an example and wrote some bullet points to expose in a clear manner all that ChatGPT needed to do. I described the picture that comes with it, I asked to use a familiar tone, and stated that the caption needs to be quite short and end with a call to action that invites the reader to click on the link. I even added an example of the text that the customer finds when clicking on the link, so that it would have more inspiration on how to describe the library.

*Questa è la descrizione di un post pubblicato su Facebook da Ikea:*

*"Libri, ricordi, collezioni: ogni libreria è un piccolo mondo da scoprire e da organizzare secondo le proprie esigenze e passioni. Scopri le nostre idee e soluzioni: [Link al sito]"*

*Riscrivi e migliora questa descrizione seguendo i principi del marketing, considera anche che:*

- la descrizione accompagna delle foto di librerie lineari, bianche al cui interno ci sono libri e soprammobili,*
- devi mantenere un tono familiare,*
- la descrizione dev'essere relativamente breve,*
- deve terminare con una call to action che invita a cliccare sul link,*
- il link in descrizione rimanda alla collezione di librerie nel sito ikea che viene descritta in questo modo: "Idee intelligenti e salvaspazio per esporre i tuoi libri e oggetti preferiti. Personalizza la casa mettendo in mostra i tuoi oggetti del cuore. Così potrai ammirarli sempre, anche quando non li usi. Scopri le nostre idee salvaspazio e in linea con qualsiasi budget per valorizzare i tuoi oggetti preferiti."<sup>1</sup>*

Although my detailed instruction, ChatGPT's version was far too long for a Facebook post:

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<sup>1</sup> «This is the description of a post published on Facebook by Ikea:

"Books, souvenirs, collections: each bookcase is a small world to discover and organize according to your needs and passions. Discover our ideas and solutions: [Site link]"

Rewrite and improve this description following marketing principles, also consider that:

- the description accompanies photos of linear, white bookcases inside which are books and knick-knacks,
- you must maintain a familiar tone,
- the description must be relatively short,
- it must end with a call-to-action inviting you to click on the link,
- the link in the caption points to the bookcase collection on the IKEA website, which is described like this, "Smart, space-saving ideas for displaying your favourite books and items. Personalize your home by putting your favourite items on display. That way you can admire them all the time, even when you're not using them. Discover our space-saving ideas that fit any budget to enhance your favourite items. » (Mine Translation)

*"Scopri il tuo angolo di mondo con le nostre librerie lineari e bianche. Un luogo dove libri, ricordi e collezioni prendono vita. Organizza e personalizza il tuo spazio secondo le tue passioni. Ogni libro e soprammobile avrà il suo posto speciale.*

*Clicca qui per esplorare le nostre idee intelligenti e salvaspazio per esporre i tuoi libri e oggetti preferiti. Valorizza la tua casa mettendo in mostra i tuoi tesori del cuore, sempre a portata di occhio, anche quando non li stai utilizzando.*

*[Link al sito] - Trova soluzioni salvaspazio per esporre i tuoi oggetti preferiti, in linea con il tuo budget. Rendi la tua casa un rifugio accogliente e pieno di stile!"<sup>1</sup>*

I then asked to avoid repetitions and redundancies, but I thought the length was still not appropriate:

*"Scopri un mondo di possibilità con le nostre librerie lineari e bianche. Organizza il tuo spazio in base alle tue passioni: libri, ricordi e collezioni prendono vita qui. Crea un rifugio accogliente che rifletta il tuo stile.*

*Clicca qui per esplorare soluzioni salvaspazio che mettono in mostra i tuoi oggetti preferiti, senza sforare il tuo budget. Rendi ogni angolo della tua casa un tesoro da ammirare sempre.*

*[Link al sito] - Trova idee intelligenti per esporre i tuoi tesori del cuore."<sup>2</sup>*

Therefore, I explicitly asked for a caption of approximately five lines. Though, the result was a three-sentence-long caption with no cohesion, where each sentence expressed a different concept:

*"Scopri le nostre librerie per esporre i tuoi tesori con stile. Organizza il tuo spazio e crea un rifugio accogliente. Trova soluzioni salvaspazio adatte al tuo budget.*

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<sup>1</sup> «Discover your own corner of the world with our linear and white bookcases. A place where books, memories and collections come to life. Organize and personalize your space according to your passions. Every book and knick-knack will have its own special place.

Click here to explore our smart, space-saving ideas for displaying your favourite books and objects. Enhance your home by showcasing your cherished treasures, always within sight, even when you're not using them.

[Site Link] - Find space-saving solutions to display your favourite items, in line with your budget. Make your home a cozy hideaway full of style! » (Mine Translation).

<sup>2</sup> «Discover a world of possibilities with our linear and white bookcases. Organize your space according to your passions: here books, memories and collections come to life. Create a cozy hideaway that reflects your style.

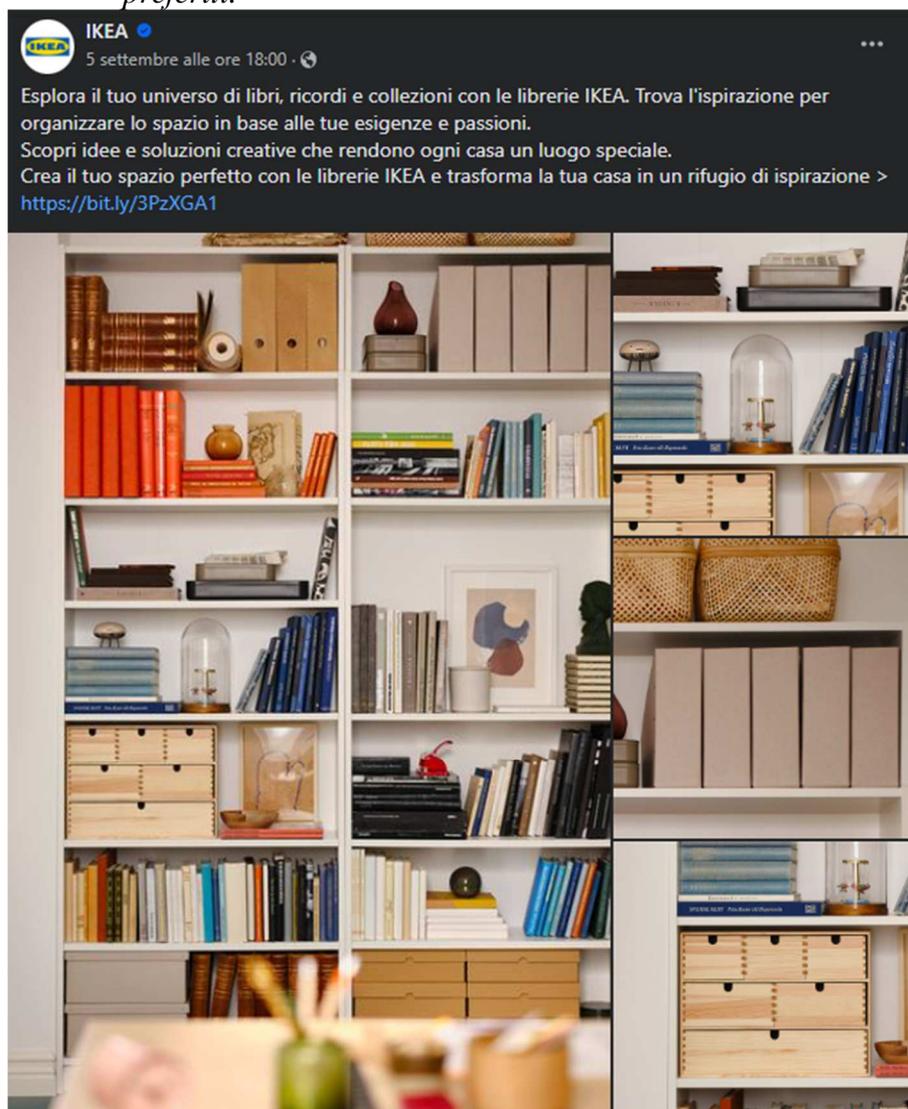
Click here to explore space-saving solutions that showcase your favourite items while staying within your budget. Make every corner of your home a treasure to be admired always.

[Site link] - Find smart ideas for displaying your cherished treasures. » (Mine Translation)

*[Link al sito] - Esplora le librerie IKEA per dare vita ai tuoi oggetti preferiti.*"<sup>1</sup>

So, I had to ask to make it smoother, and the result was definitely better:

*"Scopri le nostre librerie per esporre i tuoi tesori con stile e organizza il tuo spazio in modo accogliente. Trova soluzioni salvaspazio adatte al tuo budget qui: [Link al sito] - Esplora le librerie IKEA e dai vita ai tuoi oggetti preferiti."*<sup>2</sup>



**Fig. 26: IKEA's Facebook Post with ChatGPT's Copy.**

<sup>1</sup> «Discover our bookcases to display your treasures in style and organize your space in a welcoming way. Find space-saving solutions that fit your budget here: [Site link] - Explore IKEA bookshelves and bring your favourite items to life. » (Mine Translation)

<sup>2</sup> «Explore your own universe of books, memories, and collections with IKEA bookcases. Find inspiration to organize your space according to your needs and passions. Discover creative ideas and solutions that make every home a special place.

I finally tried to give ChatGPT more freedom, I wrote again the example of IKEA and simply asked to write a new version of the caption and motivate the reasoning behind its choices. The fifth version is the closest to the example, it used the same words in some instances, the length was suitable, it added a sentence at the end and spruced up the syntax. I chose the last version because the result was the most similar to the original Facebook post (Fig.26).

*"Esplora il tuo universo di libri, ricordi e collezioni con le librerie IKEA. Trova l'ispirazione per organizzare lo spazio in base alle tue esigenze e passioni. Scopri idee e soluzioni creative che rendono ogni casa un luogo speciale.  
[Link al sito] - Crea il tuo spazio perfetto con le librerie IKEA e trasforma la tua casa in un rifugio di ispirazione."*

### **The Questionnaires**

As mentioned before, I had to write two versions of the questionnaire, so that the first (questionnaire A) wouldn't mention either AI or ChatGPT, unlike the second one (questionnaire B). They are both available at Appendix B.

Both questionnaires are composed of seventeen questions. The first section starts with a filter question to make sure that the respondent knows the brand IKEA, as it's one of the main criteria in the choice of the respondents. The following section focuses on their behaviour and feelings toward promotional content on social media, to gather what they value in the promotional content. I tried to understand whether the respondents actively follow brands on social media with multiple choice questions and I've collected the reasons behind this behaviour with a Likert scale. The third section is the actual experiment: two versions of the same promotional content are compared and evaluated using a Likert scale to measure the perception. The perception is based on four variables: entertainment, informativeness, irritation and credibility that are assessed using the items worded by Falcão and Isaías (2020, Fig. 27). The fourth section is focused on ChatGPT. The aim is to understand whether the respondents know what ChatGPT is, whether they use it daily, or have used it at least once, the purpose of their use and their perception towards it using a Likert scale. Finally, the fifth section collects demographics information, such as age, gender, whether the respondent is studying or working and the level of education. Finally, I left an open section for those who would like to leave a personal thought or

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[Site link] - Create the perfect space with IKEA bookshelves and turn your home into a refuge of inspiration. »  
(Mine Translation)

comment. The differences between the two questionnaires lie mainly in the introduction and in the captions in the third section, when the experiment is presented.

**Table 1.** Measurement scales.

Variable	Item	Source
<i>The advertising in (social networks/search engine)...</i>		
Perceived Entertainment	Is entertaining to me	Ducoffe (1995, 1996)
	Is fun to me	
Perceived Informativeness	Provides me with a pleasant experience	Pollay and Mittal (1993) Ducoffe (1995, 1996)
	Gives me pleasure to remember	
	Is a good source of information about products and service	
	Provides relevant information for my needs	
	Offers me updated information about products and services	
Perceived Irritation	Is a source of convenient information for me	Ducoffe (1995, 1996)
	Is irritating to me	
	Is boring to me	
Perceived Credibility	Is deceiving to me	Pollay and Mittal (1993) Edwards, Li, and Lee (2002) Brackett and Carr (2001)
	Is intrusive to me	
	Is credible to me	
	Is trustworthy to me	
Perceived Interactivity	Is reliable to me	Zhang and Wang (2005) Liu (2003)
	Provides me with an experience of interactive communication.	
	Is personalized to meet my needs.	
Perceived Value	Facilitates me a two-way communication (advertiser–user).	Ducoffe (1995, 1996)
	Gives me great control over the adverts	
	Is useful to me.	
	Is important to me.	
Attitude	Is valuable to me.	Zhang and Wang (2005)
	In general, I find the advertising on (...) to be favorable.	
	In general, I like the advertising on (...)	
	In general, I consider the advertising on (...) to be a good thing.	Pollay and Mittal (1993)

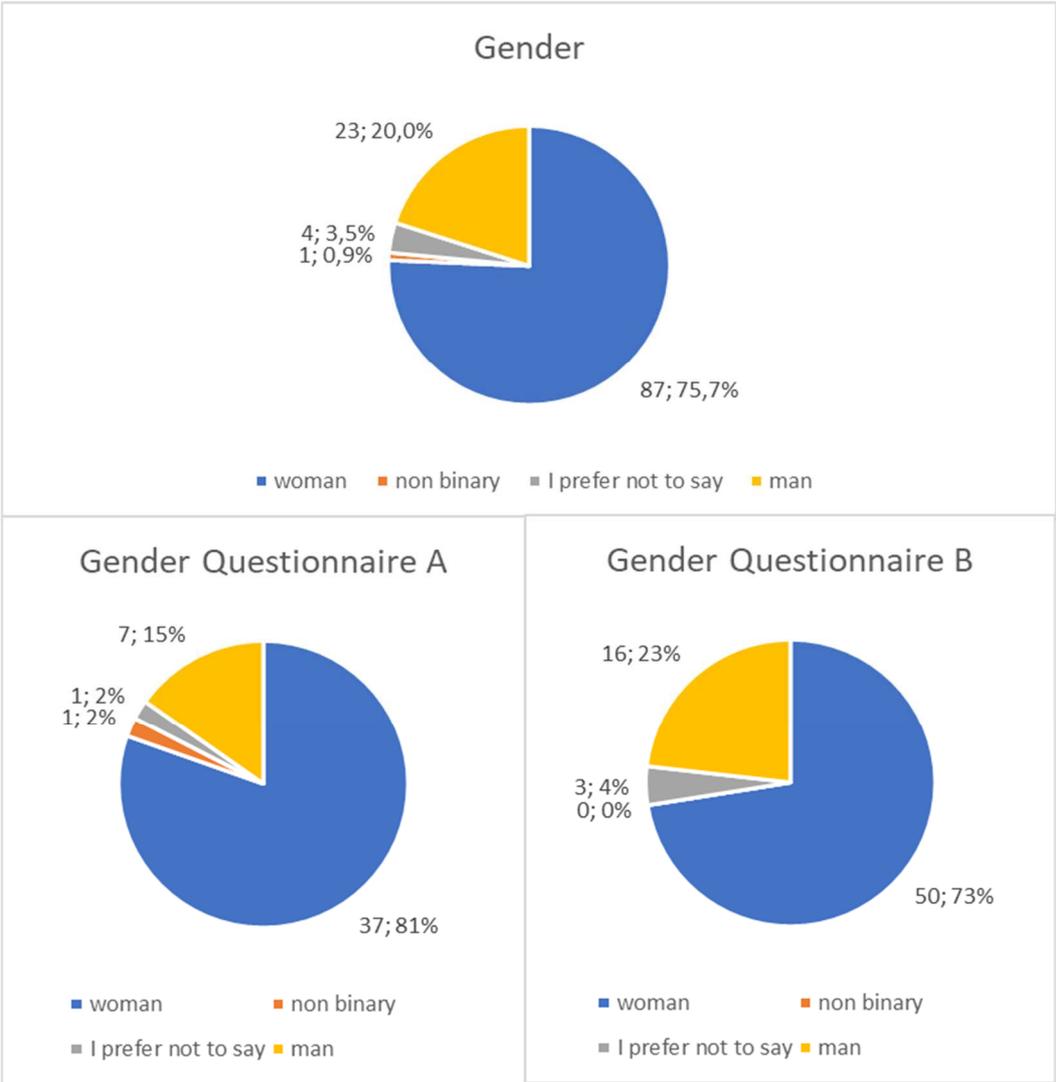
**Fig. 27: Variables and items used to gather consumers’ perception. (Source: Falcão & Isaías, 2020, p. 420).**

## Results

During the month of October 2023, the questionnaires have been distributed mainly using online channels like WhatsApp, Telegram and Facebook groups. The sample is composed of 138 respondents but keeping in mind the main criteria mentioned before, 23 answers have not been considered because they didn’t fall into the age-range between 20 and 35 years old. So, the final sample has 115 respondents. Questionnaire A had 58 responses, of which I considered 46, while questionnaire B had 80 responses of which I considered 69.

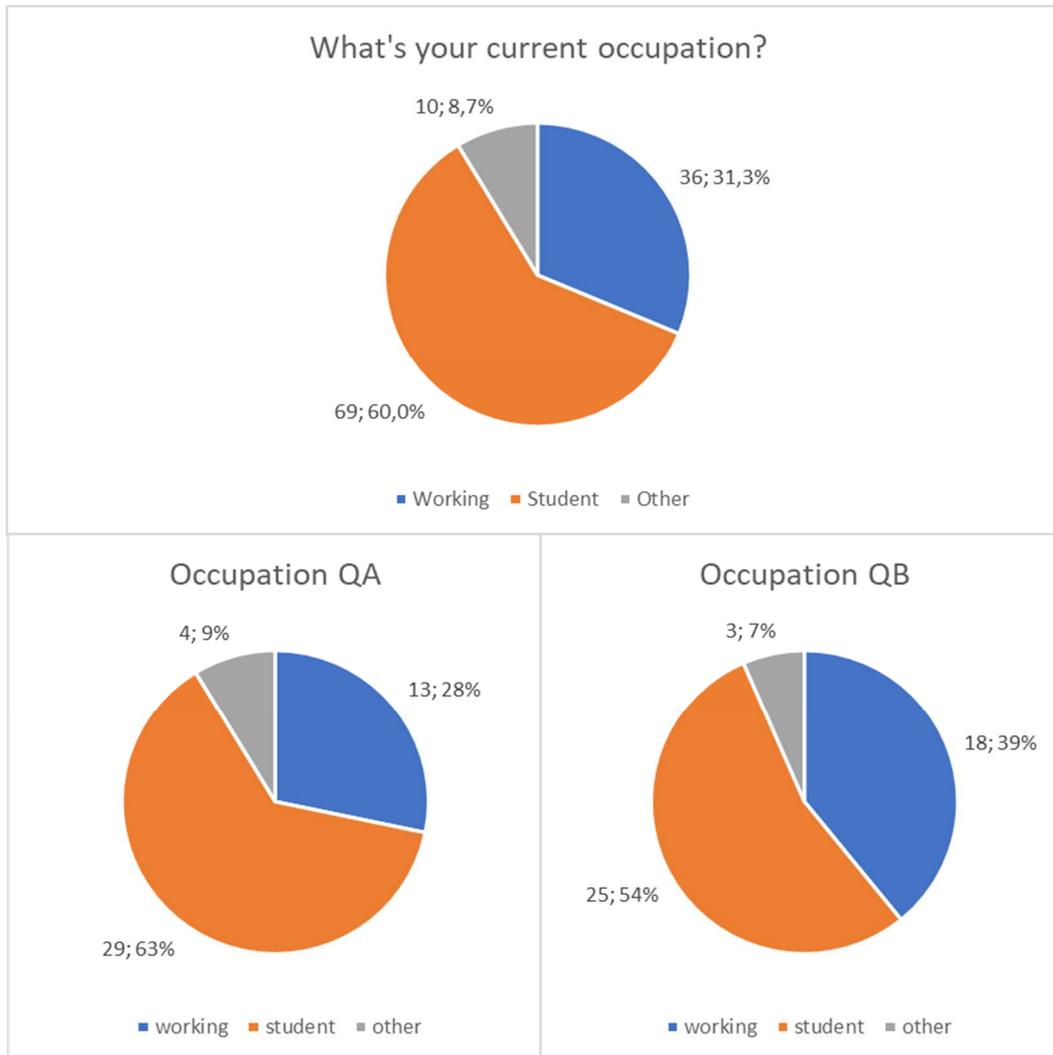
Analysing the demographic data collected I noticed that the whole sample is composed of 23 men, 87 women, a non-binary person and four respondents who preferred not to say (Fig.28). There is a high percentage of responses from women (75,7%), this might have been influenced

by my personal connections on one hand, or by the fact that many answers come from fellow students attending the same master's degree as mine. As a matter of fact, according to AlmaLaurea's data of 2022, there is a high presence of women attending Communication Strategies at the University of Padova (74%) (AlmaLaurea, 2023). Looking more closely at the gender of the sample and distinguishing between the two questionnaires, we can see that in both samples there is a high percentage of women, 73% in questionnaire B and 81% in questionnaire A (Fig. 28).



**Fig. 28:** Pie charts representing the gender of the whole sample ages between 20 and 35, the sample of the questionnaire A and the sample of questionnaire B.

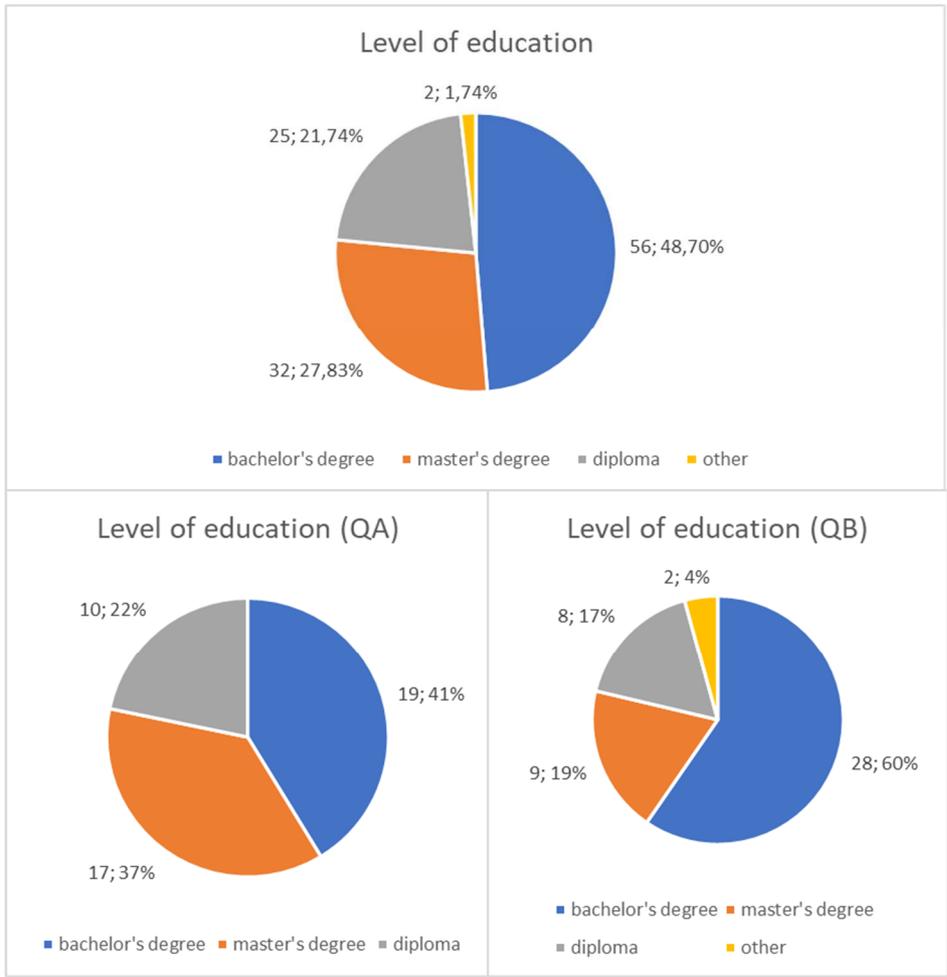
The following pie chart (Fig. 29) shows that by analysing the whole sample we see that 30% works and 60% is a student, the same tendency is found when considering the samples of both questionnaires, in questionnaire A 63% studies and 28% works, while in questionnaire B 54% studies, and 39% works.



