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Impact of Generative Artificial Intelligence: special focus on education and work

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Abstract

The topic of Generative Artificial Intelligence has emerged as one of the most trendy topics, dividing opinions. This technology starts being increasingly relevant in lives of those who are technologically aware, both professionally and educationally. Its versatility and effectiveness have provided its users with enormous satisfaction, while others prefer to continue defending a traditional way of perceiving the world, standing against the development and spread of this technology.

In a world increasingly characterised by the constant search for efficiency and optimization of available resources, Generative Artificial Intelligence has been positioned so you can rely on it. In this context, the present study aims to investigate how Generative Artificial Intelligence has revolutionized and impacted human life routines, focusing also on how students and workers are managing it. Understanding how education systems and companies are defending their interests over the propagation of a technology that has been changing the classic paradigm while users and society are consciously trying to take advantage of all Generative Artificial Intelligence can proportionate.

The information shared is crucial not only to understand how people perceive Generative Artificial Intelligence and its acceptance but also to draw some expectations for the future. Through some analysis driven, including the launch of a survey with 199 valid responses, some conclusions can be taken: younger generations are dealing better with the dissemination of this technology and are in a favourable position to gather rewards when compared to older generations, who remain hesitant and showing resistance.

The study's sample is considered not representative as the amount of responses collected is not enough to really generalize conclusions. However, is important to highlight the pertinence of the study as it allows to draw very pertinent conclusions about the sample studied.

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I. Introduction

1.1. Context and Motivation

Digital transformation and Artificial Intelligence are major challenges worldwide, representing new threats while providing new opportunities among all different sectors and industries. The swift development of technologies has reshaped the landscape of its adoption, forcing organizations to adapt or assume the risk of obsolescence. While digital transformation promises the opportunity to increase efficiency, productivity, and innovation, revolutionizing processes, decision-making, and customer experiences, it also brings up issues regarding vulnerabilities, job displacement ethical dilemmas surrounding data privacy, algorithmic bias, and the social impact of automation. As the world navigates through these challenges, it is imperative to balance embracing technological progress and mitigating its associated risks to ensure a sustainable and inclusive future.

The topic was born long ago, and the most astute researchers and philosophers began drawing up deeper theories about technology and its growing footprint. Statements such as the one uttered by Prof Stephen Hawking, one of the most prestigious Britain's pre-eminent scientists, claiming that "The development of full Artificial Intelligence could spell the end of the human race." (Cellan-Jones, 2014) alarm bells rang. Among all the tools Artificial Intelligence has developed, Generative Artificial Intelligence emerged recently as the one requiring more attention. Its ability to create new and original content has garnered significant interest from researchers, businesses, and civils due to its potential to evolve absolutely all who give this technology an opportunity. Word of mouth and its effectiveness worked as the better representatives of this technology, demonstrating the Generative Artificial Intelligence's strengths and raising it to the authority it currently occupies. According to Orchard and Leszek Tasiemski (2023) "It can be assumed that the adoption of Generative AI technologies will drive a structural change in the global job market"."

1.2. Research questions and Objectives

As individuals and organizations make use of Generative Artificial Intelligence to boost operations while safeguarding efficiency and competitiveness, understanding its implications becomes imperative. Therefore, the present dissertation aims to study the relevance of such significant technology, measuring its impact on today's daily operations

and routines, specially its applicability in professional and educational fields. Being proved Generative Artificial Intelligence is developing extremely fast, and knowing in advance that Generative Artificial Intelligence has a special usefulness for students and workers, the focus will be on how the two groups perceive this technology, using as variables the frequency of use and the degree of satisfaction. The main objective is to set clear how the two groups are reacting to coexistence with Generative Artificial Intelligence while at the same time trying to detect patterns in its behaviour and preferences.

1.3. Methodological Approach

For the purpose of the present thesis and to address the Generative Artificial Intelligence topic the most comprehensively possible, an exhaustive literature review was performed, guaranteeing the coverage of the necessary information to fully understand the Generative Artificial Intelligence concept and inherent externalities, getting familiar with MFW' 's objectives. Additionally, a survey was performed to get direct feedback from respondents regarding the utilization of Generative Artificial Intelligence technology and its satisfaction, getting access to specific details crucial for a more robust and detailed analysis, with the primary goal of clarifying the concerns brought up in the perspective of this thesis's goals. In order to meet the objectives of this work, an in-depth analysis of the results obtained through the survey will be conducted, detecting patterns of preference in the sample used that can be generalised and converted into reliable conclusions.

1.4. Structure of the Dissertation

The remainder of the paper is organized as follows. In the second chapter, a look in depth at the current state of available literature to evaluate precisely and minutely what is already written regarding the topic, guaranteeing the disclosure of the necessary information to fully understand the Generative Artificial Intelligence concept and inherent externalities. In the third chapter, is pointed out the methodological approach used to fulfil the objectives of the present MFW, making clear the rational behind every step. In the fourth chapter, the presentation and interpretation of the results can be found, which are further discussed in more detail in chapter five. Chapter six provides the main conclusions, including recommendations for future research and limitations of this study.

II. Literature Review

2.1. Artificial Intelligence

As the thematic of the impact of Generative Artificial Intelligence on human routines, with a particular focus on education and work, it is essential to understand the structure behind this type of technology. Considering it, I would like to start by defining and deeply explaining the artificial intelligence concept, passing through its capabilities, the dilemma between augmentation and automation, and the controversial legal side.

2.1.1. Definition

To understand the concept of artificial intelligence, it is necessary first to understand the notions of "Artificial" and "Intelligence" separately. "Artificial" refers to something made by humans rather than occurring naturally (Mikalef & Gupta, 2021). "Intelligence" involves mental activities like learning, reasoning, and understanding (Lichtenthaler, 2019). By combining these two notions, artificial intelligence can be understood as humans making machines capable of simulating intelligence (Wamba-Taguimdje et al., 2020).

A strict definition of Artificial Intelligence does not meet consensus. Different authors defend different definitions, but despite some diverging points, the most highly regarded definitions have meeting points. It is identifiable that there are two main ways of defining AI - as a tool that solves a specific task that could be impossible or very time- consuming for a human to complete (Makarius et al., 2020) and as a system that mimics human intelligence and cognitive processes, such as, interpreting, making inferences, and learning (Mikalef & Gupta, 2021).

Based on a study published in 2021, there is a lack of clarity concerning the concept and classification of AI in literature resources, with 54 of the 98 primary literature sources of the study giving no clear definition of AI relevant to the study, while of the remaining 44 sources, seven defined AI without referencing it and 37 used a total of 28 different definitions of AI (Collins et al., 2021).

For this dissertation, we adopt the stance that Artificial Intelligence is an applied technology that attempts to provide systems the ability to recognise and understand data, drawing conclusions and inferences to fulfil predefined societal and organisational objectives.

2.1.2. Capabilities

The widespread adoption of digital technologies and the increasing availability of data have presented people and organisations with a significant challenge: how to effectively handle the enormous volume of data to promote innovation, maximise effectiveness in the process, taking out the most of this technology. Specifically in business, the continuous proliferation of big data available (BD) was a clear incentive for the need for business analytics (BA) tools, ensuring that companies get the most out of the business intelligence (BI) world (Horani et al., 2023). In order to overcome the concept of Artificial Intelligence's inherent ambiguity, a list of capabilities is an excellent addition to better recognise its strengths and describe them.

AI' 's Capabilities	**Description**
Predictive Analytics	Roughly refers to the practice of using machine learning models for prediction purposes, learning through detecting correlations or patterns in data (Aparicio, et al, 2019, Rainer Mühlhoff & Ruschemeier, 2024).
Intelligent Process Automation (IPA)	It introduces a level of decision-making into processes or tasks with the objective of meeting demanding requirements, imparting speed, reliability, and efficiency. Its ability to comprehend context, learn, iterate, and eventually surpass human performance over time constitutes a significant advantage. (Wirtz et al., 2020)
Machine Learning	The use and development of computer systems that are able to learn without explicit instructions by using algorithms and statistical models to draw inferences from patterns in data. (Müller & Guido, 2017)
Natural Language Processing (NLP)	Allow computers to process human language, as text or voice, and synthesise a relevant response in the form of speech and natural language. NLP is the foundation of speech recognition. (Clark et al., 2013)
Machine Vision	Machine vision defines the field that enables devices to acquire, process, understand and analyse digital images and videos, and extract useful information (Xiao et al., 2023).
Expert Systems	Expert systems are a mean through which share and distribute knowledge, being it acquired directly or indirectly from domain experts of different scientific areas (Saibene et al., 2021).
Problem Solving and Knowledge Representation	Produces a set of statements that express facts, relations, and conditions in formal languages or schemes upon which reasoning can be performed to determine actions or reach conclusions (Qin, 2020).

Table 1 - AI' 's Capabilities.

Some of the discrediting around Artificial Intelligence may be rooted in a fundamental misunderstanding of its capabilities and potential applications, strongly based on the doubt between the known and the highly unknown. Moreover, fear of job displacement and societal disruption has historically accompanied major technological shifts.

2.1.3. Augmentation x Automation

In contrast to automation, which suggests that machines take completely over human work, augmentation refers to the close cooperation between humans and technology to complete a task (Raisch & Krakowski, 2021).

According to Daugherty and Wilson (2018), the relationship between automation and augmentation could be seen as a trade-off decision: organisations seeking to apply Artificial Intelligence have the option of either automating the work or using an augmentation strategy. If they choose automation, they give the work to a machine, and workers become little or no longer involved at all, searching for a more logical and effective process. Augmentation, on the other hand, suggests ongoing close interactions between people and machines. With this strategy, human characteristics such as intuition and common sense may be used to complement a machine's work. According to the referred authors, the nature of the task should determine whether organizations opt for one or the other approach.

