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Explore the interaction between Artificial Intelligence and employees, inside organizations

Diogo Afonso Capelo Neto

Master in Marketing

Supervisor:
Doutora Sandra Maria Correia Loureiro, professora associada com agregação,
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BUSINESS
SCHOOL

Department of Marketing, Strategy and Operations

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Abstract

Engagement is a topic of relationship marketing important for organizations in order to improve performances. For that reason, it should be investigated ways to increase it. The introduction of artificial intelligence inside organizations is already a reality in the present, and its growing is inevitable for the future.

The objective of this study is to understand what is the impact of AI in employee engagement in two different scenarios, one with AI robots and the other one with AI software. For that, it was analysed how social interaction, anxiety, and stress associated to AI influence engagement. Besides that it was tested if engagement is a driver for happiness, and for a "subjective well-being perspective" felt by employees. Finally, it was tested if self-esteem is a moderator, and influences any of the relationships studied.

The conceptual model was based on preliminary studies, interviews, and focus groups. It includes multiple linear regression analysis with employee engagement as dependent variable, and simple linear regression analysis with happiness as dependent variable. The moderation tests are present in the model as well.

Data was collected from two questionnaires developed, one for each scenario, and with the analysis done, it was possible to find relationships between the constructs in the model. Social interaction, anxiety, and stress, influence employee engagement, and employee engagement is a driver for happiness. With all the conclusions explained in this dissertation it is possible to answer the research questions proposed and to suggest studies and investigations for the future.

Keywords: Engagement, Artificial Intelligence, Social Interaction, Anxiety, Stress, Happiness.

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M31 – Marketing

O33 – Technological Change: Choices and Consequences • Diffusion Processes

Resumo

Engagement é um tema do marketing relacional importante para as organizações para poder melhorar performances. Por essa razão, devem ser desenvolvidos estudos com o intuito de aumentar os níveis de *engagement*. A introdução de inteligência artificial dentro das organizações é já uma realidade atualmente e a tendência será de crescimento para o futuro.

O objetivo deste estudo é compreender qual é o impacto da IA no *engagement* dos colaboradores das organizações em dois cenários diferentes, um com robôs de IA e um outro com *software* de IA. Assim, foi analisado como a interação social, a ansiedade e o stress, associados à IA, influenciam o *engagement*. Para além disso, foi testado se o *engagement* é uma fonte influenciadora para a alegria/satisfação e para a "perspetiva subjetiva de completo bem estar" sentida pelos colaboradores das organizações. Finalmente, foi testado se a autoestima é um moderador e influencia alguma das relações entre construtos estudadas.

O modelo conceptual foi elaborado com base nos estudos preliminares desenvolvidos, entrevistas e *focus groups*. O modelo é constituído por análises de regressão linear múltiplas, com engagement como variável dependente, e por análises de regressão linear simples, com alegria/satisfação como variável dependente. Os testes de moderadores estão igualmente presentes no modelo.

Os dados foram obtidos a partir de dois questionários, um com o cenário de robôs de IA e outro com software de IA, e com as análises desenvolvidas foi possível concluir algumas relações entre os construtos do modelo. Interação social, ansiedade e stress influenciam o *engagement,* que por sua vez, proporciona alegria/satisfação. Com todas as conclusões desenvolvidas neste estudo é possível responder às questões de pesquisa propostas, e sugerir estudos e investigações para o futuro.

Palavras chave: *Engagement*, Inteligência Artificial, Interação, Ansiedade, Stress, Alegria/Satisfação.

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M31 – Marketing

O33 – Mudança Tecnológica: Escolhas e Consequências • Processos de Difusão

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1. Introduction

1.1. Relevance of the topic

Employee engagement is one of the main topics of Relationship Marketing. Find what are the drivers and factors that influence employee engagement, are one of the preoccupations of organizations in order to increase efficiency and efficacy in businesses, and to increase customer engagement, growing consequently organizations performance.

Besides the five dimensions of engagement studied by Kumar and Pansari (2016), it was decided to understand what would be the impact of artificial intelligence inside organizations. For that, it was tested if social interaction (SI), anxiety (ANX) and stress (ST), all adapted to the use of artificial intelligence, influence employee engagement (EE).

Furthermore, it was investigated if employee engagement (EE) can positively influence happiness (HA), trying to understand if engagement is a bridge to reach a "subjective well-being perspective". Finally, it was tested if self-esteem is a moderator of all relationships explained above.

Concluding, the current dissertation pretends to understand how artificial intelligence impact employee engagement, and what are the factors that influence this topic of relationship marketing. Besides that, it is studied if engagement is a driver for happiness, and if self-esteem can moderate any of these relationships.

1.2. Research problematic

Kumar et al. (2016) divided employee engagement in five dimensions. Commitment is one of them, and following Lockwood (2007), when levels of commitment are high, employees show a performance 20% better than other ones, and are 87% more willing to stay at the company. This is one of the reasons why it is important to explore ways to increase employee engagement.

For that reason, and as it is an inevitable reality in the future, artificial intelligence will be tested as a driver to engagement. But for that there many issues related to AI that will be approached in this dissertation, such as to trust AI in order to be able to use it (Chi, Jia, Li & Gursoy, 2021).

1.3. Research questions, objectives and problem statement

This report is developed in order to study the impact of social interaction characteristics, anxiety and job stress, on employee engagement, in interactions with artificial intelligence contexts. Besides that, it is studied the influence of employee engagement on the "subjective well-being

perspective". Furthermore, it was tested if self-esteem is a moderator of the relations already explained. All these relationships are studied and compared in two distinct artificial intelligence scenarios: AI robots and AI software/algorithms.

Considering the objectives proposed the following problem statement is defined:

"How employees accept artificial intelligence at work. Which are the drivers for this acceptance, and its pros and cons. The impact of an AI robot is the same of the impact of an AI software/algorithm."

With the following research questions, the problem statement is studied and the objectives of this research are achieved:

RQ1: How do social interaction, anxiety, and stress, impact employee engagement?

RQ2: How does employee engagement impact "subjective well-being perspective"?

RQ3: Is self-esteem a moderator of the relationships between social interaction, anxiety and stress, with employee engagement?

RQ4: What are the differences between the impact of AI robots and AI software/algorithms?

1.4. Methodology overview

Because of the novelty of the topic approached, and the consequent scarcity of scientific information, it was decided to conduct two previous researches of qualitative data. Firstly, a set of nine interviews was conducted, selecting employees of retail, and hospitality and tourism sectors. A method to collect qualitative data, and where the questions are made directly to the respondent getting a clear comprehension of the participants opinions' (Malhotra, 2010). Furthermore, two focus group, that Malhotra (2010) considers the best research of qualitative data, were done. Both methods were realised remotely, using the application ZOOM.

Then, having these previous studies, and combining it with the research previously done, it was possible to create a model of study for the subject. Once the model was constructed, two online questionnaires were designed, in order to obtain data in a larger scale, generalizing results and to observe patterns (Malhotra, 2010). On both questionnaires were studied the following themes: employee engagement (Kumar & Pansari, 2016), social interaction: robot use self-efficacy, anthropomorphism and effort expectancy (Chi, Jia, Li & Gursoy, 2021), anxiety (Wang & Wang, 2019), job stress (Karasek & Theorell, 1990), happiness (Loureiro, Breazeale, & Radic, 2019) and self-esteem (Rosenberg, 1965), and the scales of each theme were adapted for both questionnaires. Both about artificial intelligence, but one related to an AI

robot and the other related to AI software/algorithms. The questionnaires were shared in three social networks Instagram, Facebook and LinkedIn.