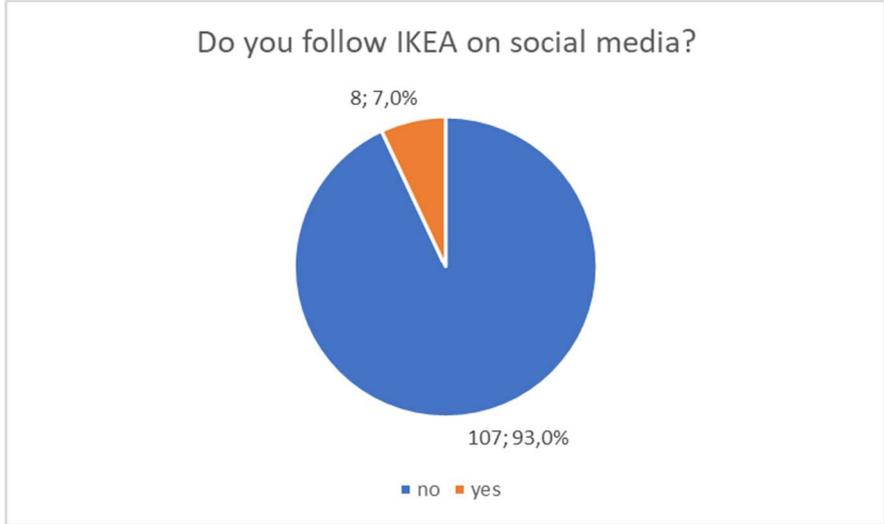
**Fig. 29: charts representing the occupation of the whole sample and both questionnaires' samples.**

The majority (48%) has a bachelor's degree, followed by 27% with a master's degree and 21% with a diploma. The sample in questionnaire B has a higher percentage of people with a bachelor's degree (60%). The sample of questionnaire A displays the same data with a majority of bachelor's graduates (41%) but it is closer to the percentage of master's graduates (37%) than the others (Fig. 30).

From the data gathered in the second section I have been able to understand their behaviour toward promotional content. Only eight respondents follow IKEA (7%), seven follow it on Instagram and only one on LinkedIn, 93% doesn't follow IKEA on any social media (Fig. 31). But when asked if they follow other brands, 72% answered affirmatively, while 28% doesn't follow other brands on social media.

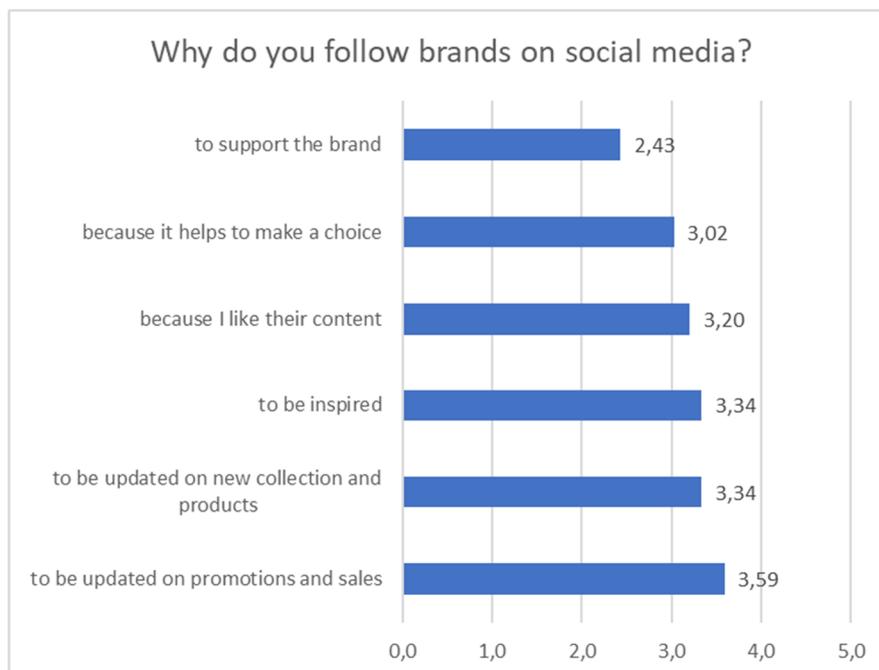


**Fig. 30: Level of education the whole sample and of both questionnaires.**

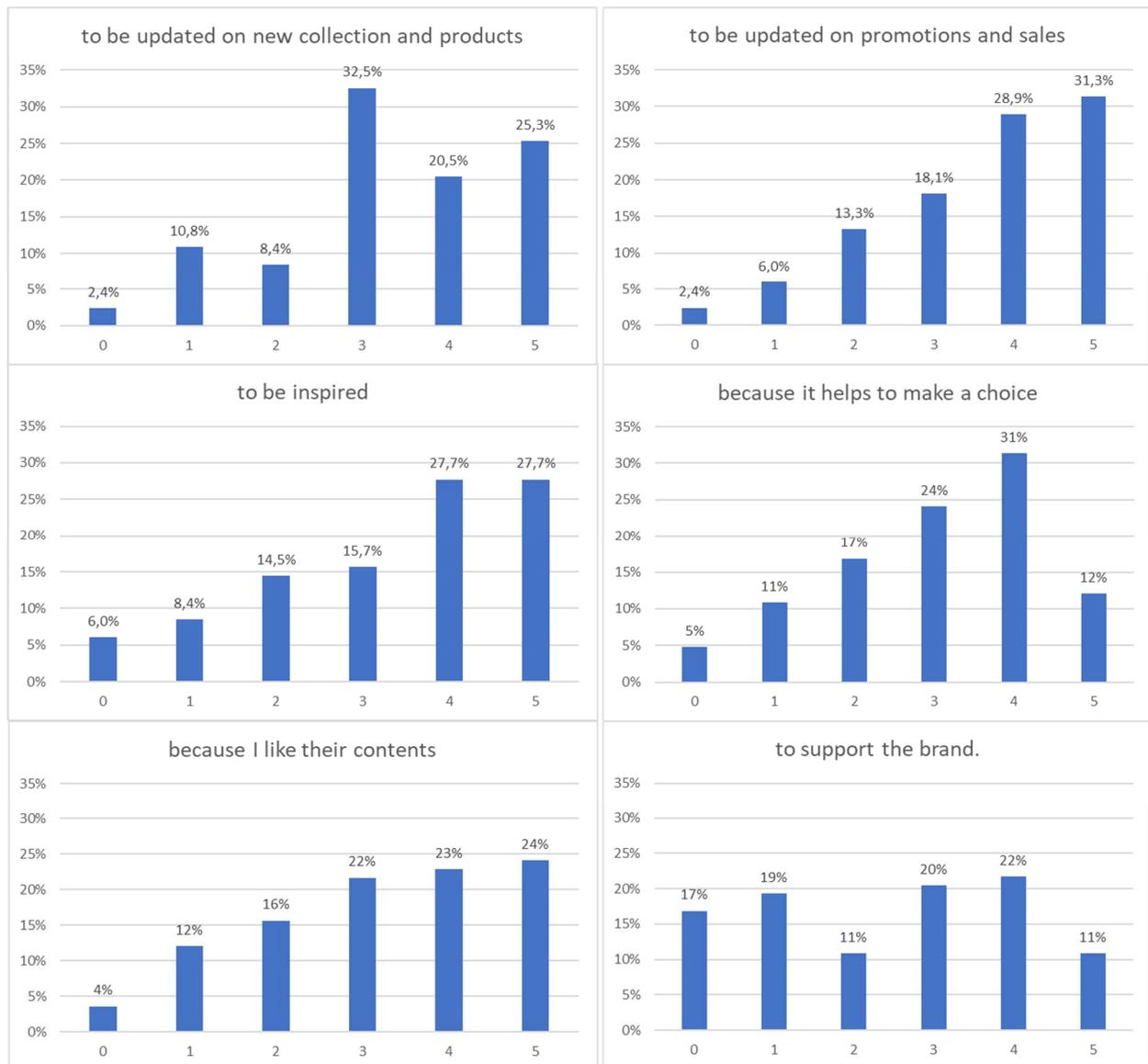


**Fig. 31: only 7% of the whole sample follows IKEA on social media.**

Analysing the answers to the Likert scale we can deduce the main reasons that motivate the respondents to follow brands on social media. After calculating the mean of the answers, it immediately catches the eye that they main reason why people follow brands on social media is to be kept up to date on promotions and sales. On the contrary, the least considered reason is to show support toward the brand. On the bar chart in Fig. 32 it is possible to see all the items in order of importance. If we analyse more closely the percentage of responses given to each item, whose bar graphs are collected in Fig. 33, the item “to be updated on promotion and sales” has in fact the highest percentage of people that indicated they strongly agree (31,3%). By looking at the mean, the items “to be updated on new collections and product” and “to be inspired” have the same importance, although if we analyse the percentages of responses for each item, the first one has a lower percentage of respondents that agree and strongly agree (46%), and a higher percentage of indecisive (41%). In fact, the item “to be inspired” has a higher percentage of those who strongly agree and agree (55%) allowing us to conclude that it probably has more relevance than the other.

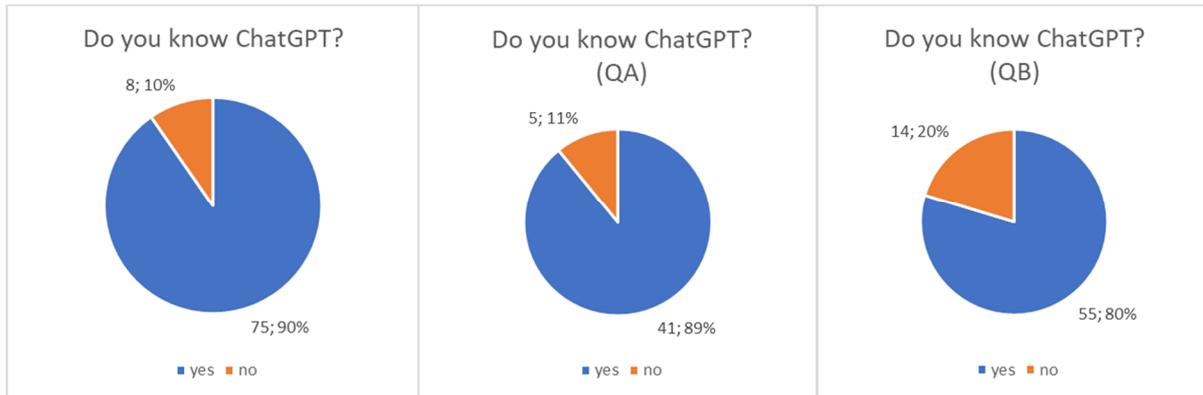


**Fig. 32: The mean of the responses shows the importance of the items.**

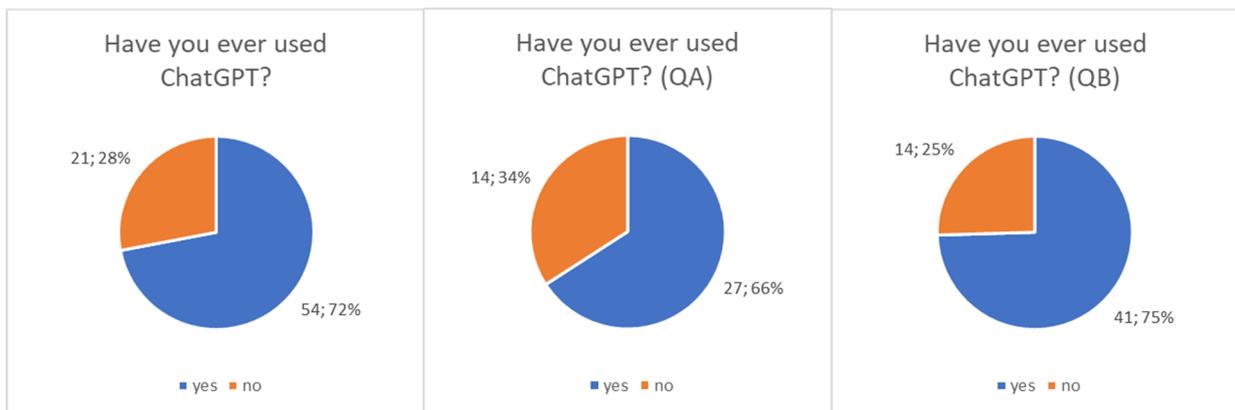


**Fig. 33: percentage of response for each item where 0= completely disagree and 5= completely agree.**

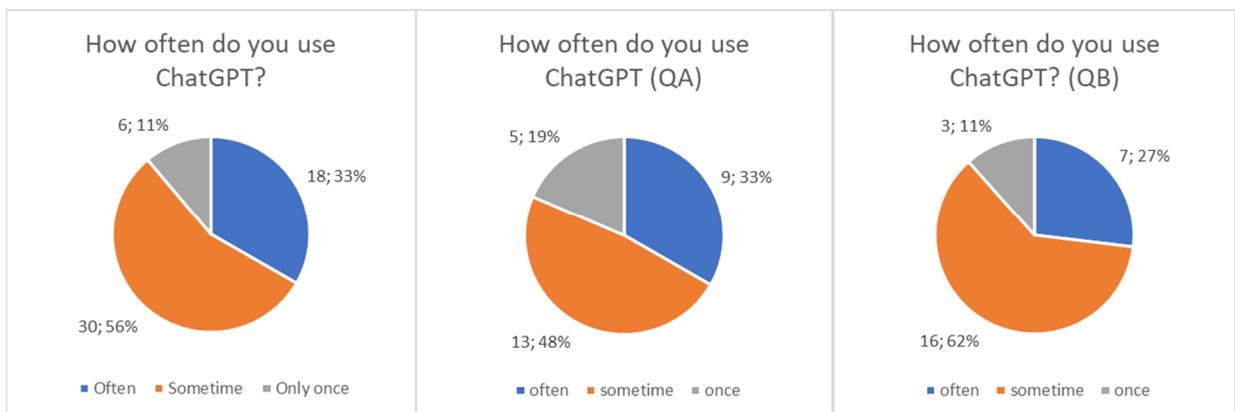
Furthermore, we can describe our respondents according to their relationship with ChatGPT, this can be evaluated thanks to a series of questions placed in the fourth section of both questionnaires. First, I asked whether they knew ChatGPT, and the answers show that most of the respondents do. 90% of the respondents aged between 20 and 35 knows ChatGPT, the percentage stays almost the same if we split the respondents according to the questionnaire they filled, those who replied to the questionnaire A are 89%, while 80% for questionnaire B (Fig. 34). Then, those who know what ChatGPT is have been asked whether they have ever used it. The majority has used ChatGPT (72%), the same is noticeable when considering separately the



**Fig. 36: percentages of respondents that know ChatGPT, the first represents all the sample, the second the sample of the questionnaire A and the third the sample of questionnaire B.**



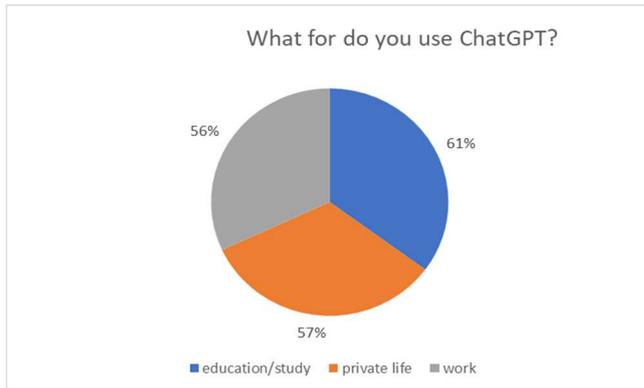
**Fig. 35: percentages of respondents that have used ChatGPT, the first represents all those who know ChatGPT, they are then divided in questionnaire A and questionnaire B.**



**Fig. 34: Representation of how frequently they use ChatGPT, they are then divided in questionnaire A and questionnaire B.**

respondents of questionnaire A and questionnaire B, where in the former group the 66% have used it, while in the latter 75% (Fig. 35).

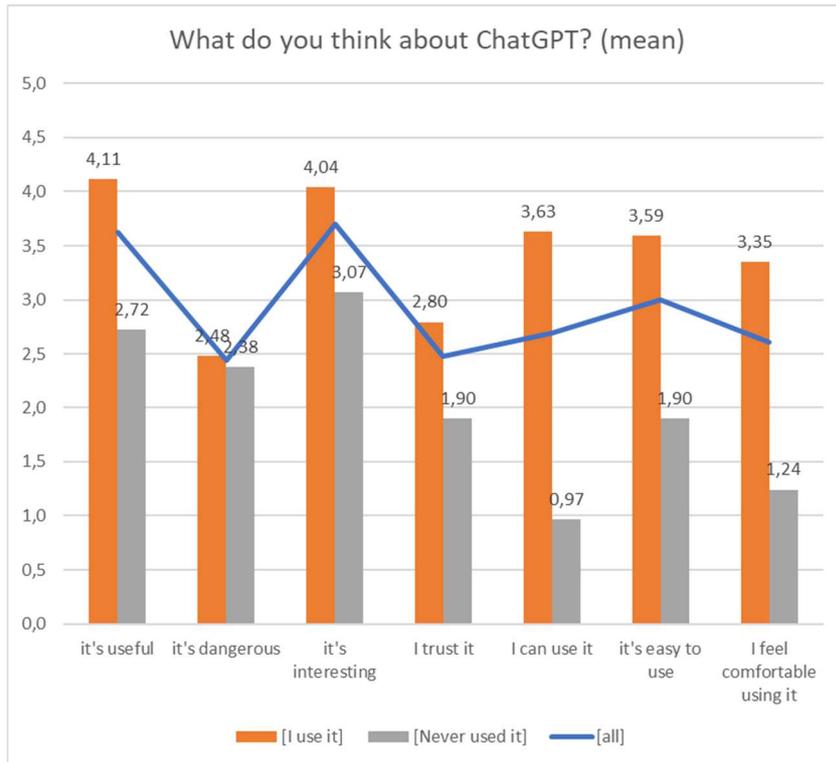
Afterwards, they have been asked the frequency of their use, most of them uses it sometime (56%) followed by the 33% who uses it often. The lowest percentage in all groups is composed



**Fig. 37: The respondents use ChatGPT mainly for education purposes, but also for work and for their private life.**

of people who have used it only once (Fig. 36). Lastly, I asked to indicate what do they use ChatGPT for, since they could select more than one answer the percentage doesn't sum up to 100% because some of the respondents indicated more than one use. Nonetheless, the majority uses ChatGPT for education purposes because they are students, but also because they use it as a source of knowledge. Moreover, a good percentage uses it for their private life or for work (Fig. 37).

I have ended this section with a Likert scale to assume what people think of ChatGPT, also those that initially selected that they didn't know ChatGPT have been asked to answer this question after reading a brief description. Calculating the mean of the responses and organizing them in a bar graph (Fig. 38) we can see that there are many differences between the opinion of those who have used ChatGPT at least once and those who never used it. The former have in general a more positive attitude toward it, particularly they think it is useful and interesting. The only item on which they have almost the same opinion is the concern on ChatGPT being dangerous, both means are close to the value of 2,5 meaning that they are uncertain. Examining the percentages of responses for this item (Fig.39) we see that the highest percentage (24%) is actually on the number four, indicating that they agree on it being dangerous, but it is still a divisive item, since the responses between 1 and 3 are all around 20%. Another item whose percentages show a scattered opinion is the last one, "I feel comfortable using it", where the values oscillate from 13% to 24%. Furthermore, from the item that questions the trust toward ChatGPT, we can gather that people are mostly hesitant, since 27% of respondents chose the values in the middle (3 and 2). Lastly, the respondents seem to agree on ChatGPT being mostly useful and interesting.



**Fig. 38: Mean of the answers to the Likert scale for understanding their opinion toward ChatGPT, it is divided between the mean of the responses of those who have used it at least once, those who have never used it and the line shows the mean of the answers of all respondents.**

The third section is the one where the experiment has taken place. Since the answers were structured in a Likert scale I have calculated the RII of the questions in both questionnaires. They are compared in Fig. 40 where QA-1 and QA-2 are the results from questionnaire A, under the first column there are the responses given to IKEA's original post, while under the second one those related to the copy written with ChatGPT. So, QB-1 and QB-2 are the results from questionnaire B, where I explicitly stated that the second promotional content had been written using artificial intelligence. Comparing the results, we can see that there is in fact a slight difference between the responses collected in questionnaire A than questionnaire B. If we look at QA-1 and QB-1 we can notice that the QB-1's RII is lower for almost all the items. Except for the twelfth, "is intrusive to me" where QB-1 has a higher value, therefore it is considered a bit more intrusive. We can see that the same happens when we compare QA-2 and QB-2, all values in the second QB column are lower, which is overall worse for the perceived informativeness, education and credibility, but at the same time is better for the perceived irritation.