Paradox theory warns that a trade-off perspective does not adequately represent reality (Smith & Lewis, 2011). According to Schad et al. (2016), the fundamental characteristics of a paradox are interdependence and contradiction, which create constant tension. Automation and augmentation are incompatible because companies select one strategy over the other to handle a certain work at a specific moment in time. Complex augmented tasks depend on specialist knowledge that is difficult to codify, whereas rule-based automation permits delegation as the rules can be clearly established and documented (Brynjolfsson & Mitchell, 2017).

Social justice and equity may be impacted by the use of artificial intelligence in management. Automation might reduce human biases, which would promise better equality and fairness by taking humans out of the loop. For instance, consistent machine processing and automated applicant evaluation based on pre-set standards may help remove latent prejudices carried by recruiters when making choices about potential candidates (Raisch & Krakowski, 2021).

According to Lindebaum et al. (2019), automation could culminate in a technologically

totalitarian regime with strict and oppressive laws that mark the end of human choice. Conversely, utopian thinkers such as Daugherty and Wilson (2018), for Harvard Business Review Press, claim that technology will not take over human control and that people will instead employ augmentation to provide significant benefits for society and organisations.

The biggest concern related to augmentation and automation implementation is that it could lead to social problems, mainly job losses and decreasing importance of the insights workers could bring. According to Ruiz-Real et al. (2020), "Companies should be aware of the value of the human workforce in solving unexpected problems and their ad hoc solutions, situations in which automation of any kind can falter".

Nevertheless, based on a statistic provided by Di Battista et al. (2023) for the World Economic Forum (WEF) report, only 25% of surveyed companies anticipate it to result in job losses. Emphasising, and according to Thormundsson (2023) for Statista, between 2023-2027, Artificial Intelligence is more expected to result in a positive impact on the economy worldwide, with only 23 percent of organizations expecting the technology to displace jobs.

According to Singh and Chouhan (2021), in the very near future, with the proper use of technology, we can experience the beginning of a new industrial era, which shall be bound to change our future completely.

2.1.4. Ethics and Legislation

Nowadays, Artificial Intelligence plays a role in facilitating criminal activities or engaging in illicit actions autonomously (King et al., 2019). Artificial intelligence can actively learn and improve its skills over time, being able to create techniques to escape from legal institutions and politics, making it more difficult to track its movements.

There are not many rules or regulations in place right now that address the particular challenges that arise from artificial intelligence. Since technology is developing so quickly, it is challenging to stay fully aware of its progress and control it. So, regulators must carefully balance the need for supervision with the encouragement of ongoing Artificial Intelligence progress, which has the potential to lead to significant and lucrative breakthroughs (Mahmud, 2022).

However, knowing in advance that the lack of legislation is a reality defended by so many experts in the field, the need of regulate it carefully is also extensively defended. If the ones who have worked in exploring the artificial intelligence world start to become easy

targets for criminal negligence activities by authorities, they may be discouraged from developing new and unknown areas for fear of being punished. As a result, governments and institutions, in general, must think about achieving the ideal equilibrium between innovation and transparency (Čerka et al., 2017). Guihot et al. (2017) also stand for being crucial in delineating the specific projects that AI engineers ought to undertake and those they should steer clear of, again fighting for transparency and clarity.

Luize and Serafim (2023) argue that as Artificial Intelligence becomes more integral to our lives, ethics should no longer be witnessed as secondary but rather as a mandatory requirement. Along the same line, David De Cremer and Narayanan (2023) advocate retaining human responsibility in decision-making despite Artificial Intelligence advancements. Both agreed that human decision-makers bear an enduring and pivotal responsibility as AI systems gain widespread integration within our institutions and communities. Their role is immutable, and they must ensure AI-augmented decisions contribute to societal well-being and justice. The moral compass of humans emerges as the ultimate guiding force in directing the use of these potent technologies for the greater social good. Without a meticulously calibrated moral compass, machines and humans would be adrift in ethical uncertainty.

Lu et al. (2022) conducted interviews with 21 professionals and concluded that the current Artificial Intelligence ethics guidelines are vague and do not offer specific instructions on how to build Artificial Intelligence systems that are ethically suitable. Additionally, the results of the investigation show that artificial intelligence ethical guidelines are frequently disregarded and perceived as ad hoc.

Ville Vakkuri et al. (2022) carried out a study of 249 practitioners, and the findings show that the majority of the firms neglected to take society and environmental concerns into account while building Artificial Intelligence systems.

2.1.5. Challenges and Benefits

As stated by Manyika et al. (2018) from the McKinsey Global Institute, "Alongside the economic benefits and challenges, AI will impact society in a positive way, as it helps tackle societal challenges ranging from health and nutrition to equality and inclusion. However, it also creates pitfalls that need to be addressed, including unintended consequences and misuse".

According to the same source, a prominent challenge arises from the inherent risk of bias

and discrimination embedded in Artificial Intelligence systems. Although, as well as being prejudicial to society, artificial intelligence could also position itself side by side with social concerns, confronting inequalities and working towards a fairer world. Therefore, transparency serves as a pivotal challenge in fostering societal trust, highlighting the lack of clarity in decision-making processes raises concerns about accountability and user trust.

Relying on Q.ai - Powering a Personal Wealth Movement (2022), despite its potential for efficiency and innovation, Artificial Intelligence algorithms can unintentionally maintain ethnic prejudices, resulting in unfair outcomes. The automation of AI streamlines processes reduce the tension associated with repeated work, giving space for the potential of human creativity. However, this efficiency presents a double-edged mirror, raising concerns about job displacement and economic shifts.

According to Perifanis and Kitsios (2023), the whole world must be mindful of how this technology can be used to create new opportunities and unlock new forms of value. This requires a deep understanding of the technology itself and a willingness to question established norms and explore uncharted territories.

2.2. Generative Artificial Intelligence

In the landscape of artificial intelligence, generative artificial intelligence is a revolutionary force that redefines the scope of creativity and innovation, having the ability to create original content, whether it be writing, pictures, or other media. The emergence of Generative Artificial Intelligence has brought forward an era in which intelligent machines showcase a unique capacity to create material that mirrors the creative process of humans (Carmen Tamara Ungureanu & Aura Elena Amironesei, 2024).

2.1.1. Definition

According to the report ““Enterprise Generative AI: State of the Market”“ (2023) , published on International Business Machines Corporation (IBM), it defines Generative Artificial Intelligence as deep-learning models that can generate high-quality text, images, and other content based on the data they were trained on. Kalyan Prasad Agrawal (2023) adds to the established definition, arguing that unlike other Artificial Intelligence tools, which are designed to classify, recognize, or predict specific patterns from existing data, Generative Artificial Intelligence models are special due to the skill of learning to generate new data by analysing patterns and relationships within a given dataset.

According to Heneghan and Henninger (2023) , Generative Artificial Intelligence models demonstrate the transformative potential of technology, enhancing productivity and simplifying tasks. Despite their benefits, its pose risks that organizations and individuals must acknowledge. Nevertheless, its integration into daily life is inevitable, both personally and professionally, prompting the need to embrace them cautiously.

2.1.2. An Overview of the literature

Conducting bibliometric research on the topic to effectively test its increased significance is suggested, as well as a look into the Google Trends results. With ChatGPT in blue, Soccer in red, and American Football in yellow, it is easily observed how the blue line is growing and getting closer to the red one. Soccer is known as the "king sport" all over the world and is consistently the one that generates the most media coverage and speculation. Even so, we can observe that the difference compared with ChatGPT has been narrowing over time, and being hard to predict what the future will hold if this trend continues.

ChatGPT was not a topic of interested in the initial of period in study, but suddenly required more attention, and by analysing tendencies, it is expected that users continue to seek more knowledge on the subject as it assumes a growing relevance and global prominence.

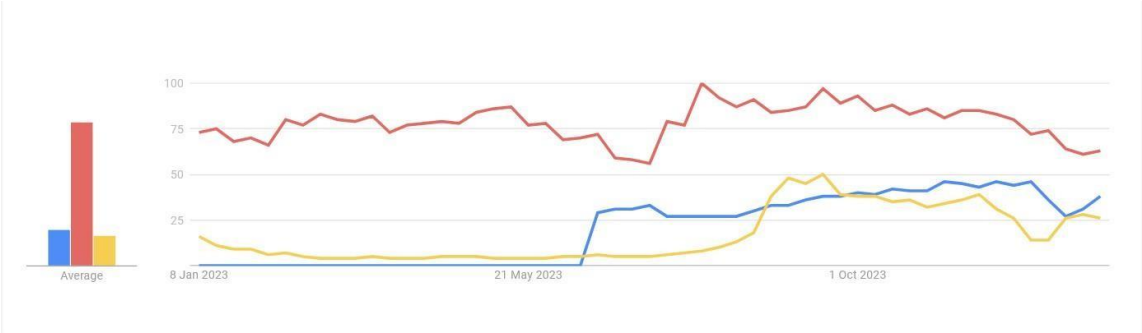

Figure 1 - Google Trends Results

Also, and relying on statistics extracted from Scopus, it was identified the amount of documents released by year regarding the topic, conditioning the research by title ("Generative AI" or "Generative Artificial Intelligence") and limiting it by language ("English").