Concluding, as the methodology combines the collection and analysis of qualitative data and, quantitative data, it is possible to say that it is a *mixed method research* (Johnson, Onwuegbuzie, & Turner, 2007).

1.5. Thesis structure

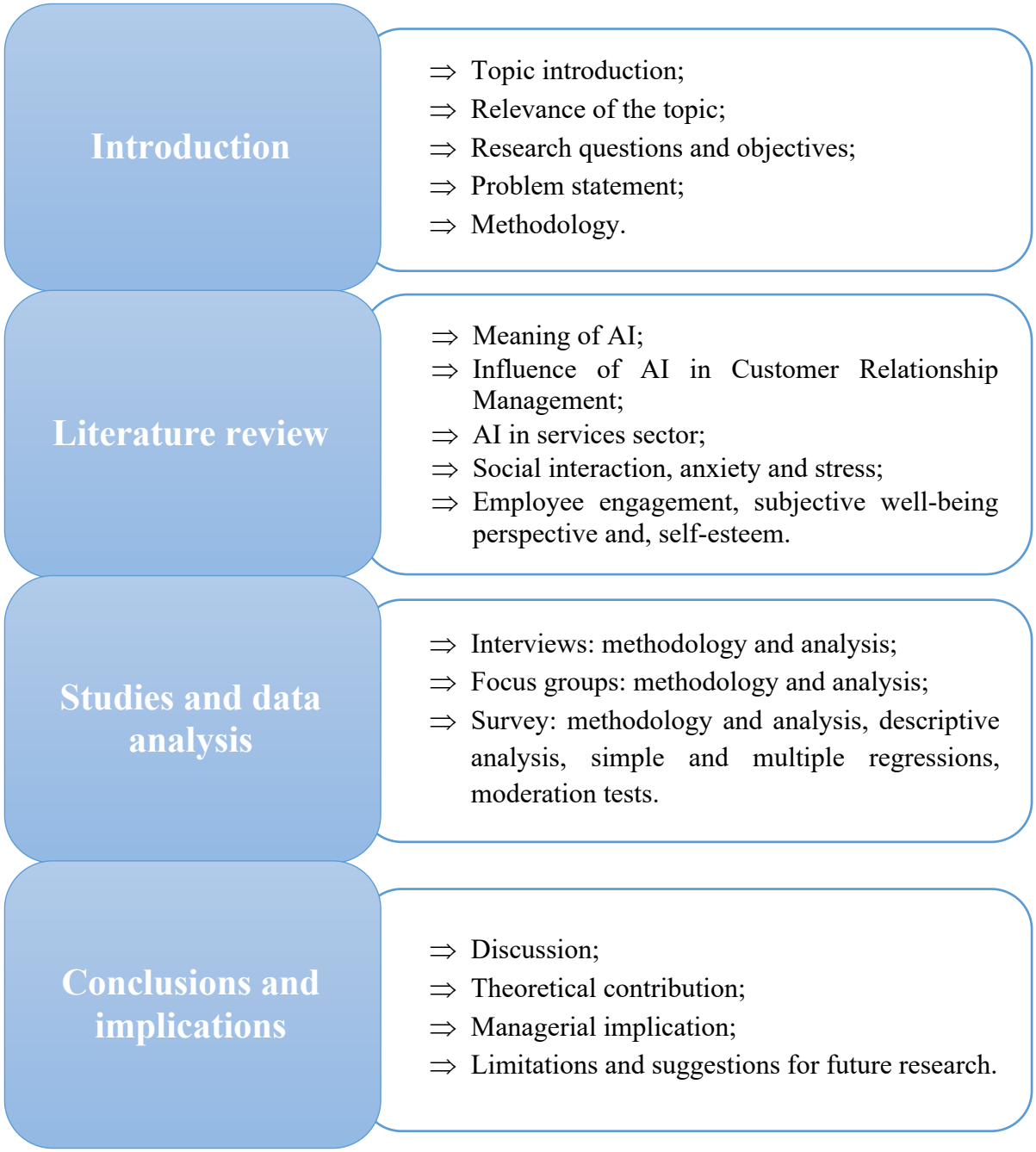

Figure 1.1. Thesis structure
Source: Own elaboration

2. Literature Review

2.1. Meaning of AI and its proliferation

Artificial intelligence can be considered as a tool capable of reproducing human behaviours and solve tasks (Marr, 2016).

For Kaplan and Haenlein (2019, p. 15) artificial intelligence is:

"a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation".

The intelligence of this tool is explained by the capability of learning and improvement by itself from experience, adding value to its initial knowledge. This way it is possible to solve non-routine tasks. In other words, this tool is not only capable of reproducing repetitive behaviours. AI technology gives machines the opportunity to act, and think like humans. This technology can use natural language processing, accepting and answering voice commands, which is crucial for in-home voice assistants (Kumar, Kumar, & Ramachandran, 2020).

Uses and Gratification theory (U&GT) is considered by Katz, Blumler and Gurevitch (1974) a theoretical motivational paradigm, used to comprehend what motivates people to use technology (Grellhesl & Punyaunt-Carter, 2012). Wurff (2011) affirmed that U&GT is a mixture of social and psychological attributes of needs. Using this theory, it is possible to understand why people use artificial intelligence devices, like the in-home voice assistants Google Assistant, Echo from Amazon or Siri from Apple. (Osei-Frimpong & Mclean, 2019).

Following Rauschnabel, He and Ro, (2018), there are three categories to explain the reasons why people adopt in-home voice assistants: utilitarian benefits, where users want to complete a task or to be informed about a topic; hedonic benefits, where it is expected to feel enjoyment during the experience; and finally, symbolic benefits, meaning that people use the device to impose their social status, passing an idea of a technologically advanced person. Despite these three categories, Rauschnabel et al. (2018) decided to introduce a fourth one, social benefits, related to individuals' social needs. Considering technology theories and U&GT, it is possible to consider that there are four key categories that influence people to use in-home voice assistants: utilitarian benefits, hedonic benefits, symbolic benefits and social benefits (Osei-Frimpong et al., 2019). Osei-Frimpong et al. (2019) decided to test if the four categories have a positive impact on adopting in-home voice assistants. Utilitarian benefits, principally because it is a hands-free device, without the need of a physical contact, driving to the possibility of multitasking. Hedonic benefits are the enjoyment and pleasure of using it. Following Fang (2018) point of view, utilitarian benefits are the key to obtain the device, and hedonic benefits are the key to continue using it. Symbolic benefits, when people use technology to increase

image and social status. Finally, from social benefits, social presence, the possibility of having a conversation with the device the same way they do with a human (Cerekovic, Aran, & Gatica-Perez, 2017), and social attractiveness, when people is more attractive to others practicing pre-conceptualized pleasant behaviours (Cialdini, 2007).

With this study, Osei-Frimpong et al. (2019) concluded that people use in-home voice assistants because of utilitarian benefits, symbolic benefits and social benefits. The test found that hedonic benefits are not important for the adoption of this devices. This can be explained because in-home voice assistants do not have images or videos, so it is more difficult to offer enjoyment to users. Other important conclusion of the study done by Osei-Frimpong et al. (2019), is that households with two or less individuals are more willing to use this AI devices because of social benefits. An in-home voice assistant could be considered as one more "human" in the house.