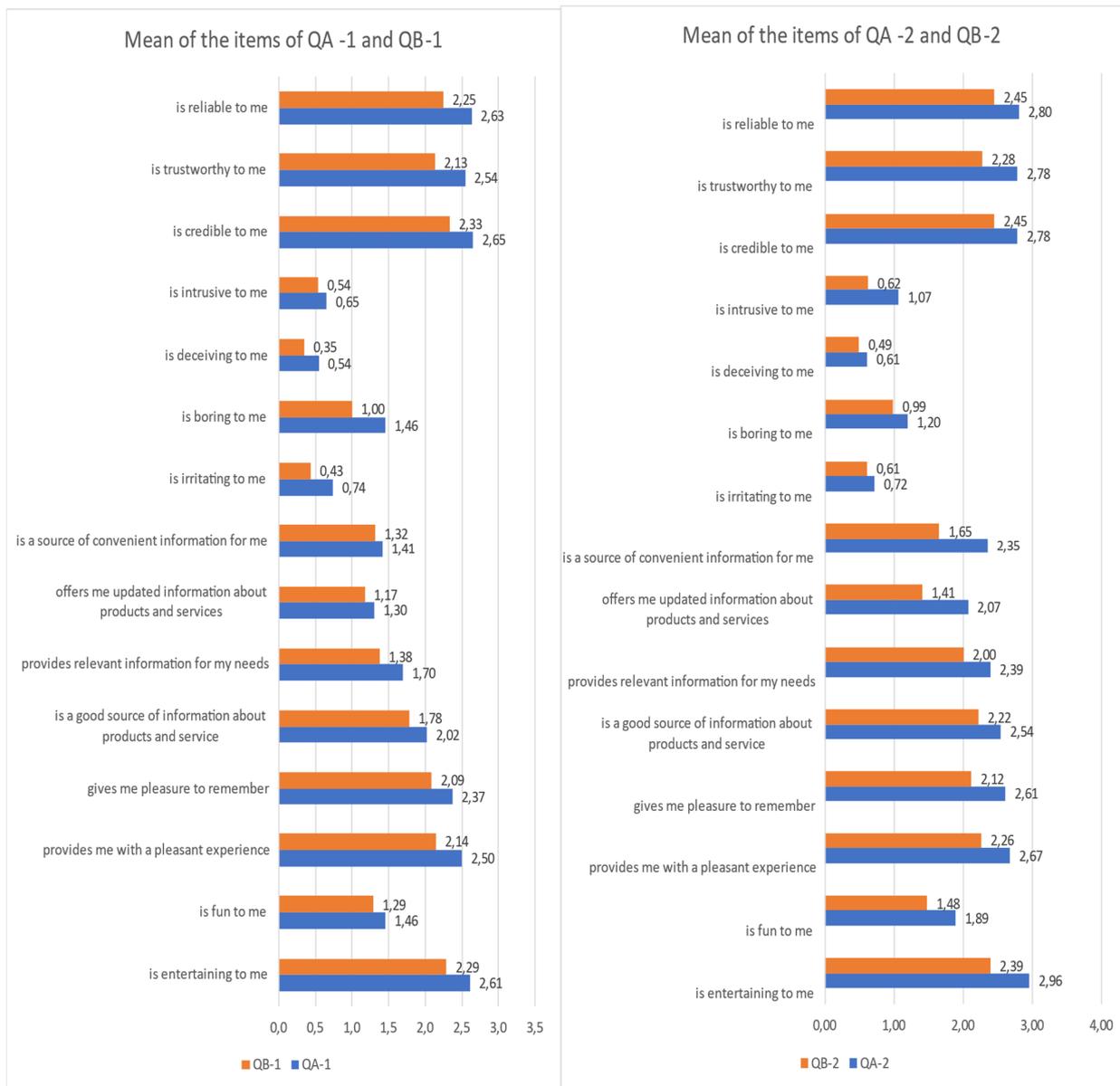
**Fig. 39: Percentages of responses for all items of the Likert scale to understand the opinion of the respondents toward ChatGPT, where 0 = completely disagree and 5 = completely agree.**

ITEMS	QA-1	QA-2	QB-1	QB-2
1. is entertaining to me	0,60	0,66	0,55	0,57
2. is fun to me	0,41	0,48	0,38	0,41
3. provides me with a pleasant experience	0,58	0,61	0,52	0,54
4. gives me pleasure to remember	0,56	0,60	0,51	0,52
5. is a good source of information about products and service	0,50	0,59	0,46	0,54
6. provides relevant information for my needs	0,45	0,57	0,40	0,50
7. offers me updated information about products and services	0,38	0,51	0,36	0,40
8. is a source of convenient information for me	0,40	0,56	0,39	0,44
9. is irritating to me	0,29	0,29	0,24	0,27
10. is boring to me	0,41	0,37	0,33	0,33
11. is deceiving to me	0,24	0,27	0,22	0,25
12. is intrusive to me	0,24	0,34	0,26	0,27
13. is credible to me	0,61	0,63	0,56	0,57
14. is trustworthy to me	0,59	0,63	0,52	0,55
15. is reliable to me	0,61	0,63	0,54	0,57

**Fig. 40: The calculated RII of both experiments for both questionnaires.**

The bar graphs in Fig. 41 compare the means of the answers showing better that there are mainly differences in the perception of the promotional content written by artificial intelligence, indicated as QA-2 and QB-2. While if we compare the means of the responses for each item of the first copy (QA-1 and QB-1), IKEA’s original promotional content, we see that they are more similar to one another.

After having noticed the presence of a difference, I calculated the one-way anova for each item, always comparing QA-1 with QB-1, and QA-2 with QB-2, to figure out whether this difference was statistically significant or not. I compared the responses of the original promotional content of both questionnaires and the responses of the promotional content modified by the artificial intelligence because the main variable of the questionnaires was that in Questionnaire B the respondents were aware of the use of AI. Consequently, I expected that the responses to the first experiment would show that there isn’t a significant difference, while I expected a significant difference by looking at the answers of the second experiment. I collected the p-values from the one-way anova analysis in a table (Fig. 42), where we can observe that my first hypothesis was



**Fig. 41: Comparison of the mean of responses for each item of the Likert scale used to evaluate the perception of the promotional content where 0 = completely disagree and 5= completely agree. The one on the left compares the responses given to the text written by ChatGPT in questionnaire A and B, the one on the right compares those given to the IKEA’s original text in questionnaire A and B.**

correct, since none of the values in the column QA-1/QB-1 is lower than 0,05. While the second hypothesis isn’t completely right, only five of the items show a value lower than 0,05 indicating a statistically significant difference. The items in question are highlighted in yellow and they indicate that knowing or not knowing that a promotional content is written by an artificial intelligence changes the perception of the copy.

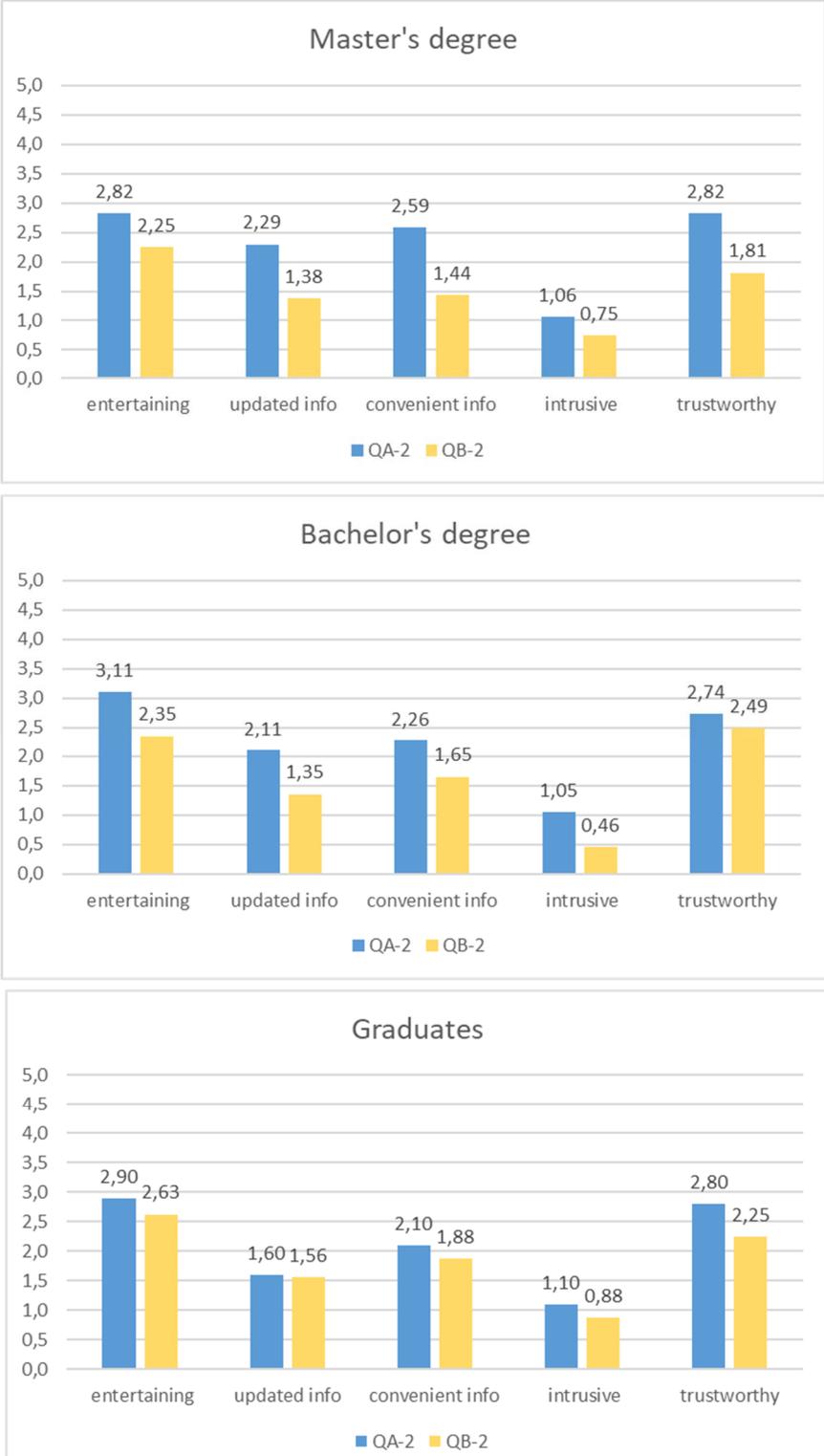
ITEMS	QA-1/QB-1	QA-2/QB-2
entertaining	0,23157443	0,038965081
fun	0,495891734	0,134094085
pleasant	0,161569995	0,135525881
pleasure to remember	0,329952334	0,089431692
good source of info	0,374896275	0,206189943
relevant info	0,212789277	0,131545738
updated info	0,599797739	0,011105111
convenient info	0,707885138	0,00455246
irritating	0,153375016	0,618486589
boring	0,10783617	0,456070639
deceiving	0,274631494	0,523159658
intrusive	0,59999649	0,051275156
credible	0,221470967	0,200388669
trustworthy	0,123743529	0,045171245
reliable	0,14680205	0,170145206

**Fig. 42: The p-values calculated through the one-way anova analysis show that five items have a statistically significant difference.**

So, if we consider only the item that have been highlighted in the one-way anova, we can say that this research has shown that the respondents that weren't aware that the promotional content had been written by ChatGPT have perceived the copy as more entertaining, more trustworthy and more intrusive than the respondents that were aware of it. Furthermore, they perceived the text as more informative.

Even though the sample isn't representative enough to make advanced analysis and determine whether some demographic characteristics are related to the way they perceived the promotional content, I have analysed the statistically significant items a bit more in depth. In the bar graphs in Fig. 44 there is a comparison of the variable level of education with the means of the answers for each item. We see that no matter the level of education there is a difference between the responses from the questionnaire A (indicated as QA) and those from questionnaire B (QB). When the respondents are made aware that the promotional content has been written with AI

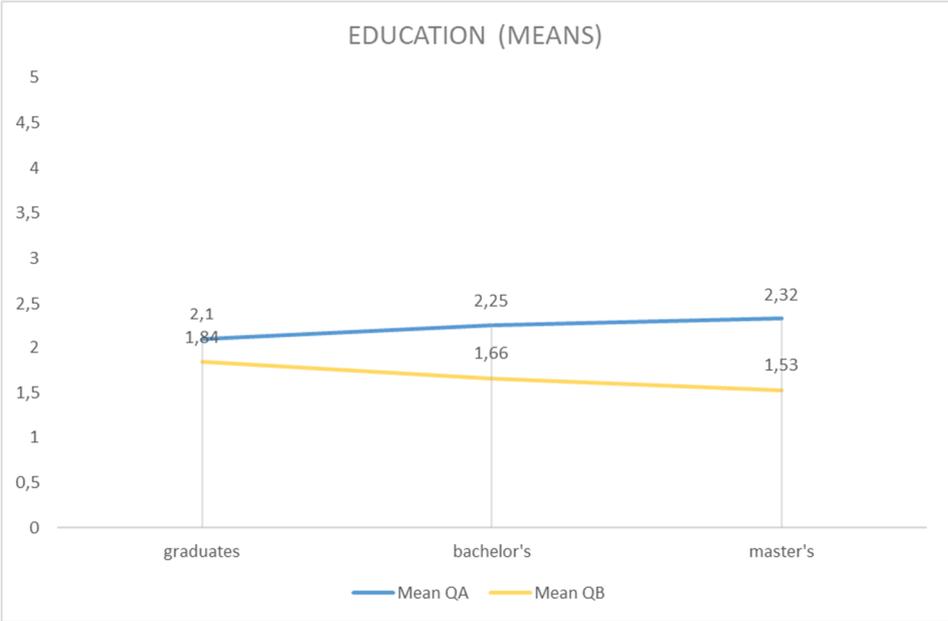
they tend to agree less with the items, considering it less entertaining, less informative, less intrusive and less trustworthy. According to the level of education, the mean of responses changes, we can see for example that for those with a diploma there's less difference between



**Fig. 43: Considering only the statistically relevant items, here's a comparison between level of education and means of responses in the Likert scale where 0 = completely disagree and 5= completely agree.**

the two questionnaires' responses. While the responses of questionnaire A differ more from those of questionnaire B when the respondents have a master's degree. This can be represented with a mean of all responses for each level of education (Fig. 45), where we see the growing difference between the means of those with a master's degree. Therefore, we can assume that the level of education related to the awareness of the use of AI, can influence the changing of perception toward a promotional content. It is also important to keep in mind that the group of respondents with a high school diploma is considerably smaller than the other two.

On the other hand, we can look at the occupation. The bar graphs (Fig. 46) and the overall means for each occupation in the line graph (Fig. 47), show us that those who work tend to be more



**Fig. 44: Comparison between level of education and means of responses indicated in the previous bar chart of the Likert scale where 0 = completely disagree and 5= completely agree.**

influenced once they know that the AI has been used than to the others. For instance, they are the category who gave the lowest responses in all items of questionnaire B, but those who didn't know (indicated as QA-2) gave the highest responses for item "it is entertaining to me". The group that gave the highest responses for all items both in questionnaire A and questionnaire B

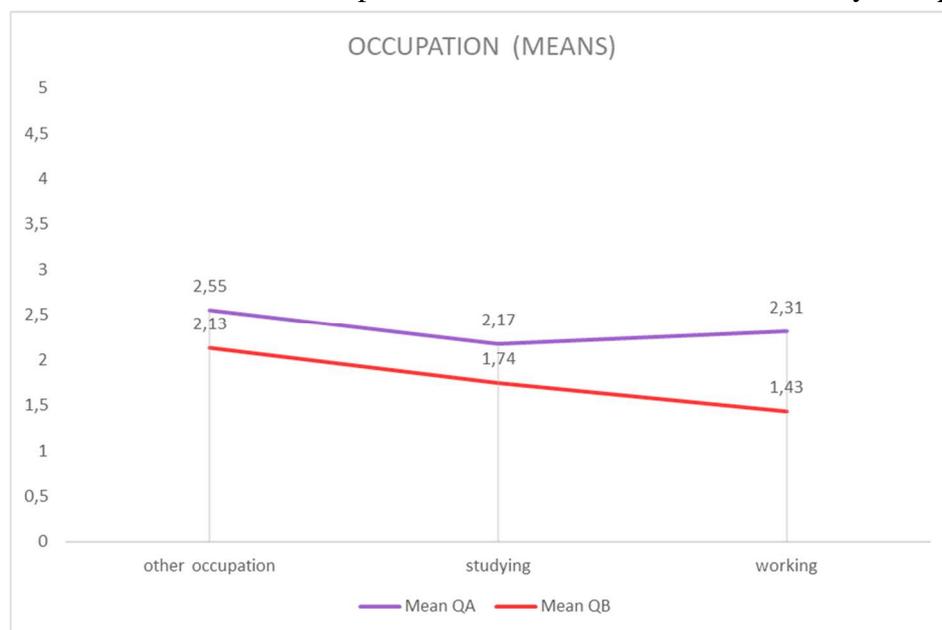


**Fig. 45: Considering only the statistically relevant items, here's a comparison between occupation and means of responses in the Likert scale where 0 = completely disagree and 5= completely agree.**

are those who indicated “other” when asked about their occupation. They are the only group where two items show a higher value in the second column, the one that indicates the responses given in questionnaire B. Finally, the students’ responses don’t show too much difference between questionnaire A and questionnaire B, although the awareness of the use of AI still seems to have negatively influenced their perception. Also in this case, it’s important to notice that the group indicated as “other occupation” is significantly smaller than the other two.

### Conclusion: Assessments and Limitations

Given the number of responses and the characteristics of my sample, my research isn’t



**Fig. 46: Comparison between occupation and means of responses indicated in the previous bar chart of the Likert scale where 0 = completely disagree and 5= completely agree.**

representative of the Italian population aged between 20 and 35. It’s an experiment that has brought to light some aspects of the perception of promotional content though. To answer my research question, does the perception of the copy changes when potential customers know that it has been written by ChatGPT? From what I gathered it partially does. The anova made clear that those who were aware of the use of AI had a different perception for some of the items than those who weren’t aware of it. Furthermore, the following comparisons with variables like level of education and occupation show that the groups that were more influenced by the awareness on the use of AI are those with a master’s degree and those who work. My previously stated hypothesis was that the education and the level of comfort toward ChatGPT could be related to a more positive perceived value of the promotional content written by AI. My analysis showed

that the mean of responses of those with a master's degree is lower than the other categories when they are aware of the use of AI. So, my hypothesis can be considered wrong. Although, because of the limited sample examined I don't feel to state clearly that those who work and those with a higher degree of education perceive more negatively the promotional content when written by an AI. I feel more confident in saying that my research question showed some tendencies and that they should be tackled with a more structured approach.

Other than the size of my sample, another limitation is the fact that the two questionnaires had a different response rate, that can result in a decreased accuracy. Since allocate monster's link should send people alternately to questionnaire A or B, the reason why the number of respondents is not the same for each questionnaire can either be that allocate monster doesn't perfectly alternate the links, or that people started questionnaire A but didn't complete it. Considering that the second reason is the one over which I might have had more control, to mitigate this occurrence I could have improved the way I expressed the questions of questionnaire A. The fault can be caused by a perceived lack of transparency from the respondents. Questionnaire B stated more clearly the intent of my research, so the respondents might have had more interest in completing the task, while questionnaire A starts with a neutral premise and ends with questions about ChatGPT. So, the respondent might have felt as if lied to and the necessary bond of trust to complete the questionnaire broke.

## Conclusion

AI has come a long way from the Imitation Game and McCarthy's first definition, the growing investments and widespread application confirm the theory that we're now in the "plateau of profitability" phase. But it is still wrapped in a veil of uncertainty. Regulators are still trying to understand how it works, its risks and benefits, and until more significant policies are written it is difficult to imagine how the future will unravel. Despite the lack of definitive regulation, the investments in research keep on growing, especially from the private sector that wants to implement this technology in every field imaginable. Marketing is one of them. From an academic perspective, according to Huang and Rust (2020) there are four fields of research about AI in marketing. They are analysing the use of AI algorithms to improve consumers' experience, the consumers' reaction to interacting with an AI, the effects on jobs and society, and finally the implementation of AI in all marketing tasks. On a practical level, many case studies prove that it can be used in every step of the customer's journey and much more, increasing efficiency, while cutting down time and costs. One of the most implemented and most discussed AI tools this year is ChatGPT, that – as I write this conclusion – has announced the introduction of GPTs, a tailored version of ChatGPT that anyone can customize according to their needs. Another major novelty that stresses how fast innovation is going. Other than captivating opportunities, AIs have risks that shouldn't be overlooked like biases, hallucinations, data collection and opaque AI. Furthermore, it's still unclear how consumers perceive the use of AI, that seems to change according to the product, but also demographic characteristics. That's why I tried to assess whether knowing or not knowing that an AI has written a promotional content, will change the perception towards it. Although my research didn't reach a representative sample of respondents it still produced some interesting outputs that I hope will inspire someone to create a more structured study.

Trying to sum it all up, I feel like this thesis ended bringing up more questions than answers: should marketers use AI? What will happen to marketing in the future? Which tools should you use? How will it be regulated? Is it good or is it bad? What if ChatGPT wrote it? No one really knows for certain yet. Even though public opinion always seems to have the secret recipe for you. I think that in certain instances – the use of AI is one of them – not knowing can be good, because it pushes you to ask the right questions and face the change with critical thinking. It's difficult to imagine how marketing will change in the next five, ten or twenty years. Right now, it seems like AI, its upsides, and its risks, are here to stay, that's why marketers (and people in

general) should try at least to understand the good and the bad that might come from it. I believe that as long as we keep an open mind and approach dilemmas with curiosity and humility, we will figure them out.

# Riassunto in Italiano

## Capitolo 1: Intelligenza artificiale

### Definizione dell'intelligenza artificiale

L'intelligenza artificiale (IA) non ha una definizione univoca. John McCarthy ha coniato il termine durante la conferenza di Dartmouth negli anni '50, con l'obiettivo di dimostrare che le macchine possono simulare l'intelligenza, definita come la capacità di apprendere (McCarthy et al. 2006). L'IA è quindi principalmente un campo di studi che si concentra sulla creazione di macchine intelligenti. Altri ricercatori hanno proposto varie definizioni, tra cui Turing che le definisce macchine pensanti (Turing, 1950). Russell e Norvig (2019) invece hanno preso in considerazione due dimensioni (umano vs razionale e pensiero vs comportamento) dalla cui combinazione si possono avere quattro definizioni di IA. Ogni definizione riassume i diversi approcci che studiosi hanno avuto nello studio di questa tecnologia:

1. Sistemi che pensano come gli esseri umani (modellazione cognitiva).
2. Sistemi che agiscono come gli esseri umani (approccio del test di Turing).
3. Sistemi che pensano razionalmente (tradizione logicista).
4. Sistemi che agiscono razionalmente (approccio dell'agente razionale).

L'approccio dell'agente razionale è predominante e si concentra su agenti che prendono decisioni ottimali. Tuttavia, l'IA ha affrontato scetticismo e critiche, con sfide come l'argomento della stanza cinese e dubbi sulla sua realizzabilità.

La confusione nella definizione di IA deriva spesso dal concetto di "intelligenza". Alcuni definiscono l'intelligenza come la capacità apprendere e adattarsi. Turing sviluppa un test per capire se una macchina è intelligente chiamato the Imitation Game. Altri propongono il Total Turing Test, per passarlo una macchina necessita di riconoscimento vocale, computer vision e robotica per interagire e percepire il mondo.

### Machine Learning

Arthur Samuel conì il termine "apprendimento automatico" nel 1959 mentre programmava un computer per giocare a dama (Samuel, 1959). L'apprendimento automatico (ML) è un sottocampo dell'intelligenza artificiale in cui gli algoritmi vengono addestrati sui dati per individuare modelli e fare previsioni o raccomandazioni.

Esistono tre tipi principali di ML:

1. **Apprendimento supervisionato:** Gli algoritmi vengono addestrati su dati etichettati con input e output desiderati. L'algoritmo impara a prevedere l'output desiderato in base all'input.
2. **Apprendimento non supervisionato:** Gli algoritmi lavorano con dati non etichettati e trova da solo pattern e punti in comune.
3. **Apprendimento per rinforzo:** L'apprendimento avviene per tentativi ed errori con un sistema di premi e punizioni. Viene usato per programmare le auto a guida autonoma.