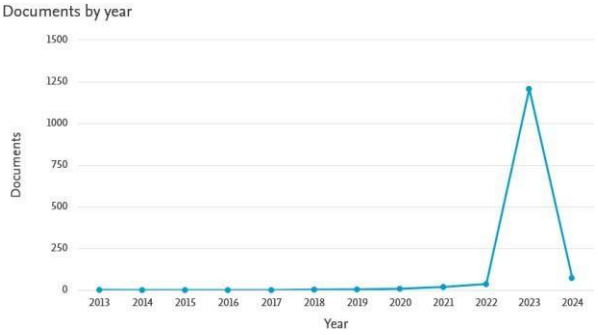

Figure 2 – Scopus: documents released, by year, about Generative Artificial Intelligence

It is promptly concluded that the documents submitted notoriously achieve their peak in 2023, being quite irrelevant until then. This information is crucial also to highlight that although the topic turned highly relevant recently, the dark side is the number of documents launched was so huge that the likelihood of divergent information is real, making it more difficult to reach a consensus and requiring more energy to formulate a structural opinion.

Also, through a quickly look into the graphic presented below, the point is to understand Generative Artificial Intelligence is possible to be relevant and interesting to study from different perspectives and many fields.

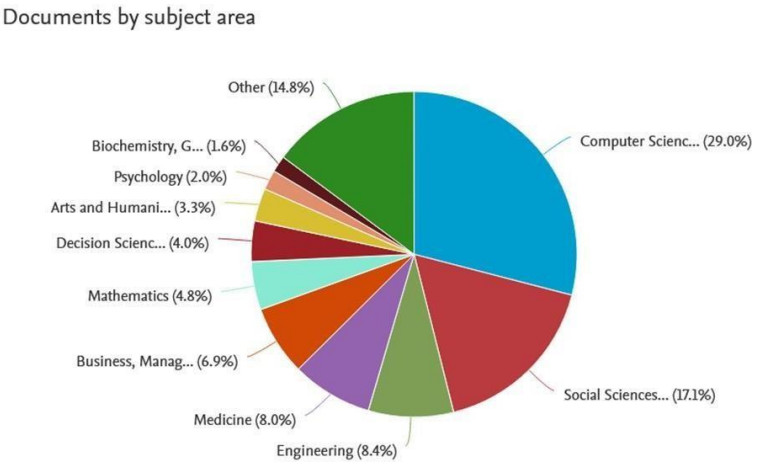

Figure 3 - Subject Area of Generative Artificial Intelligence documents

Deeply navigating in the graphic, "Computer Science" and "Social Science" are dominating the study applications fields, symbolising the magnitude of the impact for both technology and society, as already mentioned. Regarding the "Business and Management" domain, a small percentage of articles are dedicated to it, being a surprise

and meaning a lot could be investigated yet.

2.1.3. Adoption in business

Businesses must adapt to the actual environment as they cross this new landscape and strategically use Generative Artificial Intelligence's capabilities to increase efficiency, promote innovation, and increase competitiveness. Businesses' future success will depend on how well they adopt Generative Artificial technologies, how well they incorporate them into existing frameworks, and how much they continuously look for new ways to expand and stand out from the competition (Kanbach et al., 2023).

Considerable speculation persists regarding the practical impact of Generative Artificial Intelligence on delivering tangible business results. However, there is a consensus regarding the anticipated outcomes its expected from the integration of this technology. According to the report "Enterprise Generative AI: State of the Market" (2023), published by International Business Machines Corporation (IBM) in partnership with Oxford Economics, surveying almost 400 executives across the world and 200 CEOs in the US, it was pointed out that expanded capabilities and business growth are the most popular objectives when implementing Generative Artificial Intelligence, being the costs reduction the reason with lower impact. Relying on this source, "64% of CEOs say they face significant pressure from investors, creditors, and lenders to accelerate the adoption of generative AI. Moreover, over half say their employees are pushing for faster adoption. Consequently, investment in generative AI is expected to grow by four times over the next two to three years - although it remains, at least for now, a fraction of total AI spend".

There are a lot of theoretical frameworks to close the readiness gap and accelerate the adoption of Generative Artificial Intelligence. The same source mentioned above suggested that for leaders and organizations to be better prepared when the adoption starts, is crucial to focus on three distinct areas: Organization and skills, Data and platform, and Risk and governance, believing the interlinked domains collectively provide a holistic blueprint for organizations navigating the complex world of AI integration, ensuring ethical practices, technological proficiency, and risk mitigation strategies.

Kalyan Prasad Agrawal (2023) applied the TOE (Technological, Organizational, and Environmental) framework to adopt Generative Artificial Intelligence into companies. The same author, in 2017, had already applied the mentioned framework with a focus on the assimilation of big data analytics and examined how factors outlined in the TOE

framework influenced this adoption process. The proposed model offers a holistic comprehension of nine factors: in the technological domain, complexity, relative advantage, and compatibility are the conditions pointed out. Regarding the organizational field, technological resource proficiency, absorptive capacity, and organizational size are the key characteristics that are considered. Finally, in the environmental section, competition intensity, environmental uncertainty, and regulatory support are seen as crucial for Generative Artificial Intelligence adoption.

From another perspective, Baxter and Schlesinger (2023), writing for Harvard Business Review, importantly defended "Generative AI should be seen as a way to augment human capabilities and empower communities, not replace or displace them". Both pointed out some tactical tips for safety integration based on the prevailing trend in organizations that lean towards the integration of Generative Artificial Intelligence tools rather than developing proprietary solutions. In summary, ensuring high-quality and up- to-date data is paramount for the effective functioning of tools, with human oversight to mitigate potential errors and ensure responsible usage. It emphasized the need for ongoing management rather than passive deployment, soliciting feedback from distinct stakeholders for risk identification and mitigation.

As stated by Turner (2022), 30% of outbound messages from large organizations will be synthetically generated. Also, according to Combs et al. (2022) in the AI Risk Survey Report conducted by KPMG in the US in September 2022, 85% of respondents expect an increase in the use of Artificial Intelligence and predictive analytics models.

By interpreting these ratios is easily understood that Generative AI will become established in the job market, impacting almost every business sector:

- **Audit/compliance**

According to Heneghan and Henninger (2023), the integration of Generative Artificial Intelligence technologies in auditing processes is evident in the automation of audit reviews, including balance sheets, income statements, and taxation documents. Streamlining fact-finding and detailed audit assessments through query format applications. In addition to lowering operational risks related to human error, this also contributes to fraud detection.

- **Human Resources**

As stated by Heneghan and Henninger (2023), in Human Resources, the utilization of Generative Artificial Intelligence models plays a crucial role in candidate selection processes. These models undergo training on job descriptions and relevant skills data, assisting in the recruitment of suitable applicants for jobs.

- **Operations**

Generative Artificial Intelligence is a booster for simplifying business operations, ranging from drafting emails and preparing requests for proposals to conducting competitive analyses and comprehensive market research, contributing to bumped operational efficiency and strategic decision-making (Heneghan & Henninger, 2023).

- **Legal and Organizational Governance**

In the legal sphere, there are also multiple uses for Generative Artificial Intelligence, from replacing old search instruments like Wikipedia and Google when it comes to legal provisions and official documents issued by authorities, to searching case law, and even generating contracts and legal advice. Additionally, Generative Artificial Intelligence contributes to legal research processes by surfacing legal citations and source links, efficiently searching for pertinent references and case examples (Carmen Tamara Ungureanu & Aura Elena Amironesei, 2024).

However, as a recent case has proved, legal advice provided by Generative AI without being verified by a human could be tragic. As turned public by Weiser and Schweber (2023), in the Federal District Court, a lawyer used ChatGPT to produce a legal brief for a case that was full of fake legal citations and judicial opinions. Alongside this, currently, in the US, judges have started requesting lawyers to certify that they did not use AI to draft legal documents without human review or even disclosure of the utilization of Generative AI tools (Merken, 2023).

- **Marketing**

Notably, Generative Artificial Intelligence can contribute to simplifying campaign language by identifying alternative word choices that maintain coherence across various languages and possibly being clearer for an audience, increasing engagement (Łodzikowski et al., 2024).

In customer service, automation offers more efficient solutions, better understanding, and

better addressing of customer needs, enhancing user experience, reducing costs, and improving overall efficiency. Automated chatbots, one of the greatest Generative Artificial Intelligence achievements, are indispensable for prompt customer interaction in e-commerce (Chen et al., 2023).

The ability of Generative Artificial Intelligence to learn from huge amounts of data enables it to check optimal strategies by laying insights from diverse advertising campaigns. Additionally, its applications range from generating new and innovative advertising content, including advertisements, commercial texts, logos, and even slogans, to strategic marketing and branding initiatives (Garon, 2023).

According to a study conducted by IDC Future Enterprise Resiliency & Spending Survey Wave (2022), it is expected that 45% of executives considered the adoption of Generative Artificial Intelligence to refine their marketing skills.

Adding, based on Salesforce (2023), some conclusions could be taken:

- ❖ Experts in the field believe that Generative Artificial Intelligence may save them over five hours of labour per week, equally over a month annually, and allow them to concentrate on activities that actually provide them.
- ❖ 76% of industry experts who use Generative Artificial Intelligence nowadays use it for essential assignments, including copywriting and content creation.
- ❖ It is evident that too much work remains necessary, with 67% of marketers claiming their company is not set up correctly for Generative Artificial Intelligence adoption. Additionally, 43% admit being unprepared to fully capitalise on it.

- **Decision Support**

Generative Artificial Intelligence has obtained widespread adoption due to its versatile support across various management sectors and decision-making processes. This could be particularly advantageous for individual investors, who are lacking on professional analysis skills, providing valuable assistance with reliable investment project selection. As highlighted by Zaremba and Demir (2023), they may analyse financial data and classify it according to specified categories.