However, there are negative points as well. Privacy concerns can negatively impact the use of AI devices, principally in households with many individuals, where it is possible that privacy concerns, overlap social benefits.

AI can be used for many functions. For example, Affectiva produced an AI platform that, by sensing, and analyzing facial expressions, can measure emotion. The company is now trying to develop the technique analyzing human speech (Dickson, 2018). Babylon health is using chatbots and AI-enabled symptom checker feature on their digital healthcare application. In the future, the company wants to make diagnosis 100% based on AI technology (O'Hear, 2016). HSBC uses AI in models to combat fraud, and identify strange behaviours, protecting the bank and customers. HSBC uses chatbots, supported by AI technology as well, to fulfil customers' needs in a fast way, improving customer experience (Olenski, 2018). For Newman (2017), chatbots that use artificial intelligence technology, are a key tool for brands to interact with customers during a purchase on e-commerce, or an online service (Newman, 2017). Another example is Marriott. The hotels group decided to use AI inside some rooms, in a partnership with Samsung and Legrand, not only to provide a smart room with voice controls, but to create scenarios in each room according to the profile of each customer, analyzing likes and dislikes (Ting, 2017) (in Kumar et al., 2020).

The use of AI in firms' marketing departments allows companies to improve their efforts. With technologies like artificial intelligence, it is possible to define profiles for customers, based on their preferences, that allows organizations to personalize the offer for each type of customer. This way, it will be easier to deliver the right product/service to the right customer at the right time (Kumar et al., 2020).

2.2 How AI influences CRM

In 1992, Kotler pointed the importance of stablishing positive relationships with stakeholders, not only with customers but with, suppliers, unions, governments, and every other players in the market as well. However, it is possible to define CRM, customer relationship marketing, as a way to create relationships with relevant customers or customer segments. This way, strategies are developed to create this connection with customers, increasing customer value and customer knowledge. At this stage, the use of data and technology is also important to provide the best experience possible to the customer (Boulding, Staelin, Ehret, & Johnston, 2005) (Payne, & Frow, 2005) (in Payne, & Frow, 2009).

Companies are now trying to reinvent their processes, and business models with the introduction of technology in order to fulfil customers' demand, not only of digital and technological experiences, but effortless and intuitive ones as well. Brands and organizations using technology, like artificial intelligence devices, can meet these expectations (Kumar et al., 2020).

AI systems can be used to turn the analysis of data by companies, and the interactions with customers faster and in a larger number of individuals. The capability of interaction with AI devices, chatbots for example, instead of humans, allows the offer of personalized services or goods in a larger scale and at low cost prices, changing the way customer service is being done. (Kaplan et al., 2019; Hoyer, Kroschke, Schmitt, Kraume, & Shankar, 2020; Grewal, Kroschke, Mende, Roggeveen, & Scott, 2020). This way, the impact in customer relationship management is clearly positive not only for customers with better experiences, goods and services, but for firms as well, increasing their profitability (Rust & Huang, 2014; Kumar, Rajan, Venkatesan, & Lecinski, 2019; Gupta, Leszkiewicz, Kumar, Bijmolt, & Potapov, 2020).

According to the characteristics of AI technology, with the collected data, managers can predict customers' behaviours (Agrawal, Gans, & Goldfarb, 2019).

Libai, Bart, Gensler, Hofacker, Kaplan, Kötterheinrich, & Kroll (2020) think that AI must be seen as a complement of relationship marketing, and not the substitute of it. There are already examples of AI used in CRM, for customer acquisition, in campaigns to find and create more relationships (Schwartz, Bradlow, & Fader, 2017); in customer development, to communicate with customers in order to improve existing relationships (Overgoor, Chica, Rand, & Weishampel, 2019); and in customer retention, by detecting any problem in the relationship (Ascarza, 2018).

From all the capabilities of AI for CRM tasks, Libai, et al. (2020) decided to study the capability of leveraging data from customers and communicate, understand and create the same

way humans do.

The *capacity of leveraging big amount of data* is so important because it is the base for value creation. These analyses allow organizations to predict in which ads customers will click on, what are the products or services they will prefer, or even predict who are the customers that will cause turbulence in the relationship. In the line of big data, there are three areas, the three V's, volume, variety and velocity. Despite the difficult of increasing variety in comparison to increase volume, for Libai, et al. (2020, p. 46) variety is the most important area to take advantage from competitors:

"The more data types there are, the more opportunities there are for discovering associations therein".

With AI it is possible to *communicate, understand and create as humans do*. With chatbots and voice digital assistants, it is easier to communicate with a machine while it seems like a human. For example, a German organization, Precire, uses AI software to make recruitment interviews in a first phase, and it is possible to select, or reject, participants based on speech rate, volume, number of filler sounds, word choice and speech complexity. The use of AI to communicate turns this task cheaper for companies (Libai, et al. 2020) increasing their profitability.

The advances in AI technologies allow it to recognize, and understand human emotions. For Youyou, Kosinski and Stillwell (2015), there are algorithms capable to understand the personality of someone better than friends. Regarding creation, it is easier to explain it using the example of advertising agencies. There was an idea that no machine could substitute a human on producing an advertisement, because of the ability to use the right words in direct marketing, as a sales manager to close a deal, or to tell customers the brand's story. However, following Libai, et al. (2020), ad agencies already introduced ads produced by artificial intelligence technology, and these ads performed better than ads made by humans.

Regarding customer acquisition, Libai, et al. (2020) concluded important points about the impact of AI on the following CRM tasks: customer life value of new customers, customer acquisition costs, and the number of new customers. AI-CRM will allow companies to predict CLV of potential customers, based on behaviours of current customers (Bartra & Keller, 2016). This aspect is important to "select the best" new customers. This way, firms will spend their efforts on more profitable customers. In sum, AI-CRM optimizes customer acquisition in the number of new customers, and their costs. Besides internal data, if AI-CRM utilize external data as well, it will be possible to know and approach competitors' disappointed customers. For customer development, and retention, AI-CRM enables firms to invest efforts and resources in

the “best” customers, the most profitable ones, instead of do it for customers in general. Consequently, it will turn customer relationship management more profitable for firms (Libai, et al. 2020).

Following Eyal (2014), new technologies are critical to create habits, and AI takes part on how habits affect customer decision-making. It can be used to maintain existing habits, to create new ones, or even to break old habits.

By forming a habit on customers’ minds, AI-CRM drives customers to automaticity on purchase process. While algorithms are identifying customers’ needs, firms have the possibility of offering the right product/service at the right time, because of AI technology. This way, not only customers’ trust will increase, but their willingness to search for alternatives will decrease, trusting on the company. The higher level of data the firm has, the biggest is the capacity of offering the right product/service, at the right time, to the right customer (Li, Sun, & Montgomery, 2011).

This habit creation is important as well on the retention phase. Once the habit is created, customers are less willing to change to another company because of switching costs. For example, learning more about the market. Switching costs are higher when firms provide good products, or services.

However, it is important to understand that AI-CRM is not useful to increase switching costs for current customers. This technology is useful as well in acquisition phase trying to meet competitors’ customers, based on external data, and decrease switching costs as much as possible for that ones. For Libai, et al. (2020), it is easier to collect internal data. As AI-CRM is more efficient the more data it has collected, these systems will be more effective on increasing switching costs, in other words, retaining current customers, than on acquisitioning competitors’ customers, by decreasing switching costs.