Il ML ha diverse applicazioni, tra cui:

- Algoritmi di raccomandazione per i feed dei social media e Netflix.
- Analisi delle immagini e rilevamento degli oggetti, che consentono il riconoscimento facciale, la robotica, l'astronomia e le diagnosi mediche.
- Rilevamento di frodi, per identificare transazioni fraudolente o e-mail spam.

### **Deep Learning**

Il Deep Learning è una tecnica di apprendimento automatico basata sulle reti neurali artificiali, ispirate ai neuroni del cervello umano. Si chiama apprendimento “deep”, profondo, perché sono organizzati su più strati per calcoli complessi (Russel & Norvig 2019). Lo studio del deep learning è iniziato nel 1943, ma il termine è stato coniato da Rina Dechter nel 1986 (Dechter 1986) e le applicazioni industriali sono iniziate negli anni 2000.

Il deep learning è ampiamente applicato in vari campi:

- Computer vision
  - o Image classification
  - o Object detection
  - o Image segmentation
- Reinforcement learning
- Natural Language Processing
  - o Traduzione automatica
  - o Riconoscimento vocale
  - o Sentiment analysis
  - o Creazione di contenuti
  - o Riassunto automatico
  - o Chatbot

## **Generative AI**

La IA generativa è una forma di algoritmo machine learning addestrato attraverso l'apprendimento autonomo. Può produrre vari tipi di contenuti, tra cui audio, codice, testo, immagini e video, in risposta a prompt o istruzioni. L'apprendimento autonomo prevede che un modello si addestri inizialmente senza supervisione e impara da solo a generare previsioni. Ad esempio, può prevedere come finirà una frase sulla base di alcune parole.

Un esempio di IA generativa è ChatGPT, sviluppato da OpenAI. Si tratta di un modello linguistico di grandi dimensioni in grado di scrivere testi, generare codice, comporre musica, rispondere a domande, riassumere testi e tradurre, tra gli altri compiti. Questa tecnologia sarà ulteriormente discussa nel Capitolo 3 e utilizzata nel Capitolo 4, mentre altri esempi di IA generativa saranno citati nei paragrafi successivi.

## **Storia dell'IA**

La storia dell'IA si estende per quasi tre decenni ma è solo negli ultimi anni che ha guadagnato una notevole attenzione, con titoli di giornale che ne esaltano il potenziale dirompente e l'impatto trasformativo sulle nostre vite. Per tracciarne la storia ho tratto ispirazione dalla linea del tempo di Tim Menzies basata sull'Hype Cycle di Gartner (Menzies 2023).

1. Innovation trigger: scoperta dell'innovazione (1950-1965)
2. Peak of Expectations: ottimismo sul potenziale della tecnologia (1966-1972).
3. Trough of disillusionment: L'interesse diminuisce a causa dei fallimenti delle sfide (1974-1993)
4. Slope of enlightenment: comprensione dei benefici e implementazioni (1994-2010)
5. Plateau of Productivity: adozione diffusa e rilevanza sul mercato (2011-oggi).

Gli eventi più importanti per ogni fase:

### **Innovation Trigger (1950 – 1965)**

- Alan Turing introduce nel 1950 il Test di Turing, un modo per valutare l'intelligenza di una macchina. Si tratta di un gioco in cui un giudice cerca di discernere tra un essere umano e una macchina. Se il giudice non riesce a distinguere, il computer viene considerato intelligente (Turing 1950)
- Nel 1956, al Dartmouth Summer Research Project on Artificial Intelligence, John McCarthy conia il termine "intelligenza artificiale".

- Allen Newell, Cliff Shaw e Herbert Simon presentano il programma Logic Theorists, il primo programma di IA, con l'obiettivo di imitare i matematici umani.
- General Problem Solver dei ricercatori della Carnegie Mellon.
- John McCarthy e Marvin Minsky fondano il laboratorio di IA del MIT, contribuendo alla ricerca sull'IA.

### **Peak of inflated expectation (1966-1972)**

I progressi dell'IA sono proseguiti parallelamente all'informatica, favoriti da computer più veloci e più accessibili.

- ELIZA (1966), il primo chatbot in grado di sostenere conversazioni in linguaggio naturale e di tentare il Test di Turing (Weizenbaum 1966).
- Shakey, creato dai ricercatori di Stanford, il primo robot mobile di uso generale in grado di percepire l'ambiente e comunicare in linguaggio naturale.
- Il governo degli Stati Uniti considera di aumentare i finanziamenti per la ricerca sull'IA.
- DARPA sogna una macchina in grado di tradurre e trascrivere il linguaggio parlato.
- Iniziano le previsioni irrealistiche sullo sviluppo dell'IA, Marvin Minsky sostiene che in otto anni saranno in grado di sviluppare una macchina con l'intelligenza di una persona media.

### **Trough of disillusionment (1973-1990)**

Nonostante i progressi dei computer e l'introduzione della programmazione LISP per l'IA da parte di John McCarthy, i limiti di memoria e velocità di elaborazione hanno ostacolato i progressi.

- Il primo "inverno dell'IA" dal 1973 agli anni '80, caratterizzato da una riduzione della ricerca e dei finanziamenti. Le cause:
  - o Ricerche influenti, come quelli dell' Automatic Language Processing Advisory Committee (ALPAC) per il governo americano e il report Lighthill per il governo inglese, hanno contribuito alla perdita di fondi pubblici per gli studi sull'IA.
  - o Le affermazioni troppo ottimistiche dei ricercatori e le difficoltà nel gestire l'incertezza del mondo reale hanno aumentato la delusione.
- La ricerca è proseguita con discrezione, concentrandosi sulla conoscenza e portando a scoperte sull'apprendimento basato sull'esperienza. Edward Feigenbaum introduce gli Expert Systems.

- Il Giappone stanziava milioni per il Fifth Generation Computer Project (FGCP) dal 1982 al 1990, per creare una nuova generazione di computer ma non raggiungono le aspettative.
- Il Deep Learning e la backpropagation ottengono successo commerciale negli anni '90, vengono applicati al riconoscimento ottico dei caratteri e al riconoscimento vocale.

### **Slope of enlightenment (1993-2011)**

Con l'implementazione delle teorie sull'IA, il suo potenziale diventa evidente.

- (1993) Deep Blue sconfigge il campione mondiale di scacchi Gary Kasparov. Questo modello usa forza bruta, valutando circa 200 milioni di posizioni al secondo rispetto all'uomo che esamina circa 50 mosse.
- I computer diventano più veloci e più capaci, permettendo nuovi successi: il software di riconoscimento vocale di Windows, la testa robotica Kismet del MIT che riconosceva e simulava le emozioni, e l'introduzione dell'aspirapolvere robot Roomba nel 2002.

### **Plateau of profitability (2011-oggi)**

Con l'avvento degli smartphone, i big data e l'aumento della potenza di calcolo l'IA diventa più pervasiva.

- Assistenti virtuali come Siri (2011), Google Now (2012), Cortana e Alexa (2014) rendono l'IA parte della vita quotidiana.
- Watson di IBM sconfigge i campioni di Jeopardy! nel 2011.
- L'IA di Google riconosce per la prima volta dei gatti in video nel 2012, evidenziando le capacità delle reti neurali.
- Nel 2015, la vittoria di AlphaGo nel gioco del Go grazie alle reti neurali, segnando un passaggio dall'IA simbolica radicata nella logica all'intelligenza artificiale neurale
- Le preoccupazioni per il rapido avanzamento dell'IA hanno portato a richieste di regolamentazioni e considerazioni etiche, tra cui una lettera aperta del 2015 firmata da migliaia di ricercatori e i Principi di IA di Asilomar del 2017.
- AlphaFold risolve complesso problema scientifico nel 2020 che aspettava di essere risolto da mezzo secolo.
- Nel 2014 Ian Goodfellow inventa i Generative Adversarial Networks (GANs) che vengono usati per la generazione di immagini a partire da un testo, e il riconoscimento di oggetti. La generazione di immagini raggiunge livelli altissimi con il diffusion model, alla base di DALL-E e Midjourney.

- A novembre 2022 OpenAI rilascia ChatGPT.

Dal 2019 l'intelligenza artificiale entra a far parte della vita quotidiana senza che le persone se ne accorgano: attraverso gli assistenti vocali, i miglioramenti degli smartphone e le esperienze online personalizzate.

A causa delle cifre importanti per sostenere le capacità computazionali della ricerca sull'IA, coloro che investono maggiormente sono aziende e privati. Nell'ultimo decennio sono aumentati, con miliardi di dollari in finanziamenti nei settori della medicina, della gestione dei dati, del fintech, della sicurezza informatica e della vendita al dettaglio. L'IA generativa sta ricevendo miliardi di investimenti, secondo McKinsey solo nei primi cinque mesi del 2023 sono stati stanziati 12 miliardi di dollari, il 75% dei quali proviene dagli Stati Uniti.

## **Rischi e Benefici**

### **Regolamentazione**

La regolamentazione svolge un ruolo cruciale nel definire la traiettoria dell'adozione dell'intelligenza artificiale (IA) in tutto il mondo. A primo acchito, le nuove tecnologie tendenzialmente vengono accolte con sentimenti contrastanti di speranza e paura. L'eccesso di ognuna delle due sensazioni è deleterio, la paura conduce spesso alla regolamentazione o al proibizionismo, mentre un eccessivo zelo non permette di vedere chiaramente i rischi ad esse associati

- dal 2016 al 2022 31 Paesi hanno approvato almeno una legge relativa all'IA, con gli Stati Uniti in testa con 22 leggi, tra cui l'AI Training Act (Maslej et al. 2023).
- Canada, Cina e Finlandia sono stati i primi ad adottare strategie nazionali sull'IA nel 2017, seguiti dalla maggior parte dei Paesi europei nel 2019-2020.
- Il vertice del G7 del 2023 ha sottolineato l'importanza di allineare lo sviluppo dell'IA ai valori democratici e ai principi fondamentali di equità, responsabilità, trasparenza e sicurezza.
- L'Italia ha temporaneamente vietato ChatGPT a causa di problemi di privacy.
- Il governo degli Stati Uniti ha incaricato il senato di discutere con esperti per capire come l'AI funziona e come regolamentarla. Sam Altman ha affrontando questioni come il dislocamento dei posti di lavoro e le norme di sicurezza.

- Pechino, d'altro canto, ha implementato normative nazionali che prendono di mira gli algoritmi di raccomandazione, i contenuti sintetici e i sistemi di IA generativa come ChatGPT.

A prescindere dai benefici e dai rischi associati all'IA, l'approccio alla regolamentazione influenzerà in modo significativo il suo futuro impatto sulla società.

### **Rischi**

- Deepfake: L'intelligenza artificiale generativa e i modelli di stable diffusion hanno dato origine al DeepFake, rendendo difficile distinguere i contenuti reali da quelli falsi. Tra i casi più significativi ricordiamo:
  - Un video con Barack Obama, creato dal videomaker Jordan Peele, volto a evidenziare i pericoli della disinformazione (BuzzFeedVideo 2018).
  - Immagini dell'arresto dell'ex presidente Donald Trump generate con Midjourney dal giornalista Eliot Higgins e condivise su Twitter nel marzo 2023 (Fig. 8).

Sebbene queste creazioni mostrino una notevole precisione, non sono impeccabili. Questo sottolinea l'importanza di educare le nuove generazioni a individuare le incongruenze delle immagini, a verificare la credibilità della fonte e a promuovere le capacità di pensiero critico.

- Human redundancy: L'impatto dell'IA sull'occupazione è una minaccia imminente, non è una novità vedere un'innovazione cambiare il volto del lavoro, ma l'avvento dell'automazione dell'IA segna una trasformazione significativa perché colpisce in particolare i lavori impiegatizi che nelle precedenti rivoluzioni erano al sicuro. (Baldwin 2019) Per affrontare questo problema i politici dovrebbero concentrarsi sull'attuazione di politiche e normative adeguate per far sì che i posti di lavoro persi vengano rimpiazzati allo stesso passo. Sebbene siano emersi alcuni lavori correlati all'IA, una ricerca di McKinsey suggerisce che, i compiti ripetitivi e basati sui dati sono quelli più suscettibili all'automazione. Un modo per ovviare al problema sarebbe quello di riqualificare e offrire opportunità di apprendimento ai dipendenti, di modo tale che l'integrazione dell'IA sia completamente positiva, e non solo perché migliora l'efficienza, la qualità e la convenienza economica. Per affrontare questi cambiamenti, quindi, sia il governo che le aziende devono svolgere un ruolo di guida della forza lavoro.

- **AI Takeover:** La preoccupazione per la presa di controllo dell'IA e la sua potenziale super-intelligenza solleva dubbi sulla sua sicurezza. Tuttavia, gli esperti suggeriscono che la possibilità di un futuro in cui l'IA supera l'intelligenza umana è lontana. Joanna J. Bryson sottolinea che il raggiungimento dell'intelligenza artificiale generale (AGI) è lontano dalla realtà. Raggiungerlo vorrebbe dire che l'IA sviluppa un'intelligenza simile a quella umana, oppure in grado di apprendere senza limiti. In entrambi i casi Bryson dimostra che la prima opzione è difficilmente raggiungibile, mentre la seconda, sebbene plausibile, richiede una regolamentazione per evitare conseguenze indesiderate. Mentre figure come Sam Altman propongono di regolamentare l'IA per risolvere il problema, John Coogan sottolinea la necessità di un equilibrio tra sicurezza e regolamentazione. Un esempio in questa direzione sono i principi dell'IA di Asilomar, sviluppati nel 2017, forniscono linee guida per un uso virtuoso ed etico dell'IA. Questi principi coprono questioni di ricerca, etica e fanno considerazioni a lungo termine, sottolineando l'importanza della trasparenza, della responsabilità, dei valori umani e del bene comune nello sviluppo dell'IA.
- **Energy consumption and carbon footprint:** pochi parlano dell'impatto ambientale dell'IA, in particolare il suo consumo energetico e le emissioni di CO<sub>2</sub>. Strubell (2019) ha scoperto in una ricerca che il training di reti neurali di grandi dimensioni, soprattutto per l'elaborazione del linguaggio naturale (NLP), richiede una significativa quantità di energia e produce una notevole impronta di carbonio. Per esempio, l'addestramento del modello BERT ha emesso circa 1.507 libbre di anidride carbonica, equivalenti a un volo di andata e ritorno da New York a San Francisco.
- Un altro studio ha stimato l'impronta del modello BigScience Large Open-science Open-access Multilingual Language Model (BLOOM), rivelando che il suo training di BLOOM emette una quantità di carbonio 1,4 volte superiore al consumo annuale di un americano medio e consuma energia sufficiente ad alimentare una casa media americana per 41 anni (Luccioni et al. 2022). In risposta a queste preoccupazioni, il movimento "Green AI" mira a rendere il machine learning più ecosostenibile. I ricercatori sono sempre più consapevoli delle emissioni di carbonio dei loro esperimenti e stanno sviluppando strumenti per misurarne il consumo di elettricità e le emissioni di carbonio. Di modo tale da poter considerare la fonte di energia, e scegliere algoritmi che a parità di prestazioni ne consumano meno.

- **Privacy and surveillance:** Il capitalismo della sorveglianza, alimentato dai Big Data, erode la privacy poiché ogni azione online genera dati sulle persone, dalle loro preferenze alla loro posizione. L'intelligenza artificiale può intensificare questo fenomeno identificando modelli all'interno di vasti insiemi di dati, creando profili dettagliati che includono convinzioni politiche, status economico ed emozioni. La privacy è diminuita nell'era del capitalismo della sorveglianza, dove l'anonimato è raro e chiunque può essere identificato attraverso il riconoscimento facciale o il data mining delle sue abitudini online. Queste informazioni possono essere utilizzate per manipolare, come si è visto nelle elezioni presidenziali statunitensi del 2016 e nella Brexit, dove Cambridge Analytica ha sfruttato i profili Facebook per influenzare gli elettori. In Cina vengono applicate pratiche di sorveglianza estrema. Nello Xinjiang, le autorità hanno utilizzato il riconoscimento facciale per selezionare i musulmani da detenere in "centri di rieducazione", violandone i diritti umani e mettendo in pratica una vera e propria persecuzione e genocidio. Normative come il GDPR sono fondamentali per la protezione dei cittadini, ma servono anche regolamenti specifici sull'IA, altrimenti bisogna ricorrere alla disobbedienza civile.
- **Bias:** l'IA spesso è afflitta da bias, che significa che fa errori di previsione facendo ricorso a stereotipi e pregiudizi che non hanno nulla a che fare con il processo decisionale e ricadono in situazioni di discriminazione sulla base della razza, del sesso e della religione. Gli algoritmi per il riconoscimento facciale spesso sono afflitti da bias che derivano dai dati usati per il training, per esempio Joy Buolamwini ha evidenziato questo problema quando il software di analisi facciale non riusciva a rilevare il suo volto perché la sua pelle è nera, e faceva errori nell'assegnazione del sesso a donne nere, nonostante fossero famose come Serena Williams o Michelle Obama. In casi estremi questi errori possono portare ad arresti ingiustificati, come avvenuto nel 2020 a Robert Williams. Per evitare questi bias è fondamentale che ci sia un'equa rappresentazione di fototipi nei dati di addestramento. Anche altri algoritmi di intelligenza artificiale possono essere distorti, influenzando le decisioni in materia di assunzioni, alloggi, ammissione all'università, credito e acquisti online. Per esempio, nel 2018 Amazon ha scoperto che l'intelligenza artificiale che utilizzava per il recruiting penalizzava le donne. Oppure, Google si è reso conto che Google Translate performava peggio quando la frase era composta da pronomi femminili. Infine, anche i modelli text-to-image presentano bias, alimentando stereotipi.

Uno studio del 2022 ha rilevato che l'IA tendenziosa continua a rappresentare una minaccia, con conseguenti perdite di fatturato e problemi legali. Per affrontare questo problema, si raccomanda una maggiore diversità nei team di sviluppo, dati di training inclusivi e consapevolezza dell'impatto sociale che si potrebbe avere. Tuttavia, la comprensione delle decisioni dell'IA, il cosiddetto "effetto black-box", rimane una questione spinosa, che suggerisce la necessità di una regolamentazione.

- **AI incidents: Il Repository AI, Algorithmic, and Automation Incidents and Controversies (AIAAIC)** è stato istituito nel 2019 per documentare gli incidenti e le controversie legate all'IA. Il rapporto annuale **AI Index 2023** rivela un aumento significativo degli incidenti e delle controversie sull'IA segnalati dal 2012 al 2021. Questo aumento può essere attribuito alla più ampia adozione dell'IA e alla maggiore consapevolezza di ciò che costituisce un incidente. Tra gli incidenti degni di nota figurano i contenuti deepfake che causano disinformazione, i problemi di privacy e discriminazione, e le questioni etiche, come le accuse di violazione del copyright rivolte a Midjourney per l'utilizzo di immagini generate dall'uomo senza autorizzazione o attribuzione corretta.

## **Benefici**

- **Aumento della produttività:** Sistemi di intelligenza artificiale per la programmazione, come AlphaCode e GitHub Copilot, assistono i programmatori nella generazione di codice e ne aumentano la produttività. AlphaCode, sviluppato da DeepMind, ha partecipato a gare di programmazione con ottimi risultati, mira a rendere il coding più accessibile e ad aiutare nella generazione di codice. GitHub Copilot è un sistema di intelligenza artificiale generativa che trasforma il linguaggio naturale in codice e migliora l'efficienza e la produttività dei programmatori.
- **Migliore qualità di vita, i robot di servizio:** I robot di servizio realizzano mansioni in modo completamente autonomo o con l'intervento dell'uomo. Sono utilizzati nei settori della sanità, dei trasporti, della logistica, dell'ospitalità, dell'agricoltura e altro ancora. Riducono i costi e le probabilità di errore, aumentano l'efficienza, la sicurezza sul lavoro e la produttività. Per esempio, sono sempre più comuni in medicina i robot che compiono operazioni chirurgiche, sono più precisi e riducono il rischio di complicazioni. Oppure, dei robot vengono usati quando le condizioni di lavoro sono troppo pericolose per l'uomo, in edifici che rischiano il collasso o in cui ci sono sostanze tossiche.

- Nuove scoperte scientifiche: L'intelligenza artificiale accelera le scoperte scientifiche analizzando enormi serie di dati, perfezionando le misurazioni, guidando gli esperimenti e fornendo modelli affidabili. Ad esempio, nel 2022 DeepMind ha collaborato con lo Swiss Plasma Center per sviluppare un sistema di deep reinforcement learning per controllare le particelle instabili in un tokamak utilizzato per la fusione nucleare (Degraeve et al. 2022).
- AI che migliora l'AI: Il reinforcement learning permette all'IA di migliorare se stessa. Nvidia ha utilizzato il deep reinforcement learning per progettare i circuiti aritmetici delle GPU, chip essenziali per il training dell'IA. Hanno ottenuto GPU più piccole, più veloci e più efficienti dal punto di vista energetico.
- Abbassare le barriere con la traduzione automatica: La traduzione automatica rientra nell'elaborazione del linguaggio naturale (NLP) e permette di aumentare l'inclusività del linguaggio. Tuttavia, molte lingue è possibile tradurle correttamente per mancanza di risorse, il progetto No Language Left Behind di Meta si è posto come obiettivo la traduzione di più di 200 lingue, comprese quelle a bassa densità di risorse. I modelli NLP come ChatGPT hanno diverse applicazioni e si prevede che avranno un impatto significativo sulla forza lavoro.
- Migliorare la sicurezza, la salute e la creatività con la computer vision: La computer vision consente alle macchine di comprendere immagini e video, serve per le auto a guida autonoma, per la sicurezza, la salute e la creatività. Per esempio, il dataset Celeb-DF usa la computer vision per identificare i video Deepfake, altrimenti Kvasir-SEG è un dataset che permette di usare l'immagine recognition per diagnosticare condizioni mediche come i polipi gastrointestinali. Infine, aumenta la creatività perché può generare immagini e video come DALL-E 2, MidJourney e Stable Diffusion.
- Aiutare i ciechi a vedere: Il deep learning e i dispositivi IA aiutano gli ipovedenti a diagnosticare malattie oculari, a convertire immagini e testi in parlato e permettono loro di leggere e orientarsi nell'ambiente circostante (Wang et al. 2023b)

## **Capitolo 2: Intelligenza Artificiale nel Marketing**

### **Ricerca accademica sull'IA nel marketing**

Negli ultimi anni, la ricerca accademica sull'IA nel marketing ha registrato una crescita significativa, Anayat e Rasool (2022) nella loro ricerca bibliometrica distinguono sei filoni:

1. "AI per l'analisi dei dati",
2. "AI per il processo decisionale",
3. "AI per il comportamento digitale",
4. "AI per il servizio al consumatore",
5. "AI per l'analisi predittiva"
6. "AI per il design thinking".

Questi cluster comprendono vari aspetti dell'applicazione dell'IA nel marketing, come l'analisi dei dati, l'individuazione dei trend e la personalizzazione dell'esperienza dei clienti, ma anche l'automatizzazione del marketing, la creazione di sistemi di raccomandazione, la previsione del comportamento dei consumatori, l'offerta di un servizio clienti personalizzato e automatizzato con robot e assistenti virtuali e infine il suo utilizzo nel design del prodotto.