- **Fashion Industry**

In the fashion industry, Generative Artificial Intelligence has become a key tool,

converting many facets of fashion displays and promotions. By applying models to create virtual exhibitions, fashion brands can significantly reduce costs associated with the traditional process, namely photography, makeup, and hairstyling. Generative Artificial Intelligence is being integrated into fashion events held in the metaverse, where Artificial Intelligence models elegantly wear replicas of company clothes. As stated by Carmen Tamara Ungureanu and Aura Elena Amironesei (2024), this innovative approach changes the conventional runway experience.

- **Journalistic Field**

Within the realm of journalism, Generative Artificial Intelligence plays a fundamental role nowadays, mainly in content creation for websites and newspapers, as mentioned by (Garon, 2023). This technology is capable of generating articles that undergo a slight review and adjustment process before publication, demonstrating its incredible talent to contribute to good journalistic content production.

- **Gaming Industry**

The gaming industry stands as a prominent beneficiary of Generative Artificial Intelligence (Gatto, 2023). Considering how much evidence the business industry depends on innovative content creation and excellently crafted programming, Generative Artificial Intelligence is essential since it helps write computer code and produce movies, both of which are necessary for making immersive and interesting games.

2.1.4. Impact on Creativity and Human Interactions

As previously stated during the present dissertation, Generative Artificial Intelligence has, over time, been one of its best advantages. In fact, by accelerating each step of a process, efficiency increases, and the real-time for activities requiring further detail is higher - the users can rely on some tasks to the machine to dedicate at all to the refined ones.

In the realm of personal and domestic use, Generative Artificial Intelligence appears as a tool that, beyond amplifying creativity and enhancing human analytical skills, also introduces potential pitfalls, making the susceptibility to misinformation considerably stronger. Also, there are demonstrations and evidence that this technology can help society overcome challenges - it can augment creativity and help generate and identify both novel ideas and improve the quality of unfinished ideas (Wilson & Daugherty, 2018).

According to Eapen et al. (2023), there are different scenarios where creativity within

human process creation is alongside Generative Artificial Intelligence. The technology could be a source of ideas – stimulating the machine makes it possible to pull out some fresh ideas that, without its help, would never come. Without technology assistance, many of them end up being dumped or disregarded, making it difficult to evaluate and dedicate time and brain to more than one idea at the same time.

Also, during the first steps of new product development, atypical and uncommon ideas created by Generative Artificial Intelligence can inspire creators and users to think beyond their preconceptions and go out of their comfort zone. This approach can lead to solutions that humans might never have imagined and that will never achieve using a traditional approach. Following this, some biases and stereotypes are overcome, such as functional fixedness, meaning a cognitive bias that limits a person to use an object only in the way it is traditionally used., and they also "Einstellung effect", referring to a person's predisposition to solve a given problem in a specific manner even though better or more appropriate methods of solving the problem exist, negatively affected by previous experiences (Eapen et al., 2023).

Additionally, it is also reasonable that people who lack expertise may have the ability to identify novel ideas but do not have the skill required to get the details and explore deeper making the ideas feasible – meaning incapacity of translate raw ideas into coherent ones. Generative Artificial Intelligence can go beyond simple "Yes or No" questions and help humans evaluate dimensions of creativity, exploring new fields and acting purely as a human (Eapen et al., 2023).

2.1.5. Impact on Education

Generative Artificial Intelligence presents universities with an opportunity to start structural changes in their teaching and learning frameworks. It is imperative for teachers to be given the time and resources to become proficient and better prepared and perhaps modify their lessons to encourage critical and ethical interaction with Generative Artificial Intelligence. Moreover, universities should also help in this process, calling for a solid commitment to safety, privacy, and transparency with an emphasis on enhancing human connection while raising the standard of instruction overall (Farrelly & Baker, 2023).

Few universities offered immediate direction, initially leaving decisions about how and when to use Generative Artificial Intelligence to individual teachers who had been burned out from dealing with the pandemic's consequences. This context of uncertainty and lack

of a single and consolidated response has left all professionals in the field, as well as students, wandering and relying on solutions based on intuition rather than reason. Higher education should not wait for a committee-approved strategy to start acting proactively in the topic (Tasneem & Panthagani, 2023). Adding, as purely defended by Eaton (2023), it is unfounded and unhelpful to advise students to just stay away from Generative Artificial Intelligence.

Students need boundaries so they can expand their understanding within a disciplinary framework consistent worldwide. Some departments and even institutions have forbidden the use of Generative Artificial Intelligence in classes and tasks, defending plagiarism rights and integrity. Time is better spent helping students using AI responsibly than trying to criminalize it (Ward et al., 2024).

The University of Michigan provides a good example of how to do that by creating consensus guidelines and proposing its own Generative Artificial Intelligence tools for learning and research (Burns, 2023). Courses where Generative Artificial Intelligence is being incorporated must adapt fast and frequently to avoid being obsolete for businesses and recruiters, and teachers who reject the technology in their classrooms have to be in mind they will not be able to adequately prepare students for current job market and civic life.

It is evident that a Human-AI cooperation will become essential in the future society, where both parties contribute their particular expertise and also work alongside to come up with something that is more educationally effective than either operating alone. (Hellman et al., 2019).

However, it is imperative that we do not undervalue the detrimental effects that this type of technology may have on the educational process. The Berkman Klein Centre for Internet & Society at Harvard University was an open space to embrace this theme. Speakers in the discussion questioned if using Generative Artificial Intelligence would render inequality worse or better. Academic performance gaps might be exacerbated by unequal access to such technology based on pre-existing socioeconomic patterns. Differences in local educational standards and policies impact directly the experience of people, particularly students, with Generative Artificial Intelligence being crucial to apply a universal guideline (Jeen Ha et al., 2023).

In May of 2023, UNESCO released a global survey of over 450 schools and universities,

where fewer than 10% have created specific guidelines and/or institutional regulations for the usage of Generative Artificial Intelligence applications. The study emphasises the need for education to continue being a fundamentally socially interactive pursuit. It reminds us that kids and teenagers suffered brutally academically and socially during the Covid-19 pandemic, when digital technology took over as the main educational tool. The study issues an alert, stating that Generative Artificial Intelligence in particular, has the capacity to both weaken teachers' authority and fuel calls for further automation of education - less teachers in schools equals less education in schools, highlighting the need of prioritizing well-managed institutions (Giannini, 2023).

Despite the benefits cited, it is important to be aware of the possible drawbacks of the material generated, including the chance for bias, inaccuracy, and inappropriate use due to taking information out of context, as well as an output of out-of-date or untrustworthy information (GOV.UK, 2023).

III. Methodology

As mentioned, the main goal of the present study is to measure the impact of Generative Artificial Intelligence on today's daily operations and routines, with a special focus on professional and educational fields, and try to analyse how both groups are reacting to coexistence with the technology mentioned, looking for their preferences and any disparities.

To address the objectives selected is possible through many approaches (Costa et al., 2020; Costa et al., 2024), differing not only in the nature of the data processed but also in the method through which that data is collected. Regarding the methods existing to collect data, primary and secondary data are two different concepts: primary is the procedure by which data is collected directly from the source, and secondary is composed of the data collected by someone other than the primary user. Relatively to the nature of the data, it can be characterized as qualitative or quantitative, depending on whether we are dealing with numerical or more descriptive and non-numerical data. As a basis for the present study and to address its objectives, quantitative data will be analysed and collected through primary methods.

Regarding the conception of the Literature Review chapter, it is important to mention using Artificial Intelligence to address its purpose better. To improve efficiency during the searching 'articles' process, Scispace was used, an Artificial Intelligence tool

to filter documents, certifying that it is dedicated time only to the ones that proved to have relevant information to complete and engage with the work being done.

It was decided to conduct a survey in light of the objectives set, which are extremely crucial to extracting people's perceptions directly regarding the Generative Artificial Intelligence technology. It was not possible to meet the objectives and extract conclusions about how people use it, how often, and if they are satisfied when using it without getting feedback directly from users. Therefore, the survey aims to understand and clarify the relevance of Generative Artificial Intelligence, which has been assumed in personal and professional routines for different generations, and how the same generations are reacting.

The questionnaires were developed using the professional software Google Forms and shared via social media, which allowed a broad reach of respondents. 199 responses were collected, including 79 responses regarding the education branch and 169 for the professional branch. The sample is considered not representative as the number of responses collected is not enough to really generalize conclusions about the Metropolitan Area of Lisbon population. It was intended to collect as many responses as possible from people of different ages in the Lisboa Metropolitan Area, with the aim of drawing conclusions from this sample for broader groups. More responses would make this survey more consistent, but if not possible, it is assumed the number of responses collected is enough to provide useful findings.

The first section of the survey includes a brief introduction to the Generative Artificial Intelligence concept to guarantee every respondent is conscious of the technology in the study. Starting by questioning their age and gender, following some introductory questions to extract responses about the previous knowledge on the Generative Artificial Intelligence technology, frequency of use, and degree of satisfaction, the objective is to formulate groups based on age and to conclude how the different generations perceived the same events. Obviously, a student of 20 years old engages with technology completely differently when compared to an adult of 50 years old. This type of demographic data is very useful for making conclusions regarding the preferences and habits of the different groups of ages demonstrated, enabling comparisons.

The initial section is available for every respondent, and by using frequency of use and level of satisfaction as variables, we are directly safeguarding answers that are linked to the thesis's objectives: understanding how often users use Generative Artificial

Intelligence and having access to how satisfied they become with the final result, we can understand how they are managing their lives and routines simultaneously with the Generative Artificial Intelligence existence.