2.3. AI in services sector

In this sector, for Huang (2016), technology is the most important force for the expansion. This way, thinking about technologies to develop the services sector, artificial intelligence is a good opportunity for the services’ companies. AI has two aspects that allow it to change needs: (1) self-learning, AI can collect information, learn from that, and use it to act and complete tasks. The more knowledge AI devices can get, the higher will be the willingness to think, and feel like a human. (2) connectivity, that can be machine to machine, machine to customer or/and machine to employee, is mainly provided by internet of things. For example, Roomba, a vacuum

cleaner, can be connected with an in-home voice assistant, Alexa, turning this task easier (Huang & Rust, 2020).

AI can be divided into four different types of intelligence: mechanical, thinking, that can be analytical or intuitive, and feeling.

Each one of these four types of intelligence has a strength. It is possible to say that mechanical AI is more indicated for standardizing, while thinking AI, analytical and intuitive, can be used for personalization, and feeling AI is more appropriated for relationalization (Huang, Rust & Maksimovic, 2019).

Mechanical AI: is the one with less capabilities. The main goal here is to maximize efficiency. When demand is homogeneous it is a good opportunity to use mechanical AI because the tasks that need to be done by the device are repetitive. Other characteristic that should be taken in count is that this type of AI is more appropriated for customer with lower potential of lifetime value (Huang et al., 2020). There are jobs more focused on repetitive tasks such as: call centre agents, retail salespersons, waiters or waitresses, taxi drivers, and others. In this kind of jobs, one of the advantages of mechanical AI, compared to humans, is the possible consistency for example, a robot will not be tired of the job (Huang & Rust, 2018).

Thinking AI can be divided in two different types: analytical and intuitive. Used for personalization, this level of intelligence allows the device to adapt for each occasion. It can be used with heterogeneous demand (Huang et al., 2020).

Analytical intelligence can be characterized by the capability of collecting information, analyse it, and learn from that to solve tasks with acquired knowledge. So, analytical intelligence is used for analytical and data-based tasks. Because of this ability, for Huang et al. (2018), analytical intelligence is the most differentiated aspect that AI has offered to the service sector.

Intuitive intelligence algorithms offer the capability to think with creativity, and to fit to different and new situations. The flexibility of this type of AI, turns intuitive intelligence closer to act more similar to a human (Huang et al. 2018), at least comparing with analytical, and mechanical AI.

Feeling AI, or empathic AI, is the most recent generation of AI (Huang et al. 2018), but at the same time is the one in the lowest stage of development. It is considered by Goleman (1996) as a tool capable to comprehend emotions, and to answer emotionally to people influencing their emotions. It learns and adapts from experience. It is used for homogeneous demand with customers with high potential lifetime value. This level of intelligence is the one that acts more similar as humans (Huang et al., 2020).

For Huang et al. (2020), there are four main aspects that define the role of AI in service: nature of service task, service offering, service strategy and service process. That means that for each situation of these four points, there is a level of intelligence more indicated.

Nature of service task: when tasks are more repetitive it is advisable to use mechanical AI to perform these jobs. When service task is more analytical and data-based, it should be performed by analytical intelligence. Nevertheless, when tasks are more intuitive, Huang et al. (2020) consider that it is difficult to use only AI devices to solve the situation. So, in this case, human intelligence performs some tasks, and artificial intelligence others, working as a team to solve a principal job (Wilson & Daugherty, 2018). This symbiosis between human employee and thinking AI is called augmentation (Davenport & Kirby, 2015). When the service task requires communication, is experience-based and emotional, it is recommended to use feeling AI. In the present, these kind of tasks is mainly performed by humans, the higher the level of intelligence, the biggest is the difficulty to replace the human employee with a machine.

Nature of service offering: this point varies between utilitarian and hedonic, and transactional and relational.

Huang (2003, 2005) considers that utilitarian service consists mainly in tasks that provide to customers, instrumental, functional and non-sensory benefits. This kind of high-tech tasks are better developed by thinking AI. On the other hand, hedonic services are more devoted to provide sensory benefits to customers, with experiences of fun, and pleasure (Huang, 2003, 2005). Feeling AI is the one more capable to complete these tasks.

Regarding transactional service, this is a situation where tasks are more mechanical, and there are no intentions to develop a customer relationship. So, the use of mechanical AI is indicated. For example, fast food restaurants use mechanical AI to serve customers. At the same time, relational service, consists in situations where customer lifetime value is high, so, there are benefits from a developed customer relationship. In order to create this relation between the brand and customers, feeling AI is the most appropriated level of intelligence (Huang et al., 2020).

Utilitarian transactional service: in this case, it should be used analytical AI to complete mechanical tasks.

Utilitarian relational service: this type of service should use intuitive AI and human intelligence at the same time (augmentation).

Hedonic transactional service: here it should be used mechanical and feeling AI, and a little of human intelligence. Mechanical AI because of transactional tasks, that are repetitive

and mechanical, and feeling AI because of the necessity of communication skills of hedonic tasks.

Hedonic relational service: in this situation should be used feeling AI and human intelligence at the same time. Maybe in the future it will be possible to use only feeling AI, but considering the actual development of this level of AI, it is necessary to complement it with human employees with high emotional intelligence, and good communicational skills.

Service strategy: considering three different strategies of service, cost leadership, quality leadership and relationship leadership, it is possible to indicate the most appropriated AI to each strategy (Huang et al., 2020).

Cost leadership: it is a standardized job, consisted by mechanical and automating tasks. For example, Amazon already uses robots to deliver orders giving high relevance to operational excellence. For that reason, mechanical AI is the most indicated when cost leadership is the strategy.

Quality leadership: as customer experience is relevant, it is important to personalize each service to each customer. So, in order to achieve premium quality, it should be used thinking AI. Travel companies are good examples of this situation. Each customer has his own preferences of destinations, and experiences while traveling, so travel agents need to adapt their service to each customer.

Relationship leadership: this strategy is mainly used to customers with high customer life time value, and when customer relationship, and satisfaction, are important for the company. As it is a strategy highly dependent of emotions, it should be used feeling AI, that can analyse, recognize, and understand, customers' emotions (Schuller, 2018).

Stage of service process: Huang et al. (2020), divided the service process in three different stages, delivery, creation and interaction.

Service delivery: shipping, delivery and payment are some of the tasks in this process. As the service delivery consists in automatic tasks, that require low intelligence, mechanical AI should be used. For example, Amazon uses drones to deliver orders.

Service creation: the main goal of this process is to understand how it is possible to create value, and which are the customers that will accept it. Identify new markets, develop new services, or personalize service are some examples of tasks. That is why a tool indicated for personalization should be used. That tool is thinking AI. GAP already uses it to predict fashion trends.

Service interaction: as the proper name indicates, this process is related to tasks of interaction between the organization and customers. For instance: engage customers, customer service, customer care. The main goal is to understand what is important to communicate with customers, and how it should be done. To complete all these tasks, feeling AI should be used. The most common examples of it, are the chatbots that are already used for customer service.

2.4. Employee engagement and its five dimensions

This component of engagement is related not only to the relationship established between the employee and the customer, but to the connection between employees and the organization as well. Besides it, employee engagement can be divided in five main dimensions: employee satisfaction, employee identification, employee commitment, employee loyalty, and employee performance (Kumar & Pansari, 2014).