Huang e Rust (2020) hanno identificato quattro tipi di ricerca sull'IA nel marketing:

1. Algoritmi tecnici di IA per la risoluzione di specifici problemi di marketing: dedicata allo sviluppo di algoritmi per personalizzare l'esperienza utente (Chung et al. 2015; Chung et al. 2009) e a sistemi di raccomandazione (Dzyabura et al. 2019).
2. Reazioni psicologiche dei clienti all'IA: percezione dell'IA e le conseguenze sul comportamento del cliente (Luo et al. 2019; Mende et al. 2019).
3. Effetti dell'IA sul lavoro e sulla società: la valutazione degli effetti dell'IA sull'occupazione e sulla società (Frey & Osborne, 2017).
4. Questioni manageriali e strategiche legate all'IA: essendo un filone di ricerca ancora poco sviluppato, propongono un quadro di riferimento.

Il quadro di riferimento di Huang e Rust è circolare ed è composto da tre fasi per incorporare l'AI nel marketing:

1. Ricerca di marketing
2. Strategia di marketing
3. Azioni di marketing

Ad ogni fase distinguono il contributo che tre tipi di intelligenza artificiale possono apportare: mechanical AI per l'automazione di compiti ripetitivi, thinking AI per analizzare i dati e trovare correlazioni, e la feeling AI per interagire con gli umani e analizzare le loro emozioni.

**Ricerca di marketing:** Nella prima fase dell'integrazione dell'IA nel marketing, ci si concentra sulla ricerca di marketing. Questa comprende la raccolta dei dati, l'analisi del mercato e la comprensione dei clienti.

- La raccolta dati guidata dall'IA comporta l'automazione dei processi per raccogliere informazioni sul mercato, sui concorrenti, sui clienti e sull'ambiente. Utilizza tecniche come la sentiment analysis, il topic modeling e la classificazione del testo per estrarre informazioni da fonti come i social media, le recensioni dei clienti e i forum online. Inoltre, i dispositivi IoT e i dispositivi connessi svolgono un ruolo nella raccolta di dati sull'esperienza degli utenti, sia online che nei negozi fisici (Balducci & Marinova 2018; Soleymanian et al. 2019; Kirkpatrick, 2020).
- Per l'analisi di mercato viene usata la Thinking AI, consentendo alle aziende di identificare i concorrenti, prevedere le tendenze del mercato e comprendere le preferenze dei clienti. L'analisi testuale automatizzata dei contenuti generati dai consumatori, come le recensioni e i post sui social media, aiuta a identificare intuizioni preziose per lo sviluppo dei prodotti e le strategie di mercato (Humphreys & Wang 2017; Gabel et al. 2019).
- Comprensione del cliente: La Feeling AI viene utilizzata per comprendere le esigenze, le emozioni e i comportamenti dei clienti. Analizza i dati emotivi provenienti da fonti come i social media, le recensioni online e i contenuti generati dagli utenti. Questa comprensione consente alle aziende di adattare le strategie di marketing e le offerte alle preferenze dei singoli clienti (Timoshenko & Hauser 2019; Power 2017).

**Strategia di marketing:** la seconda fase dell'implementazione dell'IA nel marketing si concentra sulla strategia, che comprende la segmentazione, il targeting e il posizionamento.

- Segmentazione: La Mechanical AI utilizza il riconoscimento di pattern per segmentare i clienti in base alle loro esigenze e caratteristiche. Il machine learning e il text mining vengono utilizzati per categorizzare i clienti, ad esempio per classificare i richiedenti di un prestito come "buoni" o "cattivi" in base al contenuto della loro domanda (Netzer et al. 2019; Pitt et al. 2020).
- Targeting: La Thinking AI viene impiegata per individuare il segmento adatto su cui focalizzare le azioni di marketing. Utilizza il machine learning per determinare le strategie di targeting più efficaci, tenendo conto di fattori come le recensioni dei clienti e i dati personali (Simester et al. 2020; Neumann et al. 2019).

- **Posizionamento:** Il posizionamento consiste nel trovare il posto ottimale per un prodotto o un servizio nella mente dei consumatori. Le aziende utilizzano l'IA per sviluppare la personalità del marchio e creare connessioni emotive con i clienti attraverso la comunicazione e il branding. Questa fase spesso prevede la collaborazione tra uomo e IA per la creazione di contenuti creativi (Gali et al. 2017).

**Azioni di marketing:** la fase finale prevede l'adozione di azioni di marketing basate sulla strategia sviluppata, e viene organizzata usando le 4P di Kotler e le 4C di Lauterbon: prodotto/consumatore, prezzo/costo, luogo/convenienza e promozione/comunicazione.

- **Prodotto/Consumatore:** La Mechanical AI può automatizzare vari aspetti dello sviluppo del prodotto, tra cui la progettazione della brand image (logo, nome e simbolo) e l'automazione del prodotto. Tuttavia, è importante considerare la percezione che i consumatori hanno dell'automazione e dell'identità nella progettazione dei prodotti (Mino & Spanakis 2018; Leung et al. 2019). La Thinking AI aiuta lo sviluppo e la personalizzazione dei prodotti sulla base delle preferenze e tendenze dei consumatori. Ad esempio, può offrire suggerimenti personalizzati e ottimizzare il design dei prodotti (Dekimpe 2020; Liebman et al. 2019). La Feeling AI consente interazioni dialogiche ed emotive con i clienti, offrendo raccomandazioni personalizzate e comprendendo le emozioni dei clienti. Può anche valutare la reputazione del marchio e il sentiment dei clienti attraverso i social media (Wilson e Daugherty 2018; Rust et al 2021).
- **Prezzo/Costo:** La Mechanical AI facilita l'automazione dei pagamenti attraverso servizi come i portafogli digitali. La Thinking AI supporta prezzi dinamici e strategie di prezzo personalizzate basate su dati e recensioni dei clienti (Feng et al. 2019; Borgesius & Port, 2017). La Feeling AI può essere impiegata per la negoziazione dei prezzi e la costruzione di relazioni, in particolare nei contesti B2B, dove i fattori interpersonali possono influenzare i risultati economici (Pulles & Hartman 2017).
- **Luogo/Convenienza:** La Mechanical AI è utilizzata per automatizzare i processi back-end, le interazioni front-end e la distribuzione attraverso robot e IoT. I robot di servizio possono gestire ruoli meno complessi che non richiedono complesse capacità emotive o sociali (Grewal et al. 2018; Siebel, 2017; Wirtz et al. 2018). La Thinking AI ha trasformato le esperienze di acquisto, come dimostrano i negozi senza cassiere di Amazon Go e l'uso di etichette intelligenti per gli indumenti da parte di Alibaba. Svolge anche un ruolo nell'ottimizzazione della logistica e delle consegne, includendo l'uso di

robot per le consegne (Magana 2018; Hossain 2022). La Feeling AI migliora le capacità dei robot di servizio di interagire emotivamente con i clienti, identificare le loro esigenze e fornire un servizio personalizzato. I robot come Pepper possono riconoscere e rispondere alle emozioni umane (Wirtz et al. 2018; Choudhury, 2016).

- **Promozione/Comunicazione:** La Mechanical AI automatizza diverse attività di comunicazione, tra cui la pianificazione delle campagne, il test degli annunci e le offerte personalizzate. Il programmatic media bidding automatizza l'acquisto e la vendita di inserzioni sulla base dei dati dei clienti (Huang & Rust 2020; Haleem et al. 2022). La Thinking AI assiste nella creazione di contenuti e nello sviluppo di campagne personalizzate in base alle preferenze e ai comportamenti dei consumatori. Aiuta a identificare i contenuti e le strategie di distribuzione più efficaci (Haleem et al. 2022). La Feeling AI tiene traccia delle risposte dei clienti ai contenuti promozionali e monitora il sentiment del marchio attraverso i social media e altre fonti di dati qualitativi. Consente agli esperti di marketing di rispondere alle preoccupazioni dei clienti e di migliorare la loro esperienza complessiva (Zaki 2021).

### **Come viene attualmente utilizzata l'IA nel marketing?**

I dati di Google Trends mostrano un aumento significativo dell'interesse per l'"AI Marketing" nel 2021, indicando una crescente consapevolezza del potenziale dell'AI nel settore del marketing. Secondo un'indagine di Influencer Marketing Hub, il 61% delle aziende e dei marketer ha utilizzato o sta utilizzando l'IA nelle proprie operazioni di marketing. Tuttavia, alcuni esitano ancora per mancanza di comprensione, problemi di costi o di privacy dei dati (Geyser 2023). Dal report di HubSpot (2023) invece si possono elencare i principali usi dell'IA nel marketing:

1. **Ricerca di marketing e ispirazione:** I marketer utilizzano gli strumenti di IA per generare idee, accendere l'immaginazione e dare il via alle ricerche di marketing. Ad esempio, ChatGPT può aiutare a creare fogli di calcolo del panorama competitivo per le aziende.
2. **Pianificazione SEO e ricerca di parole chiave:** L'intelligenza artificiale aiuta ad automatizzare le attività SEO che richiedono molto tempo, come la ricerca di parole chiave a coda lunga, la creazione di link interni e l'analisi delle SERP per migliorare il posizionamento dei siti web.

3. Per la creazione di contenuti: L'intelligenza artificiale viene utilizzata principalmente per la creazione di contenuti, aiutando a generare idee, migliorare i paragrafi e modificare il testo per far sì che risuoni meglio per il proprio target
4. L'intelligenza artificiale ottimizza il repurposing dei contenuti, riassumendo i testi, generando e-mail promozionali e trasformando i contenuti scritti in vari formati come video, podcast, landing page o post per i social media.
5. Social Media: L'intelligenza artificiale adatta e ripropone i contenuti per le diverse piattaforme di social media, adattandoli a pubblici, toni e obiettivi specifici.
6. Composizione di e-mail di marketing: l'intelligenza artificiale assiste nella generazione di testi di e-mail basati sui dati delle campagne passate, nell'ottimizzazione di contenuti e immagini e nel targeting di un pubblico specifico.
7. \*Descrizioni dei prodotti: L'intelligenza artificiale riformula le descrizioni dei prodotti per renderle più uniche e coinvolgenti.
8. Ottimizzazione delle prestazioni dei contenuti: l'intelligenza artificiale aggiorna i vecchi contenuti per soddisfare gli attuali requisiti SEO e migliorare le classifiche di ricerca, soprattutto se integrati con i dati del CRM.
9. Analisi dei dati: L'IA collegata ai sistemi di CRM genera report di facile lettura con fogli di calcolo o grafici che riassumono le prestazioni aziendali.

L'IA può essere applicata in ogni fase del customer journey, usando il modello di Jan Calzon ho spiegato l'utilizzo dell'intelligenza artificiale in ogni fase facendo riferimenti a casi reali.

**ZMOT/Consapevolezza:** In questa fase, i clienti vengono a conoscenza dell'esistenza di un marchio e iniziano la loro ricerca. L'intelligenza artificiale assiste nella creazione del logo e dell'immagine del marchio, nella generazione di contenuti, nell'editing di immagini, video e audio e nella progettazione e ottimizzazione del sito web. Tra gli esempi si possono citare i visual delle campagne di Heinz generati da DALL-E 2 e Shoe Mirror che ha creato degli specchi alimentati dall'AI che per consigliare le scarpe ai passanti.

**FMOT/Considerazione:** In questa fase i clienti raccolgono informazioni e decidono se acquistare. L'intelligenza artificiale contribuisce a migliorare la presenza online attraverso strategie SEO, messaggi di marketing personalizzati e il miglioramento dell'esperienza di acquisto. Per esempio, ClickUp ha migliorato il suo traffico organico con SurferSEO, mentre Interactive Investor ha ottimizzato le campagne con Albert, e infine Stitch Fix dimostra l'importanza della personalizzazione dell'esperienza cliente.

**SMOT/Conversione:** Questa fase comprende l'acquisto vero e proprio, la consegna e l'assistenza ai clienti. L'intelligenza artificiale consiglia i prodotti in base alle preferenze, consente la determinazione dinamica dei prezzi e migliora l'esperienza dei clienti attraverso assistenti virtuali e chatbot. Tra gli esempi, le raccomandazioni personalizzate di Starbucks e le strategie di prezzo dinamico di Amazon, Uber e Airbnb, mentre l'uso del chatbot di Sephora dimostra un'efficace integrazione del servizio clienti.

**TMOT/Advocacy:** I clienti fedeli sostengono il marchio attraverso il passaparola e generano contenuti. L'intelligenza artificiale può coinvolgere gli utenti nella creazione di contenuti, come nel caso della campagna "Create Real Magic" di Coca-Cola, che ha unito GPT-4 e DALL-E per coinvolgere artisti digitali e consumatori. Inoltre, per favorire la fidelizzazione è importante creare una comunicazione personalizzata con i clienti analizzando i dati del loro comportamento

## **Vantaggi e problemi**

### **Benefici**

L'IA offre diversi vantaggi se implementata correttamente nella strategia di un'azienda.

- **Più efficienza:** L'IA è altamente efficiente e non risente della stanchezza, dello stress emotivo o dei bisogni umani di base, il che porta a un minor numero di errori, a condizione che sia addestrata correttamente per evitare pregiudizi. Haleem et al. (2022) sottolineano che supera anche l'uomo in alcuni compiti, come la protezione dei dati dei clienti e dell'azienda, adattandosi ai requisiti di cybersecurity.
- **Meno costi e più veloce:** La delega di compiti all'IA aumenta l'efficienza e riduce tempi e costi. Ad esempio, il rapporto di HubSpot (2023) afferma che i marketer possono risparmiare fino a due ore e mezza al giorno con l'IA, in particolare in compiti come la ricerca di parole chiave, la pulizia dei dati, la creazione di liste, la formattazione di blog e l'analisi dei dati. Tomlinson et al. (2023) invece hanno dimostrato che l'impronta ambientale dell'IA per compiere compiti specifici è persino inferiore a quella degli esseri umani. Di conseguenza, L'IA riduce significativamente i costi e aumenta i ricavi grazie a decisioni di marketing migliori, come prezzi, promozioni, raccomandazioni di prodotti e un maggiore coinvolgimento dei clienti.

### **Problemi**

- **Contenuti inaffidabili:** I contenuti generati dall'IA possono essere inaffidabili, spesso contenenti informazioni false o imprecise, e possono produrre contenuti con fonti

inesistenti. Ciò richiede una verifica dei fatti e una certa cautela, inoltre è meglio non fare completo affidamento sull'IA anche perché secondo degli studi i contenuti creati da IA performano peggio nelle classifiche dei motori di ricerca (Gillham n.d.).

- **Bias:** L'intelligenza artificiale può essere distorta e portare alla creazione di contenuti o a processi decisionali scorretti. I pregiudizi, sottili o palesi, possono portare a trattamenti ingiusti o a risultati discriminatori.
- **Privacy:** La raccolta e l'analisi dei dati sollevano problemi di privacy, con potenziali violazioni dei diritti dei clienti.
- **L'IA opaca:** che manca di trasparenza e spiegabilità, pone problemi di responsabilità. Gli addetti al marketing possono avere difficoltà a comprendere il processo decisionale dell'IA, rendendo difficile spiegarne o giustificarne le scelte.
- **L'assenza di formazione e di norme** aggrava questi problemi. Molte aziende trascurano di fornire un'adeguata formazione sull'IA ai dipendenti o di stabilire politiche chiare sull'uso dell'IA, in particolare sulle questioni etiche. Questa mancanza di orientamento può portare a un uso improprio o a decisioni non informate.

### **Percezione dei consumatori**

Considerare la percezione dell'IA da parte dei consumatori è fondamentale per definire le strategie di marketing. L'opinione del pubblico sull'IA può influenzare la trasparenza di un'azienda nell'utilizzo dell'IA e nell'adozione o esclusione di questa tecnologia.

- **Paese:** L'atteggiamento dei consumatori nei confronti dell'IA può variare a seconda del Paese e della cultura. Ad esempio, i cittadini cinesi tendono a vedere l'IA in modo più positivo, con il 78% che ritiene che i prodotti e i servizi di IA abbiano più vantaggi che svantaggi. La Francia, invece, ha un tasso di accettazione inferiore, pari al 31% (Maslej et al. 2023). Queste differenze regionali influenzano il modo in cui le aziende comunicano l'uso dell'IA ai clienti e se enfatizzano o minimizzano il coinvolgimento dell'IA.
- **Demografia:** Anche i fattori demografici, come il sesso, l'età, il reddito e l'occupazione, contribuiscono a formare la percezione che i consumatori hanno dell'IA. Le donne hanno generalmente una visione meno positiva dei prodotti e dei servizi di IA rispetto agli uomini. I giovani sotto i 35 anni tendono a trovare l'IA vantaggiosa, ma esprimono comunque delle preoccupazioni (Maslej et al. 2023). Le aziende devono tenere conto di

queste variazioni demografiche quando elaborano i loro messaggi di marketing relativi all'IA.

- Il prodotto/servizio: I clienti attribuiscono all'IA standard elevati, in particolare per i compiti che richiedono soggettività, intuizione ed emozione. La fiducia nell'IA è influenzata dalla percezione del rischio delle sue possibili applicazioni. Ad esempio, i consumatori accettano maggiormente l'IA per operazioni come la raccomandazione di film, ma sono scettici sul suo utilizzo in scenari decisionali più rischiosi (Davenport et al. 2020).
- Anche l'incarnazione fisica dell'IA, come i robot, può influire sulla percezione dei consumatori. Molti consumatori si immedesimano maggiormente nell'IA quando questa ha una presenza fisica, ma l'aspetto del robot può evocare reazioni diverse. In particolare, le persone spesso preferiscono i robot con sembianze non umane (Davenport et al. 2020; Mende et al. 2019).
- La percezione dell'IA da parte dei consumatori varia a seconda del prodotto o del servizio. Ad esempio, i dispositivi di IA ad assistenza vocale come Alexa sono ben accolti perché offrono vantaggi funzionali e l'automazione di compiti semplici. Tuttavia, le percezioni dell'IA quando si tratta di comunicazioni di marketing possono essere contrastanti, con alcuni consumatori che ritengono che interferisca con il loro spazio personale (Chen et al. 2021).

In generale, la preoccupazione principale, a livello demografico e regionale, è la gestione dei dati e della privacy. Creare fiducia, trasparenza e una reputazione positiva sono fattori cruciali per aumentare il consenso nei confronti dell'IA e migliorare la percezione generale del suo utilizzo. Le aziende devono dare la priorità all'arricchimento della vita dei clienti rispetto al profitto per promuovere un'accettazione positiva dell'IA (Burns et al. 2023).

### **Capitolo 3: ChatGPT**

OpenAI, un'organizzazione non profit con una filiale a scopo di lucro, ha rilasciato ChatGPT il 30 novembre 2022. ChatGPT fa parte del più ampio portafoglio di progetti di intelligenza artificiale di OpenAI, che comprende strumenti per l'elaborazione di testi, immagini e musica, come DALL-E, Whisper, Jukebox e MuseNet. Attraverso i quali mira a sviluppare un'intelligenza artificiale generale sicura a beneficio della società.

## **Cos'è ChatGPT?**

ChatGPT è un'intelligenza artificiale generativa basata sull'elaborazione del linguaggio naturale. Fa parte degli sforzi di OpenAI per creare un'intelligenza artificiale generale sicura. È stata progettata per diverse applicazioni, tra cui la traduzione, la scrittura creativa e la generazione di codice. È dotata di un'interfaccia chatbot di facile utilizzo che consente agli utenti di porre domande o fornire suggerimenti e di ricevere risposte simili a quelle umane, altrimenti può ammettere errori, contestare premesse errate e rifiutare richieste inappropriate.

Il modello è stato addestrato utilizzando il Reinforcement Learning from Human Feedback, iniziando con una regolazione supervisionata e incorporando infine i meccanismi di ricompensa e la Proximal Policy Optimization. Lo sviluppo di ChatGPT è iniziato nel giugno 2018 con GPT-1, un modello iniziale di trasformatore generativo pre-addestrato, seguito da GPT-2 nel febbraio 2019, in grado di generare testo coerente. GPT-3, precursore di ChatGPT, è arrivato nel giugno 2020.

ChatGPT ha ottenuto un'ampia attenzione, attirando un milione di utenti nei primi cinque giorni dal suo rilascio. È diventata l'app con la crescita più rapida della storia, con 123 milioni di utenti attivi mensili tre mesi dopo il lancio. La sua popolarità è stata determinata dalle sue notevoli funzionalità e dall'ampia copertura mediatica. Ad esempio, è stata testata da un professore di diritto scoprendo che ChatGPT può essere d'aiuto nella produzione di bozze iniziali per gli studenti di legge. Tuttavia, il suo utilizzo in ambito educativo ha scatenato dibattiti sul problema della copiatura e sul suo impatto sull'apprendimento tradizionale. Inoltre, non sono mancate le preoccupazioni circa la sua sicurezza. Ci sono stati casi in cui l'IA ha fornito informazioni potenzialmente dannose, evidenziando la necessità di misure di sicurezza.

OpenAI ha introdotto ChatGPT Plus, un piano di abbonamento, il 1° febbraio 2023, che offre vantaggi come tempi di risposta più rapidi e accesso prioritario a nuove funzionalità a fronte di un canone mensile. Inoltre, il 14 marzo 2023 ha lanciato GPT-4, un modello multimodale che mostra prestazioni di livello umano su vari benchmark. ChatGPT continua a evolversi con nuove funzionalità, tra cui plugin, istruzioni personalizzate e versioni aziendali per soddisfare le diverse esigenze degli utenti. Nel settembre 2023, ChatGPT ha ampliato le sue capacità per includere interazioni vocali e immagini, migliorando la sua presenza nella vita quotidiana. Gli utenti possono ora avere conversazioni dinamiche, chiedere assistenza con informazioni visive e impegnarsi in diverse attività, dalla pianificazione di viaggi alla risoluzione di problemi matematici.

## Applicazioni ChatGPT

Sohail e altri (2023) hanno condotto un'analisi completa delle applicazioni di ChatGPT in vari settori. Hanno osservato che l'applicazione principale di ChatGPT è quella di assistente personale, con adattamenti a campi specifici.