In the following sections, second and third, there are questions focused on two specific groups: students and workers, also considering ex-students or ex-workers who assumed this function in the last two years. The rationale behind it is that it is also relevant to a response of a person who is not a student anymore, but it was in the last year. Generative Artificial Intelligence is a recent topic, and it is a way to increase the sample size in a study while maintaining tight control of the restrictions imposed. To summarise, current or past students and workers were useful for the purpose of the survey as long as they attended education and work at the same time as the Generative Artificial Intelligence technology emerged. Therefore, the second section is only available for students and former students, and the third section is available only for the ones who are workers or ex-workers.

The second section is fully dedicated to education, which was conceived precisely to fulfill the objectives set for this thesis that are related specifically to this sector. In light of the questions posed, it is important to understand how impactful Generative Artificial Intelligence has been for students and how it has contributed to a paradigm shift.

Firstly, in the second section, the respondents are questioned whether they have already felt encouraged by educational institutions to use Generative Artificial Intelligence. Although not directly related to objectives, it aims to understand how institutions deal with technology, which certainly indirectly influences the utilization of technology by students. This follows a question regarding the utilization of Generative Artificial Intelligence to measure the number of respondents that already use it for educational purposes to encompass better if Generative Artificial Intelligence tools really turned into an alternative for students when performing educational tasks. The section analysed the students' perception of Generative Artificial Intelligence linked with the academic path to understanding and whether it is perceived as a good complement to the formation or as a barrier to learning. In this way, by responded all those questions, it is possible to extract conclusions regarding 'students' interest in the technology and inherent reliability – if students already use Generative Artificial Intelligence but they did not end with a good opinion, it will be evident when answering the final question, selecting the option stating the technologies is a barrier for a good learning.

The third section is fully dedicated to workers and was particularly designed to achieve the goals established for this thesis concerning the professional domain. It is essential to understand the influence of Generative Artificial Intelligence on workers and assess its importance in a possible paradigm shift.

The third section starts with a question to determine if workers feel a propitious environment in their jobs and if they should adopt Generative Artificial Intelligence in their tasks. It is key to understand if companies are encouraging employees to get in touch with this technology and are aware of the efficiency that could possibly be incremented because it is directly related to workers' utilization. This follows a question regarding the utilization of Generative Artificial Intelligence tools for professional reasons, to measure the number of workers who are really dedicating time to the technology, looking for more efficiency when compared to traditional methods. To conclude, the section remains one question about the perception of workers regarding the impact of Generative Artificial Intelligence, questioning if they perceive the technology in the study as a good complement to professional performance or instead think it limits creativity and problem-solving skills. In this way, this section entirely meets the objectives determined, making clearer the pertinence of Generative Artificial Intelligence for professional purposes and the impact it has assumed on a worker's day-to-day routines.

In the final section of the survey were launched some reflexive questions to give to the respondent an opportunity to position alongside the coexistence specifically with Generative Artificial Intelligence. A more emotional side was appealed, questioning about the world desired for its descendants, being the rationale behind the question an intention of getting an answer that is as truthful as possible and effectively reflects what the respondent thinks, based on the fact that we care more about our descendants that about ourselves. Also, to finalise the survey, questions about the interest of the respondents in training sessions about Generative Artificial Intelligence. In case of positive interest, some outcomes could be expected in scenarios where the user actually perceives this technology as something that could have a positive impact on their future, either professionally or in their daily life.

IV. Results

A survey was conducted for the present thesis, with 199 responses. The universe of this study would be individuals of both genders living in the Metropolitan Area of Lisbon, aged randomly to get a perception about the topic of different generations. The sample is considered not representative as the number of responses collected is not enough to generalize conclusions about the population of the Metropolitan Area of Lisbon.

The universe of the sample considered is characterised by a good balance between the 'respondents' gender – 52.8% are Female, and 47.2% are Male. Additionally, regarding its age, the respondents were mainly centred in two big groups: the ones ranged between 18-24 years old, representing 32.7% of the responses, and also the age group ranged between 41-50 years old, which represents 32.2% of the responses. The respondents belonging to the youngest (<18) and the oldest (>60) age groups proved to be not significant, considering the sample collected as picked up very few responses.

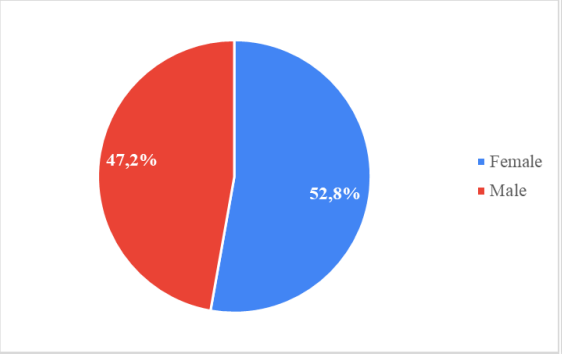

Figure 4 - Sample's Gender

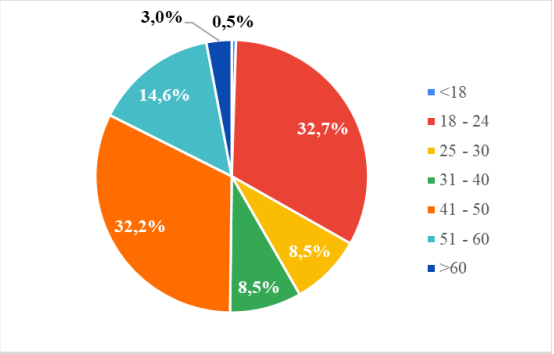

Figure 5 - Sample's Age by Group

Part of the analysis carried out below was based on the percentages directly extracted from the Google Forms questions and results, but others are the result of some calculations I made by myself, using as a basis the excel document extracted from Google Forms, making available information for detailed findings.

4.1. Impact of Generative Artificial Intelligence on daily-life

To address the objectives concerning the relevance of Generative Artificial Intelligence in people's lives and routines was used as variables the previous familiarity with the topic, the frequency of use, and the level of satisfaction with Generative Artificial Intelligence tools. Directly and indirectly, the information collected through this questions enables to understand the perception of the respondents about the technology in the study and also how they are managing the coexistence with it.

In the final section of the survey, respondents were further asked about its preference for a world with or without Generative Artificial Intelligence for their children, as well as whether they were interested in training sessions in the technology mentioned, which once again illustrates how respondents perceive technology and whether, upon reflection, they consider it to be a positive or negative complement, benefiting or harming society.

4.1.1. Previous familiarity with the Generative Artificial Intelligence

The survey started with a question about familiarity with the technology in the study. Although the beginning of the survey provides a brief introductory definition, it would be useful to understand if respondents were aware of Generative Artificial Intelligence or even if they are using it without knowing.

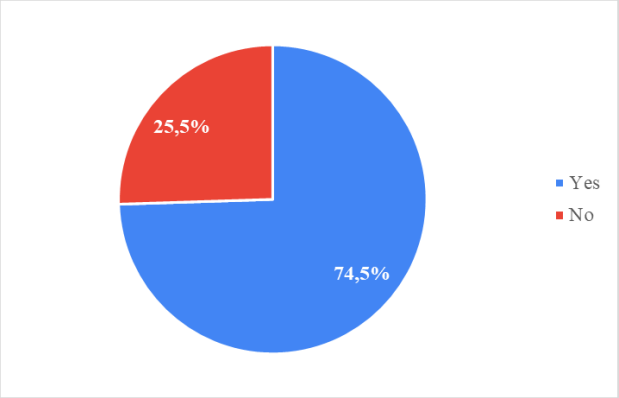

Figure 6 - Were you familiar with the concept of Generative Artificial Intelligence, before filling in this questionnaire?

Of those surveyed, 74.5% admitted to being familiar with the existence and current impact of Generative Artificial Intelligence technology. Adding and looking for detailed information, more than 50% of the respondents who admitted to not being familiar with this technology were between 41-50 years old (53.06%) – consult Appendix 2.

For the 18-24, 25-30, and 31-40 age groups, all the age groups mentioned revealed very high percentages of respondents whose response regarding familiarity with Generative Artificial Intelligence technology was positive, 85.48%, 88.24% and 88.24% respectively – consult Appendix 3.

4.1.2. Frequency of Generative Artificial Intelligence utilization

Of those surveyed, 32.1% stated that they have never used Generative Artificial Intelligence technology. Although this is a considerable value, in a way that currently continues existing a lot of people who never tried Generative Artificial Intelligence,

46.77% were in the 41-50 age group, and 20.97% in the 51-60 age group (Appendix 4). The response stating that use this technology quite rarely was also frequent, with a percentage of 32.7% of the sample surveyed, being the age groups who contributes most to this value those aged 41-50 years old and 51-60 years old, respectively 42.19% and 14.06% (Appendix 4).

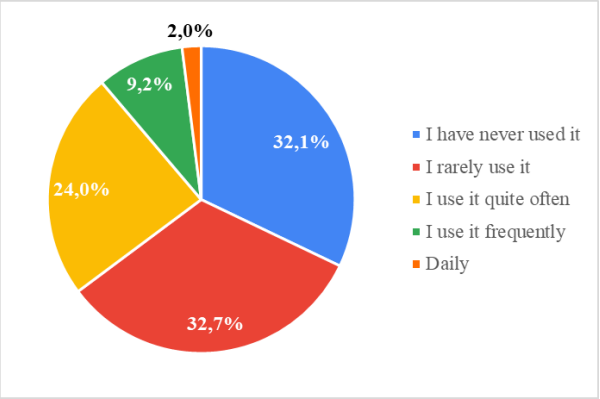

Figure 7 - How often do you use Generative Artificial Intelligence?