Employee satisfaction can be measured by the feelings, and emotions the employee express about his or her job, colleagues or organization (Heskett, Jones, Loveman, Sasser Jr. & Shlesinger, 1994). Supervisor and co-workers profile, payment conditions and level, and work environment are some examples of factors that contribute to employee satisfaction (Brown & Peterson, 1993). Employee satisfaction takes impact on the quality of work, employee turnover and absenteeism, and the identification between employees and organization (Kumar et al., 2016).

Employee identification is "*a psychological state wherein an individual perceives himself or herself to be part of a larger whole"* (Rousseau, 1998, p. 217). When employees reach this state, this means when an employee identifies himself or herself with the organization, the employee is connected with successes and failures, and consequently increases the commitment with the brand (Kumar et al., 2016).

Employee commitment is when employees are so involved with the organization that are willing to make efforts to reach a brand goal (Punjaisri, Khanyapuss, Evanschitzky & Wilson, 2009). Following a study provided by Lockwood (2007), employees with highest levels of commitment, show a performance 20% better than other ones, and are 87% more willing to stay at the company. Concluding, commitment can lead to loyalty (Kumar et al., 2016).

Employee loyalty can lead employees to work more and better, than what was expected for their organizations (Kumar et al., 2016). Employees with highest levels of loyalty are able to meet customers' needs, and to perform a good customer service (Schrag, 2009).

Employee performance is considered by Harris and De Chernatony (2001) a competitive advantage because of the capacity to deliver a good service to customers, retaining them. It is

very important because it is easier to retain instead of achieve new customers (Reinartz, Werner, Jacquelyn & Kumar, 2005).

2.5. Social interaction: trust the AI robot and willingness to use it

There are many organizations in service sector, introducing artificial intelligence robots to deliver services (Chi, Denton & Gursoy, 2020). Trust the robot is not the same to trust a common technological device. There is a group of factors that contribute to this difference: anthropomorphic designs, interaction functions, use of artificial intelligence, and complex service contexts. Besides trust the AI robot, there are other aspects that influence the use of it, such as robot use self-efficacy, and effort expectancy (Chi et al., 2021).

Robot use self-efficacy consists on the personal perception of the ability to use a robot (Turja, Rantanen & Oksanen, 2017). According to a study conducted, in health care services, by Latikka, Turja and Oksanen (2019), employees with higher levels of robot use self-efficacy are more willing to interact with AI service robots. From the customers point of view, the highest level of robot use self-efficacy, the highest acceptance to interact with AI robots, and to believe in a good service provided by the robot. Not only for employees, but for customers as well, higher levels of robot use self-efficacy lead to higher levels of trust. Consequently, trust the robot is not independent of robot use self-efficacy (Chi et al., 2021).

Anthropomorphism is the level of similarity of the robot when compared with humans. This point is not only related to human-like characteristics like appearance, but to human-like behaviours and emotions as well (Chi et al., 2021). Studies conducted concluded that customers are more willing to trust robots with human-like characteristics. With the help of artificial intelligence, humanoid robots are capable to act more similar to humans. Qiu, Li, Shu and Bai (2019) concluded that customers are more willing to establish a relationship with a robot they with human-like characteristics. More specifically, Xu (2019) found that users, employees, and customers, are more willing to trust a robot with human-like voice instead of machinelike voice. Concluding, anthropomorphism influences users' ability to trust the robot (Chi et al., 2021).

Effort expectancy is the effort, perceived by users, needed to interact with a robot in a service transaction (Gursoy, Chi, Lu & Nunkoo, 2019). Despite of the previous paragraph where is concluded that human-like characteristics influence positively users to trust the robot (Qiu et al., 2019; Xu, 2019), in some situations, these human-like characteristics can be faced as a negative impact. This argument is explained because of some users who think that a relevant psychological effort is needed to learn how to interact with intelligent robots, with artificial intelligence technologies, because of these human-like characteristics (Gursoy et al.,

2019). When users perceive that a significant psychological effort is required to learn how to interact with AI robots, they tend to have lower levels of trust in AI robots. For these reasons, the effort expectancy is one of the aspects that influence users to trust AI robots (Gursoy et al., 2019).

2.6. Perception of anxiety by the AI user

In order to study the perception of anxiety individuals have interacting with artificial intelligence, and the relationship of anxiety with the willingness to learn how to interact with AI devices, Wang and Wang (2019) divided this psychological effect in four dimensions: learning, job replacement, sociotechnical blindness and AI configuration.

According to Piniel and Csizér (2013), individuals capable to manage anxiety, are more willing to learn more, and improve professional knowledge and skills. This means that the most capable users are to facilitate anxiety, the highest degrees of willingness to learn specific skills to interact with AI robots or software (Wang et al., 2019). Regarding job replacement, Wilson and Daugherty (2018) defend that AI should be used as a tool to augment human employees at work, and not to replace them. In 2017, a study conducted by McKinsey Global Institute, concluded that until 2030, a range of 75 million to 375 million workers around the world will need to change their occupation, or improve their professional skills (Manyika, Lund, Chui, Bughin, Woetzel, Batra, & Sanghvi, 2017). Finally, sociotechnical blindness, and AI configuration are two factors that can influence the anxiety felt by AI users as well, so are also important to measure it (Wang et al., 2019).

2.7. Job stress working side by side with artificial intelligence robots/software

Karasek and Theorell (1990) studied the relationship between some characteristics at the workplace, and stress felt by workers and employees. For that, there is a model where three dimensions, demands, control and support, are compared with stress felt by employees.

Demands represent psychological factors that can change the environment at the workplace, such as deadlines, or tasks that need to be done fast. Control is related to the capability of the worker to use own capacities to develop tasks, for instance skills, expertise, knowledge, or possibility to choose what and/or how to do his/her own work.

When there are high levels of demand, and low degrees of control, the worker is in a high level of stress because there are many factors that influence stress positively, and there are no capabilities for the employee to choose how to do the work. When demand and control are low, it is not positive for the employee as well because it can lead to loss of capabilities. When both

factors have high degrees, the employee is in an active situation, despite high demands he/she is able to choose, what/how to do, and has skills and knowledge needed. Finally, when the employee has low demands and high control, reaches the perfect match, because there are no factors to increase stress in the workplace environment, and the employee is capable to control is own work and tasks (Karasek et al., 1990).

The third dimension of the model is support. This support is related to the relationship and interactions of the employee not only with co-workers but with supervisors and directors as well. When this level of support is low, the stress risk for the worker is higher (Karasek et al.,1990).

2.8. Happiness as a representation of well-being perception, and self-esteem

As anger, fear, sadness and disgust, happiness is one of the five primary emotions felt by individuals (Russell, 1991). Happiness is composed by an interaction between internal and external perspectives (Loureiro et al., 2019). The internal one refers to situations when the individual is capable to change his/her own emotional regulation (Lutz, McFarlin, & Perlman, 2013), in an action that requires resilience, and patience (Lazar, Kerr, & Wasserman, 2005).

On the other hand, the external one is dependent of external events, and conditions, that can occur. For Hausman and McPherson (2006), external stimulus influence internal happiness. External happiness being dependent of external conditions and events experienced, can be evaluated as an hedonic perception of happiness, being vulnerable and less pleasurable (Frederick, & Loewenstein, 1999).

Self-esteem is a complex state of individuals. In order to measure it, Rosenberg (1965) constructed a scale where in 10 items individuals are asked about positive, and negative feelings felt by themselves.

3. Study 1: Interviews

3.1. Interviews procedure

For this study, 9 interviews were done in a universe of retail, and hospitality and tourism workers'.