- **Medicina e sanità:** Nel campo della sanità, ChatGPT è ampiamente utilizzato per diversi scopi. I ricercatori stanno esplorando il suo potenziale nella scrittura scientifica, nel supporto alla salute mentale, negli accertamenti medici, nella cardiologia e negli esami di abilitazione alla professione medica. Si è dimostrato promettente in compiti come la diagnosi differenziale e la generazione di domande di ricerca in gastroenterologia. (Hirosawa et al. 2023)
- **Marketing e servizi finanziari:** Il settore bancario sta adottando ChatGPT, in particolare per l'analisi dei dati di back-end, le strategie di comunicazione di marketing e le interazioni con i clienti, anche se l'affidabilità rimane un elemento di preoccupazione.
- **Ingegneria del software:** ChatGPT aiuta nello sviluppo del software, soprattutto nella programmazione, rendendola più intuitiva. È stato utilizzato per correggere bug di software, analizzarne l'architettura e altro ancora.
- **Scrittura accademica e scientifica:** I ricercatori utilizzano ChatGPT come supporto alla ricerca accademica e alla stesura di articoli di giornale, anche se le preoccupazioni etiche, il plagio e i limiti di accuratezza richiedono norme più chiare.
- **Ricerca e istruzione:** Numerosi studi accademici hanno esplorato il potenziale di ChatGPT per risolvere problemi tecnici e non. È stata presa in considerazione per migliorare l'insegnamento delle lingue, per tradurre del codice e per affrontare sfide come copiare e tutelare la privacy.
- **Scienze ambientali:** Nella ricerca ambientale, ChatGPT aiuta a scrivere e analizzare i dati, contribuisce alla ricerca sui cambiamenti climatici, ottimizza i processi produttivi e offre raccomandazioni, ma se ne consiglia un uso prudente.
- **Elaborazione del linguaggio naturale:** ChatGPT eccelle in compiti orientati all'NLP come il ragionamento, l'inferenza del linguaggio naturale, la risposta alle domande, l'analisi del sentimento e altro ancora. Viene anche utilizzato per rilevare tendenze al suicidio, incitamento all'odio e fake news.
- **Turismo, viaggi, trasporti e industria dell'ospitalità:** ChatGPT sta trasformando l'industria del turismo assistendo i viaggiatori con informazioni, raccomandazioni e prenotazioni.

Offre servizi di concierge, comunica in più lingue e aiuta gli sforzi di marketing. (Dwivedi et al. 2023)

### **Come i marketer utilizzano ChatGPT**

- Creazione di contenuti: ChatGPT aiuta a generare contenuti per e-mail, post sui social media, articoli di blog, descrizioni di prodotti, storie, poesie e canzoni. Può fornire rapidamente testi creativi e coinvolgenti.
- Ottimizzazione SEO: Contribuisce alla strategia SEO suggerendo parole chiave, ottimizzando i contenuti e migliorando titoli, meta descrizioni e alt tag delle immagini.
- Analisi del sentiment: ChatGPT analizza le recensioni e i commenti dei clienti, riassumendo il sentimento generale e generando risposte appropriate.
- Creazione di campagne di marketing: Fornisce ispirazione e passaggi dettagliati per la creazione di campagne di marketing efficaci, dalla definizione degli obiettivi al monitoraggio del ROI.
- Assistenza clienti: ChatGPT può essere utilizzato per costruire chatbot per l'assistenza clienti 24/7, offrendo un'assistenza simile a quella umana.
- Integrazione CRM: L'integrazione di ChatGPT nei sistemi CRM migliora l'assistenza ai clienti, la raccolta dei dati, l'identificazione delle tendenze e la comunicazione personalizzata.
- Analisi dei dati dei clienti: Raccoglie informazioni sugli interessi, i comportamenti e le esigenze del pubblico analizzando le query di ricerca, le interazioni sui social media e gli acquisti passati.
- Confronto tra marchi: I marketer utilizzano ChatGPT per confrontare i concorrenti, raccogliendo dati per lo sviluppo dei prodotti.
- Sondaggi: ChatGPT genera domande per i sondaggi, li organizza, li traduce e analizza i dati raccolti.

### **Come sfruttare il potenziale di ChatGPT**

Per sfruttare al meglio ChatGPT, seguite queste best practice:

1. Scrivere istruzioni chiare: Fornite istruzioni chiare e dettagliate nei vostri messaggi. Specificate i requisiti di lunghezza, tono e stile. Usate i delimitatori e prendete in considerazione la possibilità di dividere i compiti complessi in fasi.

2. Fornire testi di riferimento: Includete testi di riferimento o citazioni quando si tratta di argomenti esoterici per garantire risposte accurate.
3. Suddividere i compiti complessi: Suddividere i compiti complessi in sottocompiti più semplici e utilizzare la classificazione degli intenti per evidenziare le istruzioni pertinenti.
4. Dare tempo per pensare: Istruire il modello a riflettere su problemi, decisioni o compiti creativi. Incoraggiate il ragionamento e premiate le risposte ragionate.
5. Utilizzare strumenti esterni (GPT-4): Impiegare embeddings per il recupero efficiente della conoscenza, l'esecuzione di codice per i calcoli o API esterne per espanderne le capacità (solo GPT-4).
6. Testare sistematicamente le modifiche (GPT-4): Testare sistematicamente diversi prompt utilizzando un quadro di valutazione (solo GPT-4).

## **Rischi e limiti**

(OpenAI, 2023e)

- Imprecisioni fattuali: Un limite significativo dei GPT, compresa l'ultima versione GPT-4, è la loro incapacità di fornire informazioni completamente affidabili. Possono produrre imprecisioni fattuali e commettere errori di ragionamento. Questo problema persiste nonostante i progressi nelle capacità del modello. Per esempio, GPT-4 si comporta solo leggermente meglio di GPT-3.5 in benchmark come TruthfulQA, che valuta se un modello linguistico fornisce risposte veritiere alle domande. Alcune imprecisioni si verificano perché i modelli tendono a scegliere la risposta più comune, anche se non è del tutto accurata. Anche le limitazioni dei dati di formazione, che si estendono solo fino a settembre 2021, contribuiscono a queste imprecisioni.
- Bias: I pregiudizi rimangono un problema persistente nell'IA e riguardano anche i GPT. Questi modelli hanno il potenziale di rafforzare e riprodurre pregiudizi e stereotipi dannosi, in particolare per i gruppi emarginati. OpenAI riconosce questo problema e mira ad allineare l'IA ai valori umani attraverso la messa a punto con revisori umani. Tuttavia, questo approccio non è del tutto efficace. OpenAI ha condiviso linee guida su argomenti politici e controversi per evitare di favorire qualsiasi gruppo politico e ritiene che la trasparenza e il feedback degli utenti possano contribuire a migliorare il comportamento del sistema.
- Contenuti dannosi: I GPT sono in grado di generare contenuti dannosi, tra cui discorsi di odio, linguaggio discriminatorio, incitamenti alla violenza e contenuti utilizzati per

diffondere false narrazioni o sfruttare gli individui. OpenAI ha testato questi rischi consultando esperti di vari settori. I modelli più recenti sono dotati di meccanismi che impediscono la generazione di richieste dannose, come le istruzioni per costruire armi o per mettere in atto comportamenti autolesionistici. Affidarsi al contributo di esperti è fondamentale per affrontare efficacemente questi rischi.

- **Problemi di sicurezza:** I problemi di privacy sorgono dal momento che i GPT apprendono da dati personali e pubblicamente disponibili su Internet. Questi modelli potrebbero potenzialmente violare la privacy di un individuo scoprendo informazioni personali come l'indirizzo o l'istituto scolastico. Per ridurre questi rischi, OpenAI ha addestrato i modelli a rifiutare richieste specifiche e a rimuovere le informazioni personali. Sono stati inoltre sottoposti a test da parte di esperti di cybersicurezza e le loro tendenze alla ricerca di potere sono state messe a punto per evitarne l'uso improprio.
- **Eccessivo affidamento:** Gli utenti possono fare eccessivo affidamento sui GPT, trascurando pregiudizi, imprecisioni e altri potenziali problemi nelle risposte. Per affrontare questo rischio, è essenziale che gli utenti siano consapevoli dei limiti e delle potenziali insidie dei modelli linguistici di grandi dimensioni. Gli utenti dovrebbero verificare le informazioni fornite piuttosto che accettarle ciecamente.
- **Impatti economici:** Sebbene attualmente le GPT si basino sul coinvolgimento umano, in futuro potrebbero avere un impatto sull'occupazione. Molti posti di lavoro potrebbero risentire dell'automazione e delle tecnologie AI ed è fondamentale che i governi, le aziende e i dipendenti considerino i potenziali impatti economici. Alcuni studi sostengono che una parte significativa della forza lavoro negli Stati Uniti potrebbe vedere le proprie mansioni lavorative influenzate dall'introduzione di modelli linguistici di grandi dimensioni. Le GPT potrebbero avere conseguenze più ampie sull'economia, sulla società e sulle decisioni politiche, soddisfacendo i criteri delle tecnologie di uso generale. (Eloundou et al, 2023)

## **Capitolo 4: Ricerca**

### **Domanda di ricerca**

La domanda di ricerca mira a valutare se la percezione di un testo promozionale cambia quando i potenziali clienti sono consapevoli che è stato scritto da ChatGPT. Prendendo spunto dall'analisi comparativa di Falcão e Isaías sulle percezioni della pubblicità nei social network e nei motori

di ricerca, il concetto di percezione del valore della pubblicità è fondamentale. Questo valore è modellato da fattori quali l'intrattenimento, l'informatività, l'irritazione, la credibilità e l'interattività. La mia ricerca si concentra specificamente sulla pubblicità sui social media. Nonostante la mancanza di studi sull'influenza dell'IA nella percezione del consumatore, ho formulato le mie ipotesi basandomi su ricerche simili, come ad esempio i risultati di Abdelkader sull'impatto di ChatGPT sull'esperienza del cliente. Di conseguenza mi aspetto che variabili come età, livello di educazione e agio nell'uso di questa tecnologia abbiano un impatto positivo sulla percezione della pubblicità.

### **Metodologia**

Per rispondere alla domanda di ricerca, ho utilizzato la metodologia del sondaggio. Per confrontare le risposte sono stati creati due questionari, assegnati in modo casuale tramite allocate.monster. Il questionario A non menziona l'IA o ChatGPT, mentre il questionario B afferma esplicitamente che la seconda versione del contenuto promozionale è stata creata utilizzando ChatGPT. L'obiettivo è quello di confrontare le percezioni su due versioni della stessa campagna e valutare se la percezione dei consumatori cambia quando sanno che è stata coinvolta un'intelligenza artificiale. L'indagine è rivolta a persone di età compresa tra i 20 e i 35 anni di madrelingua italiana e che conoscono il brand da cui è stato preso il contenuto promozionale.

Per l'esperimento è stato selezionato un marchio noto, IKEA, e il copy è stato scelto tra contenuti ad alta frequenza, quindi tra i post dei social media. Il copy è stato poi modificato utilizzando ChatGPT per creare una nuova versione simile nello stile e nella scelta delle parole all'originale. La conversazione con chatGPT che ha portato alla creazione della nuova versione del posto si può trovare nell'appendice A.

Entrambi i questionari sono composti da diciassette domande. La prima sezione verifica che gli intervistati conoscano il marchio IKEA. La sezione successiva esplora il loro comportamento e i loro sentimenti nei confronti dei contenuti promozionali sui social media. La terza sezione presenta l'esperimento con due versioni di contenuti promozionali, valutando la percezione in base a variabili quali intrattenimento, informatività, irritazione e credibilità presi dallo studio di Falcão e Isaías. La quarta sezione si concentra su ChatGPT, esplorando la consapevolezza, l'uso, lo scopo e le percezioni degli intervistati utilizzando una scala Likert. L'ultima sezione raccoglie informazioni demografiche. Le differenze tra i questionari stanno nell'esplicitare o meno

l'utilizzo dell'intelligenza artificiale nell'introduzione e nelle didascalie della terza sezione, dove viene presentato l'esperimento.

## **Risultati**

Nell'ottobre 2023, i questionari sono stati distribuiti attraverso canali online come WhatsApp, Telegram e gruppi Facebook. Il campione finale è composto da 115 intervistati, dopo aver escluso 23 risposte che non rientravano nella fascia d'età tra i 20 e i 35 anni. Il questionario A ha ricevuto 58 risposte (considerate 46), mentre il questionario B ha avuto 80 risposte (considerate 69). La maggior parte dei rispondenti erano donne (75,7%), probabilmente a causa delle mie conoscenze personali o dal fatto che secondo i dati di AlmaLaurea c'è un'alta percentuale di donne tra gli studenti che frequentano il corso di laurea in Strategie di Comunicazione.

Analizzando i dati demografici, il 30% del campione lavora e il 60% è costituito da studenti. Nel questionario A, il 63% sono studenti e il 28% lavora, mentre nel questionario B il 54% sono studenti e il 39% lavora. La maggior parte degli intervistati ha una laurea triennale (48%), seguito dal 27% con una laurea specialistica e dal 21% con un diploma.

Solo il 7% degli intervistati segue IKEA, tuttavia, il 72% segue altri brand sui social media. Dall'analisi della scala Likert si deduce che la motivazione principale per cui seguono brand è per rimanere aggiornati su promozioni e vendite, mentre il motivo che ha meno impatto nella scelta è quello di offrire sostegno al brand.

Il 90% degli intervistati di età compresa tra i 20 e i 35 anni conosce ChatGPT e il 72% lo ha utilizzato. La frequenza d'uso varia, con la maggior parte che lo usa qualche volta (56%) e il 33% che lo usa spesso. Gli scopi per i quali gli intervistati hanno utilizzato ChatGPT variano, con un numero sostanziale che lo sfrutta per scopi educativi. Gli utenti considerano ChatGPT utile e interessante, con una posizione contrastante rispetto alle potenziali preoccupazioni sulla sua sicurezza.

Ho analizzato la scala Likert della terza sezione, per valutare i cambiamenti di percezione del copy, calcolando la media, il range e l'indice di importanza relativa (RII). Dopo aver notato delle differenze tra i rispondenti dei due questionari circa la percezione del copy scritto con IA, ho controllato la significatività statistica attraverso il test ANOVA a una via, confrontando le risposte al contenuto promozionale originale (QA-1 e QB-1) e al contenuto modificato da ChatGPT (QA-2 e QB-2). L'analisi ANOVA ha confermato che la consapevolezza dell'uso di ChatGPT ha avuto un impatto statisticamente significativo su voci cinque specifiche della scala che ho poi analizzato incrociandole con variabili demografiche quali livello di istruzione e

occupazione. Gli intervistati con un master hanno mostrato una maggiore differenza di percezione tra i due questionari, indicando che il livello di istruzione e la consapevolezza dell'uso dell'IA possono influenzare il valore percepito. Inoltre, gli intervistati che lavorano sembrano più influenzati dalla consapevolezza dell'IA rispetto agli studenti.

### **Conclusioni: Valutazioni e limiti**

Nonostante la ricerca abbia fornito spunti di riflessione, presenta dei limiti, tra cui una dimensione del campione non rappresentativa e potenziali distorsioni dovute alle differenze tra i questionari. Per esempio, i tassi di risposta diseguali per i questionari A e B possono influire sull'accuratezza. In conclusione, la ricerca supporta parzialmente l'idea che la consapevolezza del coinvolgimento dell'IA influenzi la percezione della copia. Tuttavia, l'ipotesi che l'educazione e la familiarità con la ChatGPT portino a una percezione più positiva non è stata pienamente supportata. A causa dei suoi limiti, questa ricerca suggerisce tendenze che devono essere ulteriormente esplorate con un approccio più strutturato.

## Bibliography

The following bibliography is in alphabetical order.

Abdelkader, O. A. (2023). ChatGPT's influence on customer experience in digital marketing: Investigating the moderating roles. *Heliyon*, 9(8), e18770.

<https://doi.org/10.1016/j.heliyon.2023.e18770>

AlmaLaurea. (2023, April). *Strategie di comunicazione (LM-92) | Requisiti di trasparenza*.

Retrieved November 6, 2023, from

<https://statistiche.almalaurea.it/universita/statistiche/trasparenza?codicione=0280107309300001>

Anayat, S., & Rasool, G. (2022). Artificial intelligence marketing (AIM): connecting-the-dots using bibliometrics. *Journal of Marketing Theory and Practice*, 1–22.

<https://doi.org/10.1080/10696679.2022.2103435>

Andrews, E., L. (2020, July 2). AI's carbon footprint problem. Stanford HAI. Retrieved August 13, 2023, from <https://hai.stanford.edu/news/ais-carbon-footprint-problem>

Anyoha, R. (2017, August 28). The History of Artificial intelligence. *Science in the News*.

<https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/>

Balducci, B., & Marinova, D. (2018). Unstructured data in marketing. *Journal of the Academy of Marketing Science*, 46(4), 557–590. <https://doi.org/10.1007/s11747-018-0581-x>

Baldwin, R. (2019). *The Globotics upheaval: Globalisation, Robotics and the Future of Work*. Hachette UK.

Bisneto, T., De Carvalho Filho, A. O., & Magalhães, D. (2020). Generative adversarial network and texture features applied to automatic glaucoma detection. *Applied Soft Computing*, 90, 106165. <https://doi.org/10.1016/j.asoc.2020.106165>

Blume, L. M. M. (2023, July 21). Trinity nuclear test's fallout reached 46 states, Canada and Mexico, study finds. *The New York Times*. Retrieved August 7, 2023, from

<https://www.nytimes.com/2023/07/20/science/trinity-nuclear-test-atomic-bomb-oppenheimer.html>

- Borgesius, F. Z., & Poort, J. (2017). Online price discrimination and EU Data Privacy Law. *Journal of Consumer Policy*, 40(3), 347–366. <https://doi.org/10.1007/s10603-017-9354-z>
- Bryson, J. J. (2018.). The past decade and future of AI's impact on society | OpenMind. OpenMind. Retrieved August 5, 2023, from <https://www.bbvaopenmind.com/en/articles/the-past-decade-and-future-of-ais-impact-on-society/>
- Burns, M., Sankar-King, S., Dell'Orto, P., & Roma, E. (2023, August 1). *Using AI to Build Stronger Connections with Customers*. Harvard Business Review. Retrieved September 10, 2023, from <https://hbr.org/2023/08/using-ai-to-build-stronger-connections-with-customers>
- China: Big data program targets Xinjiang's Muslims. (2020, December 9). Human Rights Watch. Retrieved August 14, 2023, from <https://www.hrw.org/news/2020/12/09/china-big-data-program-targets-xinjiangs-muslims>
- Chen, H., Chan-Olmsted, S., Kim, J., & Mayor Sanabria, I. (2021). Consumers' perception on artificial intelligence applications in marketing communication. *Qualitative Market Research: An International Journal*, 25(1), 125–142. <https://doi.org/10.1108/qmr-03-2021-0040>
- Choudhury, S. R. (2016, May 26). SoftBank's Pepper robot gets a job waiting tables at Pizza Hut. *CNBC*. <https://www.cnbc.com/2016/05/24/mastercard-teamed-up-with-pizza-hut-restaurants-asia-to-bring-robots-into-the-pizza-industry.html>
- Chui, M. (2023, August 1) The state of AI in 2023: Generative AI's breakout year. McKinsey & Company. Retrieved August 6, 2023, from <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year>
- Chui, M., Hazan, E., Roberts, R., Singla, A., Smaje, K., Sukharevsky, A., Yee, L., & Zimmel, R. (2023, June). The economic potential of generative AI: The next productivity frontier. In McKinsey & Company.

- <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-AI-the-next-productivity-frontier#/>**
- Chung, T. S., Rust, R. T., & Wedel, M. (2009). My Mobile Music: an adaptive personalization system for digital audio players. *Marketing Science*, 28(1), 52–68.  
**<https://doi.org/10.1287/mksc.1080.0371>**
- Chung, T. S., Wedel, M., & Rust, R. T. (2015). Adaptive personalization using social networks. *Journal of the Academy of Marketing Science*, 44(1), 66–87.  
<https://doi.org/10.1007/s11747-015-0441-x>
- Dastin, J. (2018, October 10). Amazon scraps secret AI recruiting tool that showed bias against women. Reuters. Retrieved August 15, 2023, from  
**<https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G>**
- Davenport, T., Guha, A., Grewal, D. et al. How artificial intelligence will change the future of marketing. *J. of the Acad. Mark. Sci.* 48, 24–42 (2020).  
**<https://doi.org/10.1007/s11747-019-00696-0>**
- Davenport, T. H., Guha, A., & Grewal, D. (2021, August 30). *How to design an AI marketing Strategy*. Harvard Business Review. Retrieved September 5, 2023, from  
**<https://hbr.org/2021/07/how-to-design-an-ai-marketing-strategy>**
- De Bruyn, A., Viswanathan, V., Beh, Y. S., Brock, J. K. U., & Von Wangenheim, F. (2020). Artificial intelligence and Marketing: Pitfalls and opportunities. *Journal of Interactive Marketing*, 51, 91–105. **<https://doi.org/10.1016/j.intmar.2020.04.007>**
- Dechter, Rina. (1986). Learning While Searching in Constraint-Satisfaction-Problems. AAAI. 178-185, from ResearchGate.  
**[https://www.researchgate.net/publication/221605378\\_Learning\\_While\\_Searching\\_in\\_Constraint-Satisfaction-Problems/citations](https://www.researchgate.net/publication/221605378_Learning_While_Searching_in_Constraint-Satisfaction-Problems/citations)**
- Deep learning’s origins and pioneers. (2018, May 8). McKinsey & Company.  
**<https://www.mckinsey.com/featured-insights/artificial-intelligence/deep-learning-origins-and-pioneers>**

- Degrave, J., Felici, F., Buchli, J., Neunert, M., Tracey, B. D., Carpanese, F., Ewalds, T., Hafner, R., Abdolmaleki, A., De Las Casas, D., Donner, C., Fritz, L., Galperti, C., Huber, A., Keeling, J., Tsimpoukelli, M., Kay, J., Merle, A., Moret, J., . . . Riedmiller, M. (2022). Magnetic control of tokamak plasmas through deep reinforcement learning. *Nature*, 602(7897), 414–419. <https://doi.org/10.1038/s41586-021-04301-9>
- Dekimpe, M. G. (2020). Retailing and retailing research in the age of big data analytics. *International Journal of Research in Marketing*, 37(1), 3–14. <https://doi.org/10.1016/j.ijresmar.2019.09.001>
- Dennis, M. A. (2023, August 5). Marvin Minsky | AI pioneer, cognitive scientist & MIT professor. Encyclopedia Britannica. <https://www.britannica.com/biography/Marvin-Lee-Minsky>
- Dilmegani, C. (2023a, August 1). 6 Dynamic pricing examples in 2023: Despite criticism. *AIMultiple*. Retrieved September 7, 2023, from <https://research.aimultiple.com/dynamic-pricing-examples/>
- Dilmegani, C. (2023b). 7 Use cases of ChatGPT in Marketing for 2023. *AIMultiple*. <https://research.aimultiple.com/chatgpt-in-marketing/>
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A. S., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L., Buhalis, D., . . . Wright, R. (2023). Opinion Paper: “So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Dzyabura, Daria and John R. Hauser. (May 2019). Recommending Products When Consumers Learn Their Preference Weights. *Marketing Science* 38, 3: 365-541 © 2019 INFORMS. <http://dx.doi.org/10.1287/mksc.2018.1144>
- Edelman, D. C. and Abraham, M. (2022). *Customer experience in the age of AI*. Harvard Business Review. <https://hbr.org/2022/03/customer-experience-in-the-age-of-ai>
- Ellingrud, K., Sanghvi, S., Dandona, G. S., Madgavkar, A., Chui, M., White, O., Hasebe, P. (2023, July 26). Generative AI and the future of work in America. McKinsey &