Those between 18 and 24 years old are the ones who contributed most to the moderate and frequent rate of utilization. For the scale referring to moderate frequency of use, which represents 24% of the total respondents, the age group mentioned contributed 55.32% of the responses, and for the scale referring to frequent usage, the same age group contributed 66.67% of the responses, meaning the youngest age group are the one with more weight on the higher frequency levels – consult Appendix 4.

For the age group between 25-30 years old and 31-40 years old, the preferences are very balanced between the lowest levels of frequency: never use, rarely use, and moderate use. With regard to the 41-50 age group, the second most detected behaviour was rarely used, with 42.19%, followed by 45.31% who said they had never used Generative Artificial Intelligence technology in their lives. Similar to this group, those aged 51-60 years old also show the same pattern of usage, with the two most observed parameters being never used and rarely used the technology, with 44.83% and 31.03%, respectively - consult Appendix 5.

4.1.3. Level of satisfaction regarding Generative Artificial Intelligence utilization

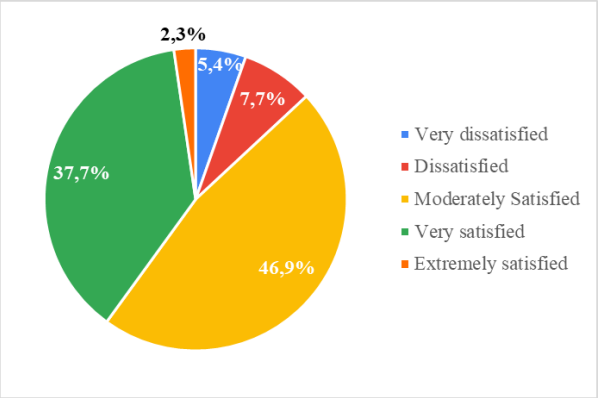

Figure 8 - How satisfied are you using Generative Artificial Intelligence?

To better address the purpose of this question, which is to measure the level of satisfaction of respondents when using Generative Artificial Intelligence, is important to take out the weight of the responses that indicate the surveyed never used this technology before.

Doing the suggested above, 46.92% of the respondents appointed for a moderated level of satisfaction while using the technology in the study, succeeded by 37.69% who stated a very satisfying level (Appendix 6).

Within the group of respondents who rated their level of satisfaction when using Generative Artificial Intelligence as very dissatisfied or dissatisfied, 52.94% belong to the 41-50 age group (Appendix 7).

4.2 Impact of Generative Artificial Intelligence on students

As explained before, it was to dedicate special attention to the education sector with the goal of measuring the impact of Generative Artificial Intelligence technology through the process of reshaping the education paradigm. As a screening question, respondents were questioned whether they are currently students or have been students in the past 2 years, ensuring that the universe sample in the study would consist only of those who had been enrolled in educational programs simultaneously with the times when Generative Artificial Intelligence became a trend.

Continuing having the appointed above as basis, 64.6% of respondents stated that they were not encouraged to use Generative AI technology during their academic journey, which may indicate resistance from educational institutions to accept the technology and to adapt the strategies that have proven effective in the past to the present times. As with many other sectors, educational is also being impacted by the technological advancements

as a whole that are occurring globally, needing also to stay up in order to prevent its educational systems from going obsolete.

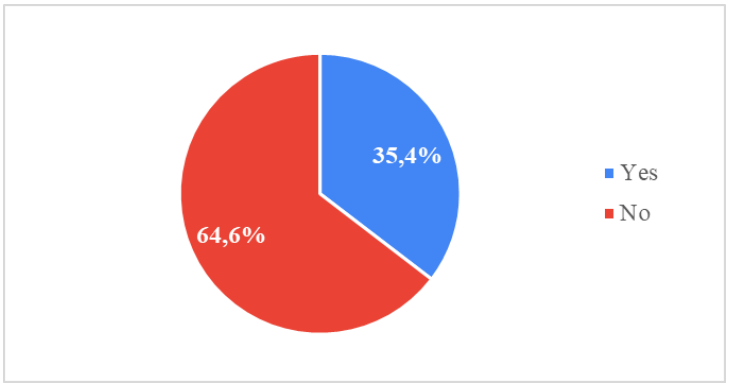

Figure 9 - Were you encouraged to use Generative Artificial Intelligence during your academic career?

To confirm the importance of this technology in education and the way it has revolutionized it, 86.1% of the surveyed students and former students stated that they have already used Generative Artificial Intelligence for academic purposes. It is noteworthy that the age group between 18-24 years old stands out, with 90.74% of young students or former students belonging to this age range affirming that they have already benefited from GAI technology in an academic context (Appendix 8).

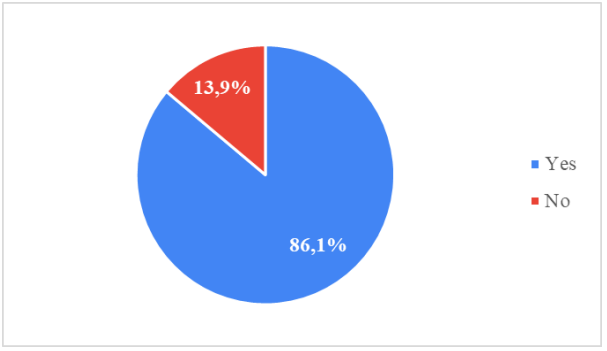

Figure 10 - Have you ever used Generative Artificial Intelligence for academic purposes? As example, to study or as a search engine during group work.

Additionally, 89.9% of the surveyed students or former students perceive the concept of Generative Artificial Intelligence as a technology that constitutes a positive complement to their learning process and that, thanks to it, they are able to grow as students and pick up better outcomes from their academic careers. Naturally, it was expected that the age groups between 18-24 years old and 25-30 years old are the ones with a stronger contribution to this high indicator value, with respectively 88.89% and 100% of the respondents stating that they perceive the use of this technology as a highly positive enhancement for their development and education – consult Appendix 9.

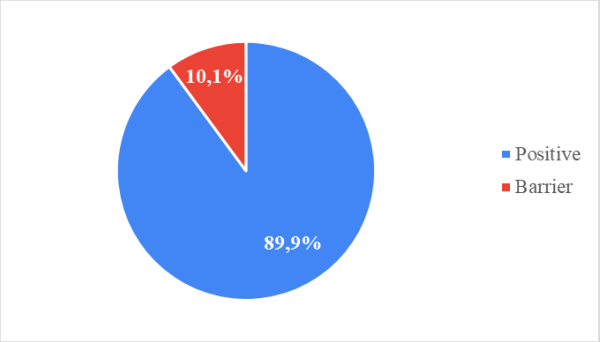

Figure 11 - Do you see Generative Artificial Intelligence as a positive complement during academic formation or do you see it as a barrier to learn?

4.3. Impact of Generative Artificial Intelligence on Employees

Similar to the impact observed in education, Generative Artificial Intelligence has an immeasurable impact on working patterns. Different positions are emerging as others are being discontinued, and new mechanisms are being introduced as part of the modernization process compared to what was traditionally applied. The use of Generative Artificial Intelligence has had both qualitative and quantitative impacts on the workforce, and a professional or a company that is not concerned about it will quickly be surpassed by something or someone demonstrating that agility. In this regard, to study the impact of this technology on work routines, the sample available was conditioned to those who are currently employed or who have been employed in the last two years, a time when the effects of Generative Artificial Intelligence's positioning and expansion have been most evident.

Among the surveyed workers or former workers, 80.5% admit to having never been guided or advised by their employer to use Generative Artificial Intelligence technology. This means that companies may need to do better in terms of normalizing the use of this technology so that their employees perceive it as a time management mechanism and an improvement to their performance to increase effectiveness. With such a high percentage, it is evident that there is much work to be done in this category.

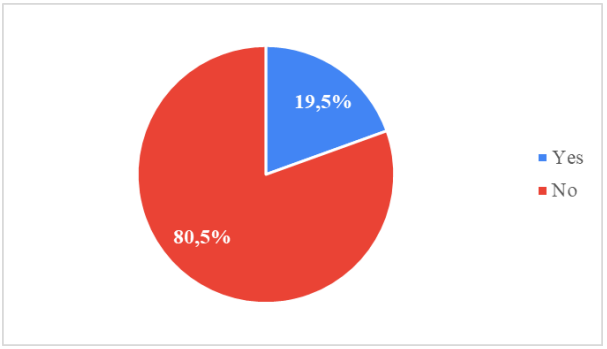

Figure 12 - Have you ever been advised by your employer to use Generative Artificial Intelligence?

Reinforcing the above-mentioned parameter, 60.9% of surveyed workers or former workers state that they have never used Generative Artificial Intelligence technology in a professional context. This figure may result from a lack of encouragement from the employer, as well as from an employee's fear of being viewed as less capable of reaching out to this technology. The age group that contributed most to this value was those aged between 41-50 years old, with 77.78% of the workers and ex-workers belonging to this age group stating they had never used Generative Artificial Intelligence technology for professional purposes. For all the other age groups, the percentages are much more balanced, with a slight advantage for non-usage compared to usage. Remarkably, in the age group between 31 to 40 years old, most respondents stated that they had already used the technology under study for professional benefits (56.25%) – Appendix 10.