The main objective with this study was to comprehend what people think AI is, if they already work with it, if they think it would be positive to work side by side with artificial intelligence devices or software, and what are the opinions, emotions, and feelings about all these issues regarding AI. In order to reach all these aspects, 29 questions (Appendix A) were asked during each interview.

As the study collects qualitative data it was used the programme ATLAS TI, version 9, to analyse data and organise it. It was chosen this programme because with it, was possible to build network graphics, turning easier the articulation of ideas. With the analysis done with ATLAS TI, it was possible to reach some conclusions.

3.2. Interviews findings

Analysing the interviews, it is possible to understand that people does not really know what artificial intelligence is. Firstly, considering Appendix B I., it is possible to observe that only three in nine respondents said that artificial intelligence is present in their business processes. This is an important aspect because considering the tasks that each one of the nine respondents usually do in their workplaces, it is easily observed that all of them deal with AI software or devices daily. From here, it is possible to conclude that people already use artificial intelligence software but they do not know it. This fact means that people do not have the right idea about what AI is.

Regarding opinions about the application of artificial intelligence for business processes, it is unanimous that AI should be used to complement human employees' work. This way, all participants think AI technology should be used for some tasks of the business processes (Appendix B II.).

Moreover, it is possible to conclude that there are two principal applications of AI from the point of view of the participants. Data analysis, that is considered by all respondents a possible application of artificial intelligence, and AI for repetitive and mechanical tasks. Despite the previous conclusion, where only three respondents answered that AI is present in their daily work tasks, actually all of them already deal with AI software or devices.

These two possible applications more referred on the interviews are matched with the two lowest levels of AI. Mechanical AI and thinking, analytical AI. Moreover, these two types of AI are the ones more present in society, and consequently, in business processes at organizations, including retail, and hospitality and tourism sectors. The industries of the respondents. This seems nonsense, however it reinforces that the participants already work with AI but they do not know what AI actually is.

Beyond these two possibilities, it was proposed to use AI for customer service, a point that is already a reality with chatbots in websites for example, AI with management capabilities and AI to understand what influences the well-being of human employees. This last application is the most curious one because it requires the need to feel human emotions. So, it is related with feeling AI, that is the highest level of intelligence and something that does not exist yet.

Finally, one of the participants proposed to use AI that could react to stimuli defined by humans. However, this participant referred that was very important to assure that the technology should not be able to act by its own, never. That means that intuitive AI is not a convenient aspect for this respondent.

Considering the participants' opinions about the inclusion of AI in their work tasks, it is possible to conclude that AI is very well received when it turns processes easier and faster, increasing productivity, and efficiency (Appendix B III.). One of the respondents answered that a positive consequence of the introduction of AI is the reduction of mistakes in the processes, and consequently a reduction of costs.

It is also referred by two participants that AI could reduce stress and anxiety at work. Replacing human employees in some tasks, mechanical ones, as already mentioned above, artificial intelligence could reduce workload as well. This is an answer present in four interviews.

Three participants think that AI could motivate, and bring happiness to the workplace. This fact can be explained by the opinions observed, and reported above. These feeling can lead to the subjective state of well-being.

Besides these positive points, only one participant assumed that AI could increase employee commitment. However, the happier and motivating the work is, the more committed the workers should be.

Concluding, and making a bridge between these conclusions collected, and employee engagement, it is possible to introduce these points in a network of ideas in a sequence. Firstly, it is evident that for the respondents AI turns tasks easier and faster. It increases productivity

and efficiency. Because of these consequences of AI, it brings happiness and motivation to the employees. These are factors that not only take a positive impact on the well-being of the employees, but it leads to a level of employee engagement that is so important for the organizations.

However, considering the opinions present on the Appendix B IV., four participants consider that AI would take a negative impact on the well-being, because the absence of human contacts and relations. Four participants even say that AI could never replace human employees, mainly because of the human interaction, and contact. That means that people do not believe in AI with communication skills. One participant considers that is not ready for the change now, and two respondents reported an important point. Unemployment. One of the most evident consequences of the introduction of AI in organizations is the unemployment. Replacing human employees responsible of mechanical tasks for example, leads to an increase of unemployment. This is an aspect that needs to be considerate not only for society, but for economy as well. Related to this topic, most of the participants answered that this replacement would bring a negative psychological impact on the human employees replaced.

On the Appendix B V., it is possible to observe some moderated opinions about the introduction of AI in business processes.

Four participants considered that AI is only capable to perform some tasks if it has communication skills. One more time, the respondents show some doubts about the possibility of an artificial intelligence device or software with communication skills.

Regarding relationship work, seven participants consider that the relationships in a team working side by side with AI would not be the same because of the absence of feelings and emotions of artificial intelligence. From these answers, there are two outputs that should be retrieved. One, is that the respondents consider that developments of AI would never reach the highest level, feeling AI. The other one, is that once more, people do not have a clear idea about what AI is. As it was already explained in this report, in every office with computers, people already work with AI. These teams already work with AI. But people keep thinking AI is a robot or something tangible. One participant even said that work side by side with AI would be scared. The point is that, as a product manager, she already works with AI but she does not know.

Two participants consider that AI can be introduced in processes where humans do not add value. Mechanical tasks for example.

As it was already reported, is unanimous that AI can supplement human employees, however two participants consider that augmentation, when a human and AI perform a task, is possible, but in the future, not for the present, considering that AI needs much more development.

Considering adaptation issues, opinions are divided (Appendix B VI.). It is possible to observe participants reporting that it would be difficult to adapt at the beginning, but facing the benefits of it will be easy to implement over time. But there are employees answering that is very difficult to implement, because of change avoidance, and one participant consider that this implementation requires a cultural change inside organizations.

Other opinions are the necessity of training, and one respondent said that if the AI only executes orders it would be easy to implement. On the other hand, if the device or software is able to act independently, the participant assumed that would be hard to implement it.

Finally, most of the respondents would feel positive to work with AI, and four of them would feel innovative (Appendix B VII.). Only one of the respondents assumed that would feel comfortable to work with AI, and one other would consider himself a pioneer. Reinforcing the opinion of some participants that AI is not used yet in organizations.

3.3. Interviews conclusions

The first point that should be mentioned is that, in general, the participants do not know exactly what artificial intelligence is. It is possible to understand that all participants deal with AI software daily at their workplace and in their personal life. However only three of them reported it.

Other idea, now unanimous in all interviews, is the acceptance of AI to complement human intelligence but not to replace it. Analysing the interviews, there are two main applications for AI: data analysis, collecting and gathering data, and for repetitive and mechanical tasks. From the perspective of the participants, the applications of AI are related with the lowest levels of AI: mechanical and analytical AI.

Participants consider that AI avoids mistakes, and turns tasks easier (Figure 3.1.). Performing repetitive tasks it reduces anxiety and stress at workplace. AI can bring motivation and happiness to the workplace, influencing the perception of well-being (Figure 3.1.).

Regarding negative aspects, participants reported that the reduction of contacts and relations between human co-workers takes a negative impact on individuals' well-being. Unemployment associated with the introduction of AI technologies in organizations is another

negative aspect from the participants' perspective. Some of them argued that it can take a negative psychological impact on human employees that are replaced.

Concluding, there are pros and cons using artificial intelligence in organizations. Despite negative aspects as unemployment, for example, this introduction is seen by the participants, in general, as a positive evolution.