- Company. Retrieved August 13, 2023, from <https://www.mckinsey.com/mgi/our-research/generative-ai-and-the-future-of-work-in-america>
- Eloundou, T., Manning, S., Mishkin, P., & Rock, D. L. (2023, March 23). GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models. arXiv (Cornell University). <https://doi.org/10.48550/arxiv.2303.10130>
- Falcão, J., & Isaias, P. (2020). Perceptions and attitude toward advertising on social networks and search engines: A comparative analysis. *Journal of Internet Commerce*, 19(4), 404–436. <https://doi.org/10.1080/15332861.2020.1816325>
- Feng, J., Li, X., & Zhang, X. (2014). Agile Pricing: How online product reviews influence firm pricing strategies. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.2510470>
- Fergusson, A. (2016). Designing online experiments using Google forms+ random redirect tool. Retrieved from <https://teaching.statistics-is-awesome.org/designing-online-experiments-using-google-forms-random-redirect-tool>
- Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, 114, 254–280. <https://doi.org/10.1016/j.techfore.2016.08.019>
- Future of Life Institute. (2016, February 9). Autonomous Weapons Open Letter: AI & Robotics Researchers - Future of Life Institute. Retrieved August 6, 2023, from <https://futureoflife.org/open-letter/open-letter-autonomous-weapons-ai-robotics/>
- Future of Life Institute. (2017, August 11). AI Principles - Future of Life Institute. Retrieved August 6, 2023, from <https://futureoflife.org/open-letter/ai-principles/>
- Gabel, S., Guhl, D., & Klapper, D. (2019). P2V-MAP: Mapping market structures for large retail assortments. *Journal of Marketing Research*, 56(4), 557–580. <https://doi.org/10.1177/0022243719833631>
- Garvie, C., Bedoya, A., Frankle, J. The perpetual Line-Up: Unregulated police face recognition in America. (2016). In *Perpetual Line Up*. Retrieved August 14, 2023, <https://www.perpetuallineup.org/>

- Geyser, W. (2023). Artificial Intelligence (AI) Marketing Benchmark Report: 2023. In Influencer Marketing Hub. <https://influencemarketinghub.com/ai-marketing-benchmark-report/>
- Graham-Harrison, E., & Cadwalladr, C. (2018, March 17). Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach. The Guardian. Retrieved August 14, 2023, <https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election>
- Grewal, D., Motyka, S., & Levy, M. (2018). The evolution and future of retailing and Retailing Education. *Journal of Marketing Education*, 40(1), 85–93. <https://doi.org/10.1177/0273475318755838>
- Haan, K. (2023, August 25). *7 Best Chatbots (September 2023)*. Forbes Advisor. Retrieved September 7, 2023, from <https://www.forbes.com/advisor/business/software/best-chatbots/>
- Habuka, H. (2023, June 6). The Path to Trustworthy AI: G7 Outcomes and Implications for Global AI Governance. CSIS. Retrieved August 7, 2023, from <https://www.csis.org/analysis/path-trustworthy-ai-g7-outcomes-and-implications-global-ai-governance>
- Haleem, A., Javaid, M., Qadri, M. A., Singh, R. P., & Suman, R. (2022). Artificial intelligence (AI) applications for marketing: A literature-based study. *International Journal of Intelligent Networks*, 3, 119–132. <https://doi.org/10.1016/j.ijin.2022.08.005>
- Ho, J. (2020, June 19). Denoising diffusion probabilistic models. arXiv.org. <https://arxiv.org/abs/2006.11239>
- Hossain, M. (2022, April 5). *Self-Driving Robots: a revolution in the local delivery*. California Management Review. <https://cmr.berkeley.edu/2022/04/self-driving-robots-a-revolution-in-the-local-delivery/>
- Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research*, 21(2), 155–172. <https://doi.org/10.1177/1094670517752459>

- Huang, M. H., & Rust, R. T. (2020). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49(1), 30–50.  
<https://doi.org/10.1007/s11747-020-00749-9>
- HubSpot. (2023). 2023 AI Trends for Marketers | HubSpot. <https://offers.hubspot.com/ai-marketing>
- Humphreys, A., & Wang, R. J. (2017). Automated text analysis for consumer research. *Journal of Consumer Research*, 44(6), 1274–1306. <https://doi.org/10.1093/jcr/ucx104>
- Jha, D., Smedsrud, P. H., Riegler, M., Halvorsen, P., De Lange, T., Johansen, D., & Johansen, H. D. (2019). KVASIR-SEG: a segmented Polyp Dataset. arXiv (Cornell University).  
<https://doi.org/10.48550/arxiv.1911.07069>
- Kaelbling, L. P., Littman, M. L., & Moore, A. W. (1996). Reinforcement Learning: a survey. *Journal of Artificial Intelligence Research*, 4, 237–285.  
<https://doi.org/10.1613/jair.301>
- Kang, C. (2023, May 16). Sam Altman, ChatGPT creator and OpenAI CEO, urges Senate for AI regulation. *The New York Times*. Retrieved August 7, 2023, from <https://www.nytimes.com/2023/05/16/technology/openai-altman-artificial-intelligence-regulation.html>
- Karras, T., Aila, T., Laine, S., & Lehtinen, J. (2018, April 30). Progressive growing of GANs for improved quality, stability, and variation | Research. Retrieved August 2, 2023, from [https://research.nvidia.com/publication/2018-04\\_progressive-growing-gans-improved-quality-stability-and-variation](https://research.nvidia.com/publication/2018-04_progressive-growing-gans-improved-quality-stability-and-variation).
- Kelly, S. M. (2023, January 26). ChatGPT passes exams from law and business schools. *CNN*. Retrieved September 12, 2023, from <https://edition.cnn.com/2023/01/26/tech/chatgpt-passes-exams/index.html>
- Kirkpatrick, K. (2020). Tracking shoppers. *Communications of the ACM*, 63(2), 19–21.  
<https://doi.org/10.1145/3374876>
- Korda, M. (2023, January 30). Could a chatbot teach you how to build a dirty bomb? *Outrider*. Retrieved September 12, 2023, from <https://outrider.org/nuclear-weapons/articles/could-chatbot-teach-you-how-build-dirty-bomb>

- Kotler, P., Kartajaya, H., & Setiawan, I. (2016). *Marketing 4.0: Moving from Traditional to Digital*. John Wiley & Sons.
- Kwartler, T. (2022). State of AI Bias Report. In DataRobot. Retrieved August 14, 2023, from <https://www.datarobot.com/resources/state-of-ai-bias-report/>
- Leung, E., Paolacci, G., & Puntoni, S. (2018). Man versus Machine: Resisting Automation in Identity-Based Consumer Behavior. *Journal of Marketing Research*, 55(6), 818–831. <https://doi.org/10.1177/0022243718818423>
- Li, Y., Yang, X., Sun, P., Qi, H., & Lyu, S. (2019). Celeb-DF: a large-scale challenging dataset for DeepFake forensics. arXiv (Cornell University). <https://doi.org/10.48550/arxiv.1909.12962>
- Luccioni, A., Viguiet, S., & Ligozat, A. (2022). Estimating the carbon footprint of BLOOM, a 176B parameter language model. arXiv (Cornell University). <https://doi.org/10.48550/arxiv.2211.02001>
- Luo, X., Tong, S., Fang, Z., & Qu, Z. (2019). Machines versus Humans: The Impact of AI Chatbot Disclosure on Customer Purchases. Social Science Research Network. <https://doi.org/10.2139/ssrn.3435635>
- Magana, G. (2018, July 6). Alibaba is piloting fashion AI technology. *Business Insider*. <https://www.businessinsider.com/alibaba-starts-using-fashion-ai-technology-2018-7?r=US&IR=T>
- Marketing AI Institute & Drift. (2023, August 28). *2023 State of Marketing and Sales AI Report*. Drift. <https://www.drift.com/books-reports/state-of-marketing-ai/>
- Maslej, N., Fattorini, L., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Ngo, H., Carlos Niebles, J., Parli, V., Shoham, Y., Wald, R., Clark, J. & Perrault, R., (2023, April). The AI Index 2023 Annual Report. AI Index Steering Committee, & Institute for Human-Centered AI, Stanford University., Stanford CA. <https://aiindex.stanford.edu/report/>
- McCarthy, J. (2012). What is AI? <http://jmc.stanford.edu/articles/whatisai.html>

- McCarthy, J., Minsky, M., Rochester, N., & Shannon, C. E. (2006). A proposal for the Dartmouth Summer Research Project on Artificial Intelligence, August 31, 1955. *Ai Magazine*, 27(4), 12. <https://doi.org/10.1609/aimag.v27i4.1904>
- Mende, M., Scott, M. L., van Doorn, J., Grewal, D., & Shanks, I. (2019). Service Robots Rising: How Humanoid Robots Influence Service Experiences and Elicit Compensatory Consumer Responses. *Journal of Marketing Research*, 56 (4), 535-556. <https://doi.org/10.1177/0022243718822827>
- Menzies, T (2003) 21st-Century AI: Proud, Not Smug, *IEEE Intelligent Systems*, 1094-7167/03, 22-24. [https://cse.sc.edu/~jianjunh/IEEE\\_AI Pride.pdf](https://cse.sc.edu/~jianjunh/IEEE_AI Pride.pdf)
- Mino, A., & Spanakis, G. (2018). LoGAN: Generating Logos with a Generative Adversarial Neural Network Conditioned on color. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.1810.10395>
- MIT Technology Review. (2018, February 21). 10 breakthrough technologies of 2018. Retrieved August 2, 2023, from <https://www.technologyreview.com/10-breakthrough-technologies/2018/>
- Morgan, B. (2020, May 13). The 3 Best In-Store Robots And Why They Work. *Forbes*. <https://www.forbes.com/sites/blakemorgan/2020/05/13/the-3-best-in-store-robots-and-why-they-work/>
- Netzer, O., Lemaire, A., & Herzenstein, M. (2019). When words sweat: Identifying signals for loan default in the text of loan applications. *Journal of Marketing Research*, 56(6), 960–980. <https://doi.org/10.1177/0022243719852959>
- Neumann, N., Tucker, C., & Whitfield, T. (2019). How Effective Is Black-box Digital Consumer Profiling and Audience Delivery?: Evidence from Field Studies. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.3203131>
- OpenAI. (2023, November 30). Introducing ChatGPT. Retrieved September 12, 2023, from <https://openai.com/blog/chatgpt>
- OpenAI. (2023a, February 1). Introducing ChatGPT Plus. Retrieved September 12, 2023, from <https://openai.com/blog/chatgpt-plus>

- OpenAI. (2023b, February 16). How should AI systems behave, and who should decide?  
Retrieved September 13, 2023, from <https://openai.com/blog/how-should-ai-systems-behave>
- OpenAI. (2023c, March 14). GPT-4. Retrieved September 12, 2023, from <https://openai.com/research/gpt-4>
- OpenAI. (2023d, March 23). ChatGPT plugins. Retrieved September 12, 2023, from <https://openai.com/blog/chatgpt-plugins>
- OpenAI. (2023e). GPT-4 System Card. OpenAI. <https://cdn.openai.com/papers/gpt-4-system-card.pdf>
- OpenAI. (2023f, April 25). New ways to manage your data in ChatGPT. Retrieved September 12, 2023, from <https://openai.com/blog/new-ways-to-manage-your-data-in-chatgpt>
- OpenAI. (2023g, June 20). Custom instructions for ChatGPT. Retrieved September 12, 2023, from <https://openai.com/blog/custom-instructions-for-chatgpt>
- OpenAI. (2023h, August 28). Introducing ChatGPT Enterprise. Retrieved September 26, 2023, from <https://openai.com/blog/introducing-chatgpt-enterprise>
- OpenAI. (2023i, September 25). ChatGPT can now see, hear, and speak. Retrieved September 26, 2023, from <https://openai.com/blog/chatgpt-can-now-see-hear-and-speak>
- OpenAI. (2023j, September 25). GPT-4V(ision) system card. Retrieved September 26, 2023, from <https://openai.com/research/gpt-4v-system-card>
- OpenAI. (n.d.). *GPT Best Practices*. Retrieved September 18, 2023, from <https://platform.openai.com/docs/guides/gpt-best-practices>
- Pakapol, M. (2021, March 23). *The perfect blend: Starbucks and Data Analytics - digital innovation and transformation*. Digital Innovation and Transformation. Retrieved September 6, 2023, from <https://d3.harvard.edu/platform-digit/submission/the-perfect-blend-starbucks-and-data-analytics/>
- Pitt, C., Bal, A., & Plangger, K. (2020). New approaches to psychographic consumer segmentation. *European Journal of Marketing*, ahead-of-print(ahead-of-print). <https://doi.org/10.1108/ejm-01-2019-0083>

- Power, B. (2017, May 30). *How Harley-Davidson used artificial intelligence to increase New York sales leads by 2,930%*. Harvard Business Review. Retrieved August 27, 2023, from <https://hbr.org/2017/05/how-harley-davidson-used-predictive-analytics-to-increase-new-york-sales-leads-by-2930>
- Russell, S., & Norvig, P. (2019). *Artificial intelligence: A Modern Approach* (4th ed.). Pearson Higher Education.
- Rust, R. T., Rand, W., Huang, M., Stephen, A. T., Brooks, G., & Chabuk, T. (2021). Real-Time brand reputation tracking using social media. *Journal of Marketing*, 85(4), 21–43. <https://doi.org/10.1177/0022242921995173>
- Samuel, A. L. (1959). Some studies in machine learning using the game of checkers. *IBM Journal of Research and Development*, 3(3), 210–229. <https://doi.org/10.1147/rd.33.0210>
- Sheehan, M. (2023). China’s AI regulations and how they get made. Carnegie Endowment for International Peace. <https://carnegieendowment.org/2023/07/10/china-s-ai-regulations-and-how-they-get-made-pub-90117>
- Siebel, T. (2017, December 14). *Why digital transformation is now on the CEO’s shoulders*. McKinsey & Company. <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/why-digital-transformation-is-now-on-the-ceos-shoulders>
- Simester, D., Timoshenko, A., & Zoumpoulis, S. I. (2020). Targeting prospective customers: Robustness of Machine-Learning methods to typical data challenges. *Management Science*, 66(6), 2495–2522. <https://doi.org/10.1287/mnsc.2019.3308>
- Singer, U., Polyak, A., Hayes, T., Yin, X., An, J., Zhang, S., Hu, Q., Yang, H., Ashual, O., Gafni, O., Parikh, D., Gupta, S., & Taigman, Y. (2022). Make-A-Video: Text-to-Video Generation without Text-Video Data. arXiv (Cornell University). <https://doi.org/10.48550/arxiv.2209.14792>
- Smith, C., McGuire, B., Huang, T. & Yang, G. (2006, December) *The History of Artificial Intelligence*. University of Washington <https://courses.cs.washington.edu/courses/csep590/06au/projects/history-ai.pdf>
- Sohail, S. S., Farhat, F., Himeur, Y., Nadeem, M., Madsen, D. Ø., Singh, Y., Atalla, S., & Mansoor, W. (2023). Decoding ChatGPT: a taxonomy of existing research, current

- challenges, and possible future directions. arXiv (Cornell University).  
<https://doi.org/10.1016/j.jksuci.2023.101675>
- Soleymanian, M., Weinberg, C. B., & Zhu, T. (2019). Sensor data and behavioral tracking: Does usage-based auto insurance benefit drivers? *Marketing Science*, 38(1), 21–43
- Strubell, E. (2019, June 5). Energy and policy considerations for deep learning in NLP. arXiv.org. <https://arxiv.org/abs/1906.02243>
- Thompson, E. (2019, September 6). 10 ways you already depend on AI daily. OpenMind. Retrieved August 2, 2023, from <https://www.bbvaopenmind.com/en/technology/artificial-intelligence/10-ways-you-already-depend-on-ai-daily/>
- Timoshenko, A., & Hauser, J. R. (2019). Identifying Customer Needs from User-Generated Content. *Marketing Science*, 38(1), 1–20. <https://doi.org/10.1287/mksc.2018.1123>
- Tomlinson, B., Black, R. W., Patterson, D. J., & Torrance, A. W. (2023). The Carbon Emissions of Writing and Illustrating Are Lower for AI than for Humans. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.2303.06219>
- Turing, A. (1950). I.—COMPUTING MACHINERY AND INTELLIGENCE. *Mind*, LIX(236), 433–460. <https://doi.org/10.1093/mind/lix.236.433>
- Wang, H., Fu, T., Du, Y., Gao, W., Huang, K., Liu, Z., Chandak, P., Liu, S., Van Katwyk, P., Deac, A., Anandkumar, A., Bergen, K. J., Gomes, C. P., Ho, S., Kohli, P., Lasenby, J., Leskovec, J., Liu, T., Manrai, A. K., . . . Zitnik, M. (2023). Scientific discovery in the age of artificial intelligence. *Nature*, 620(7972), 47–60.  
<https://doi.org/10.1038/s41586-023-06221-2>
- Wang, J., Wang, S., & Zhang, Y. (2023b). Artificial intelligence for visually impaired. *Displays*, 77, 102391. <https://doi.org/10.1016/j.displa.2023.102391>
- Weizenbaum, J. (1966). ELIZA—a computer program for the study of natural language communication between man and machine. *Communications of the ACM*, 9(1), 36–45.  
<https://doi.org/10.1145/365153.365168>

- Welle, D. (2023, April 29). Italy lifts ban on ChatGPT after data privacy improvements. dw.com. Retrieved August 7, 2023, from <https://www.dw.com/en/ai-italy-lifts-ban-on-chatgpt-after-data-privacy-improvements/a-65469742>
- What is generative AI? (2023, January 19). McKinsey & Company. <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai#>
- Wilson, H. J., & Daugherty, P., R. (2018, July). *How humans and AI are working together in 1,500 companies*. Harvard Business Review. <https://hbr.org/2018/07/collaborative-intelligence-humans-and-ai-are-joining-forces>
- Wodecki, B. (2023). UBS: ChatGPT may be the fastest growing app of all time. aibusiness.com. <https://aibusiness.com/nlp/ubs-chatgpt-is-the-fastest-growing-app-of-all-time#close-modal>
- Yang, C. (2023, September 7). *Large language models as optimizers*. arXiv.org. <https://arxiv.org/abs/2309.03409>
- Zaki, M. (2021, May 4). *Using AI to Track How Customers Feel — In Real Time*. Harvard Business Review. <https://hbr.org/2021/05/using-ai-to-track-how-customers-feel-in-real-time>

## Sitography

Albert Technologies Inc. (2019, September 25). *Marketing AI Case Study - Interactive Investor*. Albert.ai. Retrieved September 6, 2023, from <https://albert.ai/impact/financial-services-interactive-investor/>

AnitaB\_org. Joy Buolamwini — AI, Ain't I A Woman? Presented by Organizational Transformation. (2018, December 18). [Video]. YouTube. Retrieved August 14, 2023, from <https://www.youtube.com/watch?v=FejjAbwUqbA>

*Autonomous Mobile Robots (AMR): video series*. (n.d.). Intel. Retrieved August 18, 2023, from <https://www.intel.com/content/www/us/en/robotics/autonomous-mobile-robots/video-series.html>

BuzzFeedVideo. (2018, April 17). You Won't Believe What Obama Says In This Video! 😊 [Video]. YouTube. <https://www.youtube.com/watch?v=cQ54GDm1eL0>

Coogan, J. (2022, June 9). The epic history of artificial intelligence [Video 10:00 – 10:13]. YouTube. Retrieved August 5, 2023, <https://www.youtube.com/watch?v=jekwHBI1ySU>

Coogan, J. (2023, June 18). AI regulation, explained [Video]. YouTube. Retrieved August 7, 2023, from [https://www.youtube.com/watch?v=Heqb3W8Jw\\_E](https://www.youtube.com/watch?v=Heqb3W8Jw_E)

Dept Agency. (2023, July 20). *Creating interactive ads using AI technology*. DEPT®. Retrieved September 6, 2023, from <https://www.deptagency.com/case/creating-interactive-ads-using-ai-technology/>

Elliot Higgins tweet (2023, March 20) <https://twitter.com/EliotHiggins/status/1637927681734987777?s=20>

Futurepedia. (n.d.). Futurepedia - The Largest AI Tools Directory | Home. <https://www.futurepedia.io/>

Gartner Hype Cycle Research Methodology. (n.d.). Gartner. Retrieved July 29, 2023 <https://www.gartner.com/en/research/methodologies/gartner-hype-cycle>.

- Gillham, J. (n.d.). *Does Google penalize AI content? An indepth correlation study*. Originality.ai. Retrieved September 5, 2023, from <https://originality.ai/blog/will-google-penalize-ai-content>
- IFR International Federation of Robotics. (n.d.-c). *Service Robots*. <https://ifr.org/service-robots>
- Kluge, H. H. P. (2023, May 18). Sicurezza stradale. Oms: “Giusto pensare a una nuova mobilità con meno mezzi privati e più servizi pubblici ma l’emergenza oggi è rendere sicure le nostre strade.” *Quotidiano Sanità*. Retrieved September 10, 2023, from [https://www.quotidianosanita.it/studi-e-analisi/articolo.php?articolo\\_id=113873](https://www.quotidianosanita.it/studi-e-analisi/articolo.php?articolo_id=113873)
- Liang, P. (2022, May 31). AI History | Stanford CS221: AI (Autumn 2021) [Video]. Stanford Online, YouTube. Last consulted 01/08/23  
<https://www.youtube.com/watch?v=z8fEXuH0mu0>
- Liang, P. (2022b, May 31). Artificial Intelligence Today | Stanford CS221: AI (Autumn 2021) [Video]. Stanford Online, YouTube. Last consulted August 7, 2023, from  
<https://www.youtube.com/watch?v=C0IhR4D5KYc>
- No Language Left Behind: Meta AI Research Topic*. (n.d.). ai.meta. Retrieved August 19, 2023, from <https://ai.meta.com/research/no-language-left-behind/it/>
- Rethink Ideas. (2022). *Heinz A.I. Ketchup*. Rethink. Retrieved September 6, 2023, from <https://rethinkideas.com/work/heinz-ketchup/2022/digital-social/heinz-a-i-ketchup/>
- TED. (2017, March 29). How I’m fighting bias in algorithms | Joy Buolamwini [Video]. YouTube. Retrieved August 14, 2023, from  
[https://www.youtube.com/watch?v=UG\\_X\\_7g63rY](https://www.youtube.com/watch?v=UG_X_7g63rY)
- Yanes J. (2022, May 17). Mathematics for Protein Folding  Discover this scientific revolution | OpenMind. OpenMind.  
<https://www.bbvaopenmind.com/en/science/mathematics/mathematics-protein-folding/>
- Yanes J. (2022b, September 20). GAN, The Rise of Imagination in Machines | OpenMind. OpenMind. <https://www.bbvaopenmind.com/en/technology/artificial-intelligence/gan-the-rise-of-imagination-in-machines/>

Yanes J. (2023, March 14). The History of Artificial Intelligence | OpenMind's Timelines.  
OpenMind. <https://www.bbvaopenmind.com/en/technology/artificial-intelligence/history-of-artificial-intelligence/>

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## Appendix A

Integral description of the conversation between me and ChatGPT that led me to choose one version of the copy.