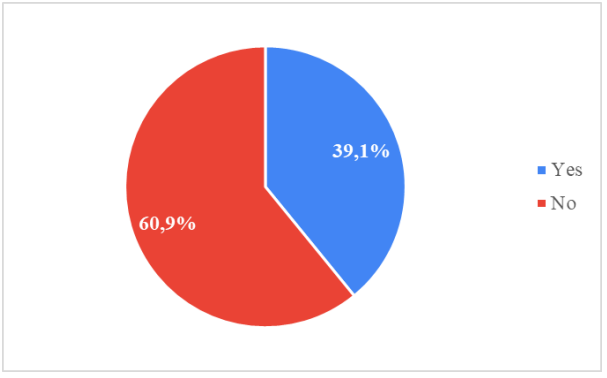

Figure 13 - Have you ever used Generative Artificial Intelligence for professional purposes?

Regarding the perception of surveyed workers and former workers about the use of Generative Artificial Intelligence technology as either a beneficial complement to their working activity or as a barrier that limits creativity and problem-solving skills, 74.6% state that they perceive the mentioned technology as a positive complement. Additionally, it is observed that for younger age groups, this percentage is higher, specifically 87.8% for the age group related to 18-24 years old and 94.12% for the 25-30 years old age group, and decreases while progressing to older age groups, reaching still positive but lower

values, around 60%, for the age group between 51-60 years old (Appendix 11).

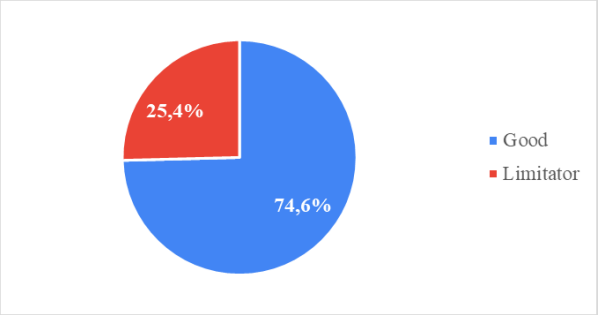

Figure 14 - Do you see Generative Artificial Intelligence as a good complement to professional performance or do you think it limits creativity and problem-solving skills?

4.4. Convictions for future projections over Generative Artificial Intelligence

A question was directed not towards the preferences of the respondent but rather appealing to their sensibility and questioning to indicate in which circumstances they would prefer their children to live. It is often said that people always want the best for their children rather than for themselves, suggesting that we strive to construct the ideal of a flawless world for our descendants. What is the ideal world for the respondents with or without access to Generative Artificial Intelligence?

Based on respondents' preferences, 57.3% of the respondents prefer a world with access to Generative Artificial Intelligence technology for their children, confirming what they wished for themselves. Despite being divided, as displayed by the percentages, the majority of the sample sees a world with Generative Artificial Intelligence as a more prosperous and promising one. However, upon deeper analysis of this percentage, it becomes evident that it hides some clear differences between each age group: if relating to the youngest age groups, the coexistence with Generative Artificial Intelligence has significantly more strength and familiarity, with 75.81% for 18-24 age group and 70.59% for the 25-30 age group. For the older age groups, the preferred trend of the respondents reverses. While for the age group between 31-40 years old, preferences are much more balanced, for the age groups ranging from 41-50 and 51-60 years old, the preference inverts and starts being a life without Generative Artificial Intelligence, with the preference mentioned being around 60.94% and 55.17% respectively (Appendix 12).

Based on this discrepancy in values, a pronounced generational gap becomes too evident, where younger groups demonstrate a strong preference for coexistence with technology, driven by their agility and capacity of adaptability. At the same time, older generations are firmly established with classic habits that resist change.

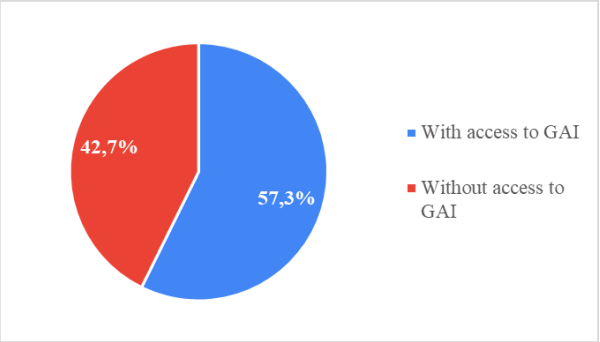

Figure 15 - If you could choose the world your children would live in, would it be with or without access to generative artificial intelligence?

Respondents were asked about their interest in training programs, and 77.9% of respondents expressed an interest in participating in eventual training sessions that would enhance their proficiency in managing Generative Artificial Intelligence and inherent skills. This preference encompasses all age groups under study, indicating a social global awareness of the circumstances and an intention to adapt to modern times – consult Appendix 13.

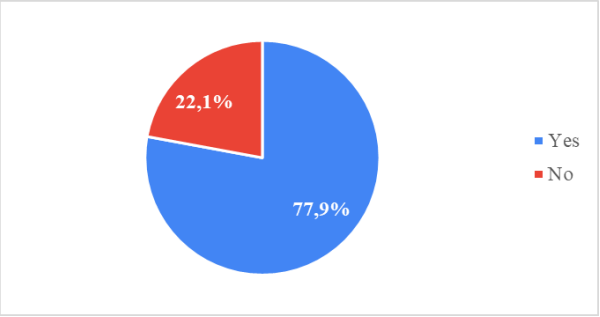

Figure 16 - Would you be interested in training sessions to understand and take out the most of this technology?

V. Discussion

In general, it is possible to assume that Generative Artificial Intelligence is a topic that a lot of people are aware of nowadays. Independent of the frequency of utilization and the level of satisfaction, it is true that society as a whole is conscious of its existence. Knowing that, I really believe it is a matter of time to see the skill of managing Generative Artificial Intelligence as a requirement.

Word of mouth also plays an important role in the adaptation and acceptance of Generative Artificial Intelligence. In fact, based on the survey launched, an incredible amount of the respondents showed very positive feedback about the results obtained through Generative Artificial Intelligence. Platforms as ChatGPT are really revolutionizing the world of making things happen quicker and more efficiently, and

managing these types of resources properly make people not only more competent but also more valuable assets.

Of those who confessed not in love with this technology, a big part of them are within of older groups ages, the same people who confessed to having never used or have rarely used this technology, representing the resistance of this group to changing its mentality. The classic way of solving problems is not mandatory to be applicable forever, and if people fear being put aside, it is up to them to search to improve their skills – and about one-third of respondents belonging to older age groups admitted not being interested in training sessions. It is not about competing with younger generations because the people who are part of older generations have its experience and work responsibility as an ability that is priceless and untrainable – simply, acknowledging that this technology may also be advantageous instead of wasting time and energy regretting how it came about would be an improved action strategy.

Regarding the use of Generative Artificial Intelligence for academic purposes, it turns evident that this technology is here to stay. Nowadays is quite intuitive for students to use platforms as ChatGPT to perform certain types of tasks. It is part of the job of the education system and institutions to adapt and evaluate differently. Is also a rational step behind the utilization of this type of technology, so it should be valuable depending on the context. This generation not only uses Generative Artificial Intelligence, but it also allows them to complete the same activities faster and with less waste of time. Still, this generation also considers technology as a healthy addition to their growth, so being unlikely that merely banning it would be sufficient to stop its expansion. It is already a reality that some universities are adapting and appealing to moderate and controlled use of Generative Artificial Intelligence, but it is also true that a lot of the applied rules were taken under an emergency situation and still required broader guidelines for all educational sector (Moorhouse et al., 2023).

Specifically in Portugal, there's still a lot to do. In fact, the sample surveyed admitted not feel encouraged by the academical institutions to make proper use of Generative Artificial Intelligence. It would be crucial that education, industry, and state work as a whole to certify that no one in the end will think all could be different if actions had been released sooner. It is easier to understand that even for teachers, the job is not easy, being new for them, and for education not to be based on intuition and subjectivity, teachers would also benefit from more established guidelines.

Regarding professional experiences and based on the feedback of workers and former workers surveyed, it is relevant to highlight that Generative Artificial Intelligence seems to have impacted the education sector until now. Even the youngest generations are not using the technology for professional purposes as much as they have been using it in an educational environment. An even higher percentage of workers and former workers, when compared to the one observed for students and former students, admit that employers are not open and do not appeal to the using of Generative Artificial Intelligence.

The reasons behind it are not covered in the present thesis, but it would also be a relevant topic to study. The fact that companies' methods of work may be so established that young people prefer to follow the protocols without diverging from the advised path, or the fear of using technology because they take a chance of being seen as less capable or lazy professionals, maybe some of the reasons, not least because of the negative perception that many of the older people in senior positions have about Generative Artificial Intelligence.

Despite this, the expected trend for the future will be dictated by what younger generations indicate is the way forward, and their preference seems to be well established in the sense that both professionals and students actually believe that Generative Artificial Intelligence is a solid complement to its performances, working alongside its critical thinking and creativity.

VI. Conclusion

The result of the preceding empirical and data analysis allows for the following major conclusions: the impact of Generative Artificial Intelligence has proven very relevant according to the sample utilised. The focus on student and worker groups enables the present work to conclude that although the impact measured was higher on education, both are passing through an adaptation period characterised by some uncertainty and lack of guidelines. Despite this, both groups showed their intention and availability to improve their technological skills, probably because they will make a difference soon.

A big part of the students who responded to the survey appointed they are using Generative Artificial Intelligence for academic purposes, proving this scenario is a reality that really deserves minute monitoring. The percentage of utilization is expected to grow as word of mouth, and the level of satisfaction mentioned by younger generations act in

their favour.