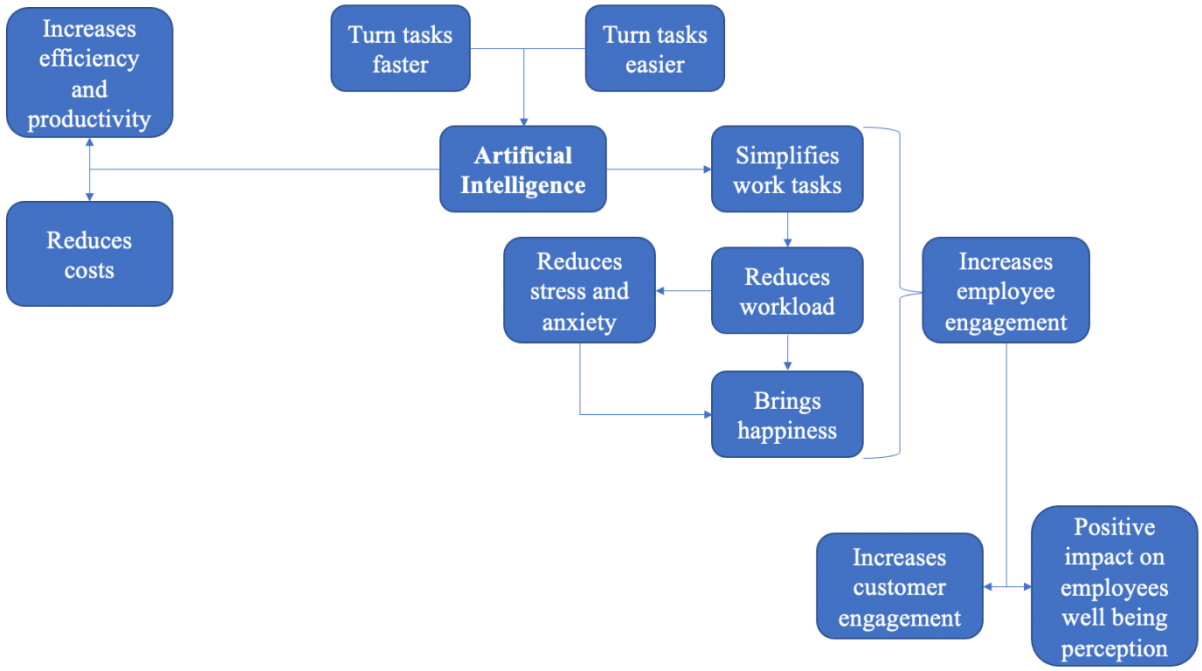

Figure 3.1. Interviews outputs framework
Source: Own elaboration based on ATLAS TI outputs

4. Study 2: Focus Group

4.1. Focus group procedure

Two distinct focus groups were conducted, following the guide in Appendix C. On both were given two different scenarios: one with an AI robot and the other one with AI software (Appendix C).

The first focus group was done with four participants and the moderator. The second one was composed by five participants and the moderator. Despite Malhotra (2010) defends groups with more people, the author considers that is important to debate opinions with this method. As the moderator was not an expert doing these procedures it was decided to reduce the number of participants to secure a productive debate, and to get interesting conclusions.

The first focus group was composed only by one person from retail industry, the other three participants were asked to imagine themselves in specific situations or to answer considering their consumer behaviour. In this case the group participated in the focus group with their previous knowledge. No explanations, and depth knowledge about AI was provided.

The second focus group was different. Not only all five participants are retail or hospitality and tourism workers, but in this case, at the beginning of the debate, the moderator provided some explanations about AI, important for the discussion.

Once more, ATLAS TI was used to analyse data.

4.2. Focus group findings

Analysing the first focus group, the respondents have had some doubts about the type of artificial intelligence present on the first scenario. The presence of mechanical and analytical artificial intelligence was consensual. However, one participant said that intuitive AI would be present in this scenario as well, because of some tasks described. Another participant have had some doubts about this possibility (Appendix D I.).

When asked about the applications of AI in restaurants, the participants concluded that this use depends on the type of restaurant it is. A restaurant where a premium service is provided is not so compatible with AI, as a fast food restaurant, from the point of view of the participants. The type of customers is another factor that influence this implementation. Despite that, AI can be used in any restaurant, at least in tasks the customer does not see. For example, inside kitchen as the first scenario described (Appendix D II.).

During the debate, the group concluded that work with AI turns tasks easier. It reduces costs in organizations, increasing efficiency and profitability. The participants considered that

as artificial intelligence devices and software do not communicate, and have no feelings and emotions, it is easier to manage a team with AI. For all that reasons, all participants would like to work with artificial intelligence (Appendix D III.).

However, some negative aspects were reported. Firstly, there is a fear of AI, because of being new. For the participants, the main problem of the introduction of AI in organisations is social and economic, the reduction of human employees, and consequently the increase of unemployment. In a team with AI, human employees would be more qualified, and the group thinks that artificial intelligence is not able to communicate without previous inputs. For example, AI cannot give an opinion by itself. Finally, feeling AI skills are only available in human employees, from the point of view of the four participants (Appendix D IV.).

The debate about the second scenario presented, considered that analytical AI was the one used in this case (Appendix D VI.). The participants concluded that AI can collect and analyse data in a proportion that humans were not able to do. For that reason, artificial intelligence is useful for marketing and strategy not only in retail, but in many other industries (Appendix D V.).

This part of the debate was dominated by the worker in retail sector. The marketing manager reported that this type of AI is already very common in organizations, and very useful to collect data from huge numbers of customers, or potential customers. After that, it is possible to take conclusions and decisions, taking in account the analysis of data.

Finally, one of the participants remembered that this type of artificial intelligence is present in every social media network, the common AI algorithms, to influence the user to a specific brand or product showing an advertise (Appendix D VI.).

The second focus group was done with five participants, three of them workers from retail sector, and the other two, workers from hospitality and tourism. In this case, the moderated provided a briefing about artificial intelligence, and some important explanations for the debate.

The group considered, without any doubts, that the type of AI present in the first scenario is mechanical and analytical AI (Appendix E I.).

As the opinions collected during the first focus group and the interviews, participants appreciate AI because it turns tasks easier and faster at work. The group reported that artificial intelligence can replace humans in some tasks, complementing human intelligence. This way, the focus group concluded that augmentation is possible, and positive. This possibility reduces costs, and increases efficiency (Appendix E II.).

A consequence of the replacement of some tasks in workplaces is the increase of unemployment. This fact was pointed by the group as the most negative aspect of the introduction of AI (Appendix E III.). Once more, it coincides with opinions collected during the other focus group, and some of the interviews.

Regarding the second scenario, participants reported that there is only one type of AI in this situation, analytical AI. The group considered that this type of artificial intelligence is useful to analyse data, in order to comprehend consumer behaviour, for example. The participants from retail sector affirmed that this software is already used in retail firms. These ones argued that this type of tasks are only possible with this software (Appendix E IV.) The same opinion of the marketing manager in retail sector, present on the first focus group (Appendix D II.).

Finally, the participants considered that intuitive AI is not already used. However, it can be a possibility for the future to take decisions based on the analysis done by analytical AI (Appendix E IV.).