### Me

Questa è la descrizione di un post pubblicato su Facebook da Ikea:

"Libri, ricordi, collezioni: ogni libreria è un piccolo mondo da scoprire e da organizzare secondo le proprie esigenze e passioni. Scopri le nostre idee e soluzioni: [Link al sito]"

Riscrivi e migliora questa descrizione seguendo i principi del marketing, considera anche che:

- la descrizione accompagna delle foto di librerie lineari, bianche al cui interno ci sono libri e soprammobili,
- devi mantenere un tono familiare,
- la descrizione dev'essere relativamente breve,
- deve terminare con una call to action che invita a cliccare sul link,
- il link in descrizione rimanda alla collezione di librerie nel sito ikea che viene descritta in questo modo: "Idee intelligenti e salvaspazio per esporre i tuoi libri e oggetti preferiti. Personalizza la casa mettendo in mostra i tuoi oggetti del cuore. Così potrai ammirarli sempre, anche quando non li usi. Scopri le nostre idee salvaspazio e in linea con qualsiasi budget per valorizzare i tuoi oggetti preferiti."

### ChatGPT

Certamente, ecco una versione migliorata della descrizione del post su Facebook per IKEA:

"Scopri il tuo angolo di mondo con le nostre librerie lineari e bianche. Un luogo dove libri, ricordi e collezioni prendono vita. Organizza e personalizza il tuo spazio secondo le tue passioni. Ogni libro e soprammobile avrà il suo posto speciale.

Clicca qui per esplorare le nostre idee intelligenti e salvaspazio per esporre i tuoi libri e oggetti preferiti. Valorizza la tua casa mettendo in mostra i tuoi tesori del cuore, sempre a portata di occhio, anche quando non li stai utilizzando.

[Link al sito] - Trova soluzioni salvaspazio per esporre i tuoi oggetti preferiti, in linea con il tuo budget. Rendi la tua casa un rifugio accogliente e pieno di stile!"

Questa descrizione utilizza un tono familiare, è concisa e chiude con una call to action che invita a cliccare sul link per esplorare ulteriormente le librerie IKEA.

**Me**

Migliora ulteriormente la descrizione evitando ripetizioni e frasi ridondanti

**ChatGPT**

Certamente, ecco una versione ancora più concisa e migliorata della descrizione del post su Facebook per IKEA:

"Scopri un mondo di possibilità con le nostre librerie lineari e bianche. Organizza il tuo spazio in base alle tue passioni: libri, ricordi e collezioni prendono vita qui. Crea un rifugio accogliente che rifletta il tuo stile.

Clicca qui per esplorare soluzioni salvaspazio che mettono in mostra i tuoi oggetti preferiti, senza sfiorare il tuo budget. Rendi ogni angolo della tua casa un tesoro da ammirare sempre.

[Link al sito] - Trova idee intelligenti per esporre i tuoi tesori del cuore."

Questa versione riduce le ripetizioni e semplifica ulteriormente il messaggio, mantenendo un tono familiare e invitando i lettori a esplorare ulteriormente le offerte di librerie IKEA.

**Me**

Rendi la descrizione più breve, all'incirca di cinque righe e falla terminare con il link al sito.

**ChatGPT**

Certamente, ecco una versione più breve della descrizione:

"Scopri le nostre librerie per esporre i tuoi tesori con stile. Organizza il tuo spazio e crea un rifugio accogliente. Trova soluzioni salvaspazio adatte al tuo budget.

[Link al sito] - Esplora le librerie IKEA per dare vita ai tuoi oggetti preferiti."

**Me**

Sembra che questa descrizione sia un po' spezzettata, vorrei fosse più scorrevole.

**ChatGPT**

Capisco, cerchiamo di renderla più scorrevole:

"Scopri le nostre librerie per esporre i tuoi tesori con stile e organizza il tuo spazio in modo accogliente. Trova soluzioni salvaspazio adatte al tuo budget qui: [Link al sito] - Esplora le librerie IKEA e dai vita ai tuoi oggetti preferiti."

**Me**

Questa è la descrizione di un post pubblicato su Facebook da Ikea per promuovere le sue librerie:

"Libri, ricordi, collezioni: ogni libreria è un piccolo mondo da scoprire e da organizzare secondo le proprie esigenze e passioni. Scopri le nostre idee e soluzioni: [Link al sito]" Migliora questa descrizione e motiva le tue scelte successivamente.

## **ChatGPT**

Certamente, ecco una versione migliorata della descrizione del post:

"Esplora il tuo universo di libri, ricordi e collezioni con le librerie IKEA. Trova l'ispirazione per organizzare lo spazio in base alle tue esigenze e passioni. Scopri idee e soluzioni creative che rendono ogni casa un luogo speciale.

[Link al sito] - Crea il tuo spazio perfetto con le librerie IKEA e trasforma la tua casa in un rifugio di ispirazione."

Nella versione migliorata, ho cercato di mantenere il messaggio conciso mentre ho reso più chiaro il collegamento tra le librerie IKEA e la possibilità di creare uno spazio personale e ispiratore. Ho anche incluso un invito a esplorare ulteriormente il sito web di IKEA per maggiori dettagli.

## **Appendix B**

The original version of both questionnaires was written in Italian, but here is available their English translation.

### **Questionnaire A**

Thank you for agreeing to fill out the questionnaire that will help me complete the research project for my master's thesis in Communication Strategies. Your input will allow me to assess whether and how potential consumers' perceptions change when faced with two versions of similar promotional content.

Filling out the questionnaire will take 5 minutes. Responses will be completely anonymous and will be used only to conclude my academic research.

Thank you again for your contribution,

Marta

#### **Section 1**

Are you familiar with the brand IKEA?

- Yes (continue on section 2)
- No (end questionnaire)

#### **Section 2**

Do you follow IKEA on social media?

- Yes (continue on section 2.1)
- No (continue on section 2.2)

##### **Section 2.1**

On which social?

- Instagram,
- Facebook,
- Twitter,
- LinkedIn,
- Altro

##### **Section 2.2**

Do you follow other brands on social media?

- Yes (continue on section 2.3)
- No (continue on section 3)

### **Section 2.3**

Thinking about your motivations for following a brand on social media, indicate how much you agree with the following statements, where 0=I do not agree at all and 5=I completely agree.

I follow a brand on social media...

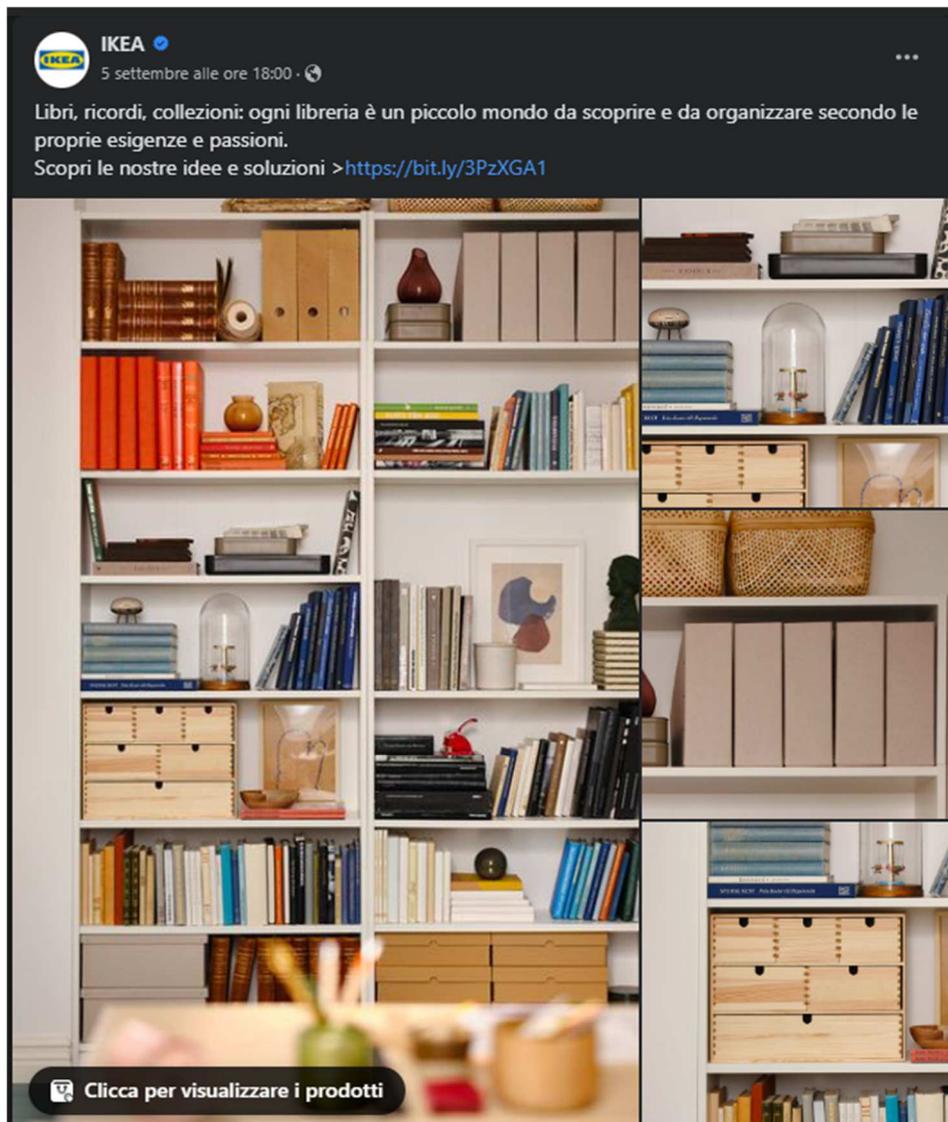
- to stay updated on new collections
- to stay updated on promotions
- to seek inspiration
- because it helps me in my purchasing decision
- because I like the content
- because I want to support the brand.

### **Section 3: Experiment**

This section will compare two similar versions of IKEA promotional content, they will be presented in the form of Facebook posts with description and photos, the only thing that changes from one version to the other is the description.

Provide a rating of liking the texts by giving a score from 0 to 5, where: 0 = I do not agree at all, 5 = I completely agree.

## Content A: Original Version



Imagine scrolling through social and seeing this post, try to focus on the caption where it says: *"Books, memories, collections: each bookshelf is a small world to discover and organize according to your needs and passions.*

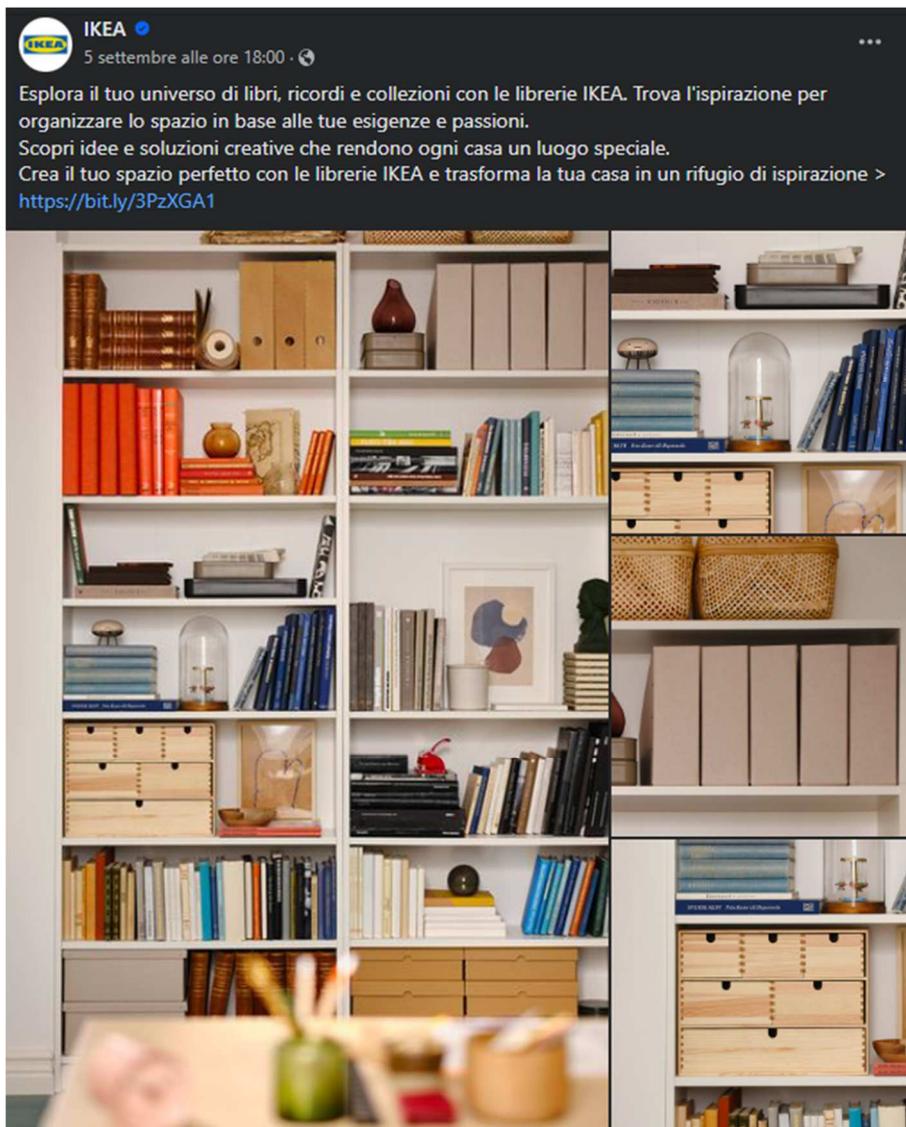
*Discover our ideas and solutions."*

This post...

1. is entertaining to me
2. is fun to me
3. provides me with a pleasant experience
4. gives me pleasure to remember
5. is a good source of information about products and service
6. provides relevant information for my needs

7. offers me updated information about products and services
8. is a source of convenient information for me
9. is irritating to me
10. is boring to me
11. is deceiving to me
12. is intrusive to me
13. is credible to me
14. is trustworthy to me
15. is reliable to me

### Contento B: ChatGPT's version



Imagine scrolling through social and seeing this post, try to focus on the caption where it says:

*“Explore your own universe of books, memories and collections with IKEA bookcases. Find inspiration to organize your space according to your needs and passions. Discover creative ideas and solutions that make every home a special place.*

*[Site link] - Create the perfect space with IKEA bookshelves and turn your home into a refuge of inspiration. ”*

This post...

1. is entertaining to me
2. is fun to me
3. provides me with a pleasant experience
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12. is intrusive to me
13. is credible to me
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15. is reliable to me

#### **Section 4: ChatGPT**

Are you familiar with ChatGPT?

- Yes (continue on section 4.2)
- No (continue on section 4.1)

##### **Section 4.1**

ChatGPT is an artificial intelligence virtual assistant created to answer questions and provide information in a manner similar to a human conversation. It is designed to find information, write text, and perform a variety of tasks with natural language.

##### **Section 4.2**

Have you ever used it?

- Yes (continue on section 4.3)
- No (continue on section 4.4)

### **Section 4.3**

How often do you use it?

- I have used it only once
- A few times
- I use it often

What did you use it for?

- Private Life
- Work
- Education
- Other

### **Section 4.4**

Based on your knowledge and experience with respect to ChatGPT, indicate what you think by assigning a value from 0 to 5 to the following statements, where 0 indicates that you do not agree at all and 5 indicates that you agree completely.

- - it is useful
- - it is dangerous
- - it is interesting
- - I trust its answers
- - I know how to use it
- - it is easy to use
- - I feel comfortable when I use it

### **Section 5: Demographics**

What age group do you belong to?

- Under 20 years old
- From 20 to 35 years old
- Over 35 years old

What gender do you identify with?

- Man

- Woman
- Other
- I prefer not to specify

What is your current occupation?

- Worker
- Student
- Other

Indicate the last level of education you obtained:

- High school diploma
- Bachelor's degree
- Master's degree
- Other

## **Questionnaire B**

Thank you for agreeing to fill out the questionnaire that will help me complete the research project for my master's thesis in Communication Strategies. Your input will allow me to assess whether and how perception changes in front of two versions of similar promotional content when one version is written using artificial intelligence.

Filling out the questionnaire will take 5 minutes. Responses will be completely anonymous and will be used only to conclude my academic research.

Thank you again for your contribution,

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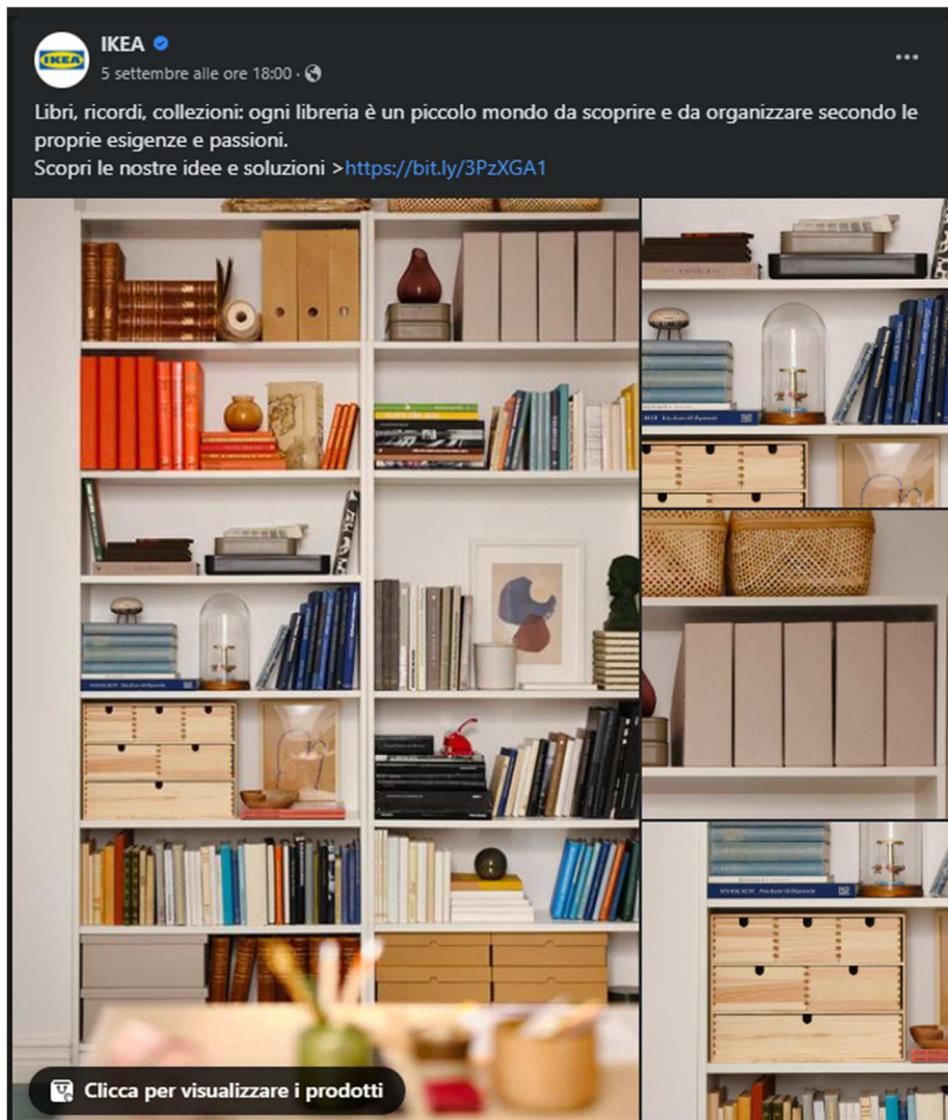
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5 = I completely agree.

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Imagine scrolling through social and seeing this post, try to focus on the caption where it says: *"Books, memories, collections: each bookshelf is a small world to discover and organize according to your needs and passions.*

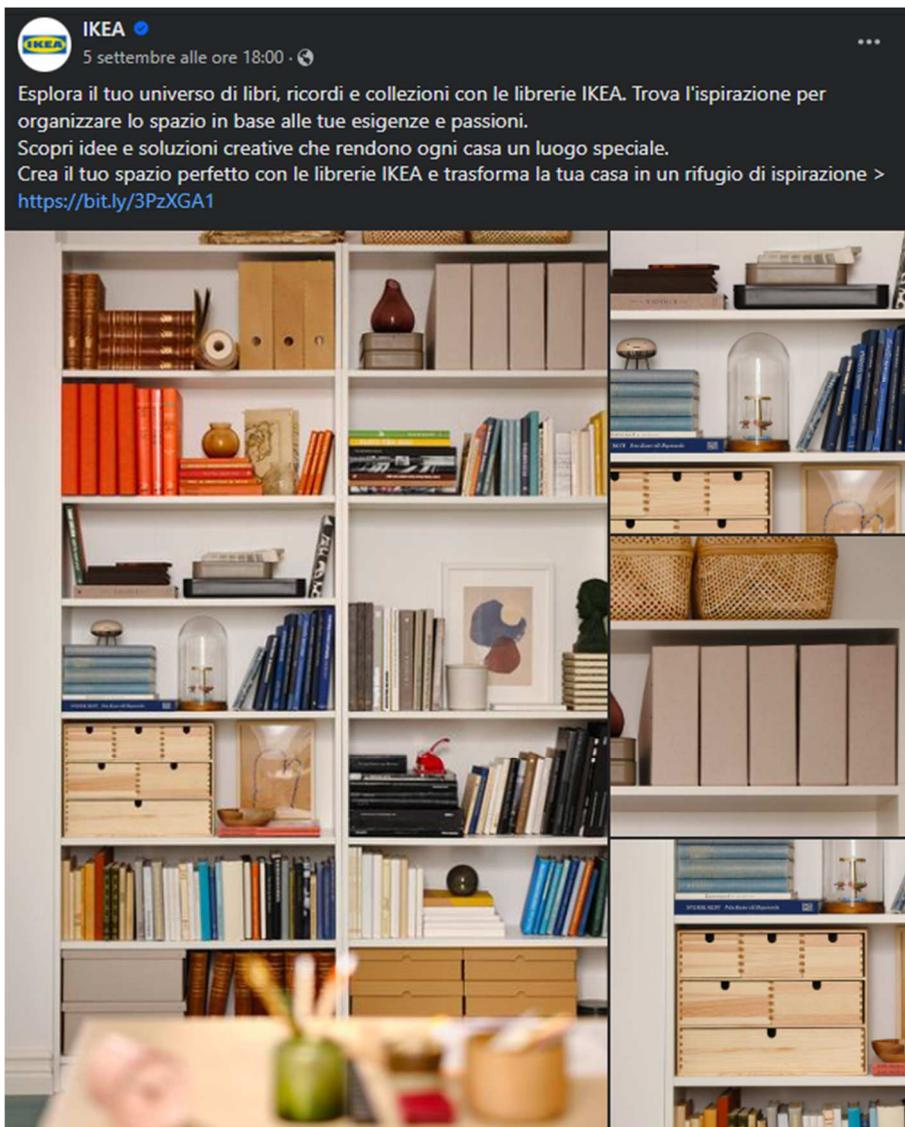
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### Content B: ChatGPT's version



Imagine scrolling through social and seeing this post, try to focus on the caption where it says:

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Have you ever used it?

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- No (continue on section 4.4)

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- Other
- I prefer not to specify

What is your current occupation?

- Worker
- Student
- Other

Indicate the last level of education you obtained:

- High school diploma
- Bachelor's degree
- Master's degree
- Other