The presence of Generative Artificial Intelligence appears less significant on older generations. The people present in the sample who belong to older age groups made it clear that they still prioritise more traditional methods, having rarely used Generative Artificial Intelligence technology or never used it at all. However, they also expressed an interest in deepening their knowledge on the subject, which could open them up to using it more regularly, possibly just needing more time or instruction.

Summing up, is possible to conclude Generative Artificial Intelligence is effectively changing the preferences of its users, and its impact on both education and the business world is visible. It is clear from the literature covered that Generative Artificial Intelligence will play an important role at work in the future, impacting some positions that are not necessarily linked to being fired but to different methods of working. Gradually, it is hoped that companies and their employees could work together to standardise the use of this technology, as well as in education, which, due to its more regular use, has already been the target of more attention and some guidelines.

There is clearly a preference among younger age groups for coexistence with Generative Artificial Intelligence. As a result of more recurrent use and higher levels of satisfaction, nowadays, these groups do not see themselves in a world where the use of this technology is not allowed. Additionally, they say that it is in a world with access to all these technologies that they hope their descendants would live in, thus laying up their technology footprint and mapping its journey. Older generations have other relevant skills, but they may be forced to follow the trend.

6.1. Limitations and Recommendations

As with any other work, during the realization of the present thesis, some limitations were faced, which can be converted into recommendations for the future.

The sample used, which was exclusively people of both genders and different ages but only living in the Lisbon metropolitan area. If it were possible to conduct a study covering a wider range of regions, it would not only increase the sample studied but also check whether there are differences between regions.

Nevertheless, the amount of responses obtained is not balanced between every group age, so it was sometimes difficult to draw conclusions for this specific group. The present work has a special focus on measuring the impact of Generative Artificial Intelligence on

students and workers, and consciously knowing the samples is considered not representative, more responses could give a different significance to the study, mainly for the groups with fewer inquiries.

It would also be very useful for future studies to consider another variable and include the professional function of the inquired. In fact, different professional tasks require different Generative Artificial Intelligence skills, and it is also possible that some tasks do not require technology at all. Therefore, including this variable would be a highly pertinent addition to the research, making it possible to draw more specific conclusions in the scope of this perspective.

Furthermore, giving voice to the people surveyed would be a good increment, allowing for more detailed feedback. Rather than being entirely restricted to the survey, the possibility of having an open conversation about the topic by conducting some interviews would also take the relevance of the study to another level, opening up the range of possible answers.

Due to the fact also mentioned during this MFW that there have only been a large number of articles published in recent years, it has been challenging to find articles on the subject of Generative Artificial Intelligence considered pertinent and with a satisfactory level of significance. As an alternative, I sometimes was forced to resort to websites that seemed to have satisfactory intellectual robustness, as well as short opinion pieces.

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Appendix

Appendix 1 – Familiarity ““Yes" ““

Yes	#	%
<18	1	0,68%
18 - 24	53	36,30%
25 - 30	15	10,27%
31 - 40	15	10,27%
41 - 50	38	26,03%
51 - 60	21	14,38%
>60	3	2,05%
	146	100

Appendix 2 –Familiarity ““No" ““

No	#	%
<18	0	0,00%
18 - 24	9	18,37%
25 - 30	2	4,08%
31 - 40	2	4,08%
41 - 50	26	53,06%
51 - 60	8	16,33%
>60	2	4,08%
	49	100

Appendix 3 – Familiarity by Age Group

18-24	#	%	25-30	#	%	31-40	#	%	41-50	#	%	51-60	#	%
Yes	53	85,48%	Yes	15	88,24%	Yes	15	88,24%	Yes	38	59,38%	Yes	21	72,41%
No	9	14,52%	No	2	11,76%	No	2	11,76%	No	26	40,63%	No	8	27,59%
	62	100		17	100		17	100		64	100		29	100

Appendix 4 – Frequency by level

I have never used it	#	%	I rarely use it	#	%	I use it quite often	#	%	I use it frequently	#	%	Daily	#	%
<18	0	0,00%	<18	0	0,00%	<18	1	2,13%	<18	0	0,00%	<18	0	0,00%
18 - 24	6	9,68%	18 - 24	16	25,00%	18 - 24	26	55,32%	18 - 24	12	66,67%	18 - 24	2	50,00%
25 - 30	6	9,68%	25 - 30	5	7,81%	25 - 30	4	8,51%	25 - 30	1	5,56%	25 - 30	1	25,00%
31 - 40	4	6,45%	31 - 40	6	9,38%	31 - 40	6	12,77%	31 - 40	1	5,56%	31 - 40	0	0,00%
41 - 50	29	46,77%	41 - 50	27	42,19%	41 - 50	6	12,77%	41 - 50	2	11,11%	41 - 50	0	0,00%
51 - 60	13	20,97%	51 - 60	9	14,06%	51 - 60	4	8,51%	51 - 60	2	11,11%	51 - 60	1	25,00%
>60	4	6,45%	>60	1	1,56%	>60	0	0,00%	>60	0	0,00%	>60	0	0,00%

Appendix 5 – Frequency by Age Group

18-24	#	%	25-30	#	%	31-40	#	%	41-50	#	%	51-60	#	%
I have never used it	6	9,68%	I have never used it	6	35,29%	I have never used it	4	23,53%	I have never used it	29	45,31%	I have never used it	13	44,83%
I rarely use it	16	25,81%	I rarely use it	5	29,41%	I rarely use it	6	35,29%	I rarely use it	27	42,19%	I rarely use it	9	31,03%
I use it quite often	26	41,94%	I use it quite often	4	23,53%	I use it quite often	6	35,29%	I use it quite often	6	9,38%	I use it quite often	4	13,79%
I use it frequently	12	19,35%	I use it frequently	1	5,88%	I use it frequently	1	5,88%	I use it frequently	2	3,13%	I use it frequently	2	6,90%
Daily	2	3,23%	Daily	1	5,88%	Daily	0	0,00%	Daily	0	0,00%	Daily	1	3,45%
	62	100		17	100		17	100		64	100		29	100

Appendix 6 – Level of satisfaction without considering "I have never used it"

How satisfied are you using Generative Artificial Intelligence? (excluding "I have never used it")	#	%
Muito pouco satisfeito // Very dissatisfied	7	5,38%
Pouco Satisfeito // Dissatisfied	10	7,69%
Moderadamente Satisfeito // Moderately Satisfied	61	46,92%
Muito Satisfeito // Very satisfied	49	37,69%
Extremamente Satisfeito // Extremely satisfied	3	2,31%
	130	100

Appendix 7 – Very dissatisfied + dissatisfied levels of satisfaction by Age Group

Very dissatisfied + Dissatisfied	#	%
18 - 24	3	17,65%
25 - 30	1	5,88%
31 - 40	1	5,88%
41 - 50	9	52,94%
51 - 60	3	17,65%
	17	100

Appendix 8 – Students or formers student who already used generative artificial intelligence for academic purposes, per Age Group

18-24	#	%	25-30	#	%	31-40	#	%	41-50	#	%	51-60	#	%
Yes	49	90,74%	Yes	6	54,55%	Yes	5	100%	Yes	4	80%	Yes	1	100%
No	5	9,26%	No	5	45,45%	No	0	0%	No	1	20%	No	0	0%
	54	100		11	100		5	100		5	100		1	100

Appendix 9 - Students or formers student who considered generative artificial intelligence a good complement or a barrier to learn, per Age Group

18-24	#	%	25-30	#	%	31-40	#	%	41-50	#	%	51-60	#	%
Positive	48	88,89%	Positive	11	100%	Positive	4	80%	Positive	4	80%	Positive	1	100%
Barrier	6	11,11%	Barrier	0	0	Barrier	1	20%	Barrier	1	20%	Barrier	0	0%
	54	100		11	100		5	100		5	100		1	

Appendix 10 - Workers or formers workers who already used Generative Artificial Intelligence for professional purposes, per Age Group

18-24	#	%	25-30	#	%	31-40	#	%	41-50	#	%	51-60	#	%
Yes	20	48,78%	Yes	7	41,18%	Yes	9	56,25%	Yes	14	22,22%	Yes	12	48,00%
No	21	51,22%	No	10	58,82%	No	7	43,75%	No	49	77,78%	No	13	52,00%
	41	100		17	100		16	100		63	100		25	100

Appendix 11 - Workers or formers workers who considered generative artificial

intelligence a good complement or a limitator, per Age Group

18-24	#	%	25-30	#	%	31-40	#	%	41-50	#	%	51-60	#	%
Good	36	87,80%	Good	16	94,12%	Good	14	87,50%	Good	40	63,49%	Good	15	60,00%
Limitator	5	12,20%	Limitator	1	5,88%	Limitator	2	12,50%	Limitator	23	36,51%	Limitator	10	40,00%
	41	100		17	100		16	100		63	100		25	100

Appendix 12 – Wish for its children a world with or without Generative Artificial Intelligence, per Age Group

18-24	#	%	25-30	#	%	31-40	#	%	41-50	#	%	51-60	#	%
With	47	75,81%	With	12	70,59%	With	9	52,94%	With	25	39,06%	With	13	44,83%
Without	15	24,19%	Without	5	29,41%	Without	8	47,06%	Without	39	60,94%	Without	16	55,17%
	62	100		17	100		17	100		64	100		29	100

Appendix 13 - Interest in training session, per Age Group

18-24	#	%	25-30	#	%	31-40	#	%	41-50	#	%	51-60	#	%
Yes	56	90,32%	Yes	13	76,47%	Yes	15	88,24%	Yes	44	68,75%	Yes	20	68,97%
No	6	9,68%	No	4	23,53%	No	2	11,76%	No	20	31,25%	No	9	31,03%
	62	100		17	100		17	100		64	100		29	100