4.3. Focus group conclusions

Comparing the results obtained on both focus groups, it is possible to conclude that there is more knowledge about the scenario with artificial intelligence software/algorithms. It can be explained because the participants of the second scenario are more connected with AI at workplace to solve tasks. However, this conclusion can be explained, as well, because AI software/algorithms, in general, are more common and more present, not only in individuals workplaces but on their personal actions, for example in a supermarket. This is observed on the second scenario, AI software/algorithm, where some of the participants already deal with this type of technology at their workplace. This turned easier the task of identify which type of AI, mechanical, analytical, intuitive or feeling, was present on the scenario. On the other hand, on the first scenario with the AI robot, there were doubts about the type of intelligence of the robot. It is not clear if it is only used analytical intelligence, or if it is present intuitive intelligence as well.

Other point that can be concluded is that an AI robot scares the participants because of job replacement. In the AI software/algorithm scenario this fear is not observed.

Finally, on both scenarios participants argued that mechanical AI is common and useful. On the other side, feeling emotions, feeling AI, is considered a capacity only present on human employees.

5. Conceptual Model and Investigation Hypothesis

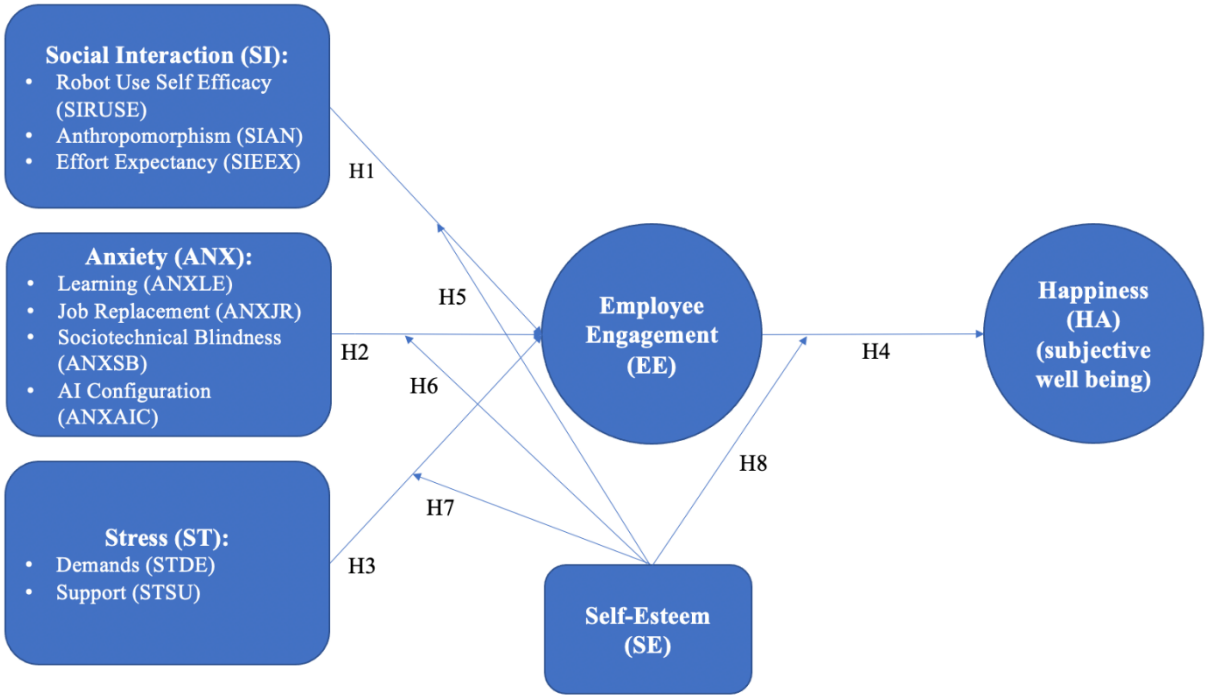

Figure 5.1. Conceptual model
Source: Own elaboration

As it was already explained, the theme studied in this Thesis is recent, for that reason there is not enough information published. That is why the research previously done, is not sufficient to build a conceptual model for the study. This way, the conceptual model (figure 5.1.), explained in this chapter, was based on the research reported on chapter 2, but mainly based on the qualitative data collected and analysed in chapter 3, interviews, and chapter 4, focus groups.

Employee engagement (EE) is in this model to measure employee: satisfaction, identification, commitment, loyalty and performance (Kumar et al., 2014), all grouped in the construct.

Regarding social interaction (SI), it is about the willingness to interact with the AI device. That interaction only occurs when the user trust the robot or the software. Following Chi et al., 2021, this trust is associated with, the own perception of ability to use the robot represented by the variable robot use self-efficacy (SIRUSE), the level of similarity between the robot and humans, variable anthropomorphism (SIAN), and the effort that users think is needed to interact with the robot, variable effort expectancy (SIEEX). So it is relevant to test if social interaction (SI) is a driver for EE.

H1: Social Interaction (SI) is positively associated with Employee Engagement (EE)

Following Wang et al. (2019), the perception of anxiety is divided in four dimensions: learning (ANXLE), job replacement (ANXJR), sociotechnical blindness (ANXSB) and AI configuration (ANXAIC). This anxiety felt by AI users is also relevant to explain employee engagement (EE) while using AI, because it mentions aspects found in the interviews, and focus groups conducted.

H2: Anxiety (ANX) is positively associated with Employee Engagement (EE)

The model defended by Karasek et al. (1990), to analyse stress (ST) felt by workers, and employees, is important to analyse some characteristics at the workplace. In the model, this construct is divided in two dimensions: demands (DE) and support (SU). Having AI devices at workplace it is relevant to comprehend if stress (ST) influences EE.

H3: Stress (ST) is positively associated with Employee Engagement (EE)

In this model, happiness (HA) is considered a representation for the subjective well-being. Following Loureiro et al. (2019), happiness is an interaction between internal and external perspectives. The relationship between the feelings revealed by EE and happiness (HA) is analysed as well.

H4: Employee Engagement (EE) is positively associated with Happiness (HA)

Finally, it is tested if self-esteem (SE) (Rosenberg, 1965), is a moderator of all four relationships explained above.

H5: Self-Esteem (SE) moderates the relationship between Social Interaction (SI) and Employee Engagement (EE)

H6: Self-Esteem (SE) moderates the relationship between Anxiety (ANX) and Employee Engagement (EE)

H7: Self-Esteem (SE) moderates the relationship between Stress (ST) and Employee Engagement (EE)

H8: Self-Esteem (SE) moderates the relationship between Employee Engagement (EE) and Happiness (HA)

All eight hypothesis are double. ".a" to test the hypothesis in the scenario with AI robot, and ".b" to test it in the scenario with AI software.

6. Study 3: Survey

6.1. Survey procedure

Two questionnaires, with two scenarios, were conducted to collect data in a larger scale. On both, participants were asked to imagine themselves in a scenario. The scenarios are the same used in the focus groups. On both, 6 scales were adapted to a perspective related to artificial intelligence, as it was already explained in Chapter 1.4. Methodology overview, and answers are done using Likert scale from "1 (Strongly disagree)" to "7 (Strongly agree)". Three main areas are approached with this study: employee engagement, social interaction and emotions that influence self-esteem, for instance anxiety, job stress, and happiness. Sociodemographic aspects were asked as well.

The questionnaires were shared in three social networks: Instagram, Facebook and LinkedIn, only for residents in Portugal. Six sociodemographic variables, gender, age group, country of residence, highest education level obtained, employment status, and annual household income, were asked in order to characterize the sample. Answers are completely anonymous. Finally, the analysis of the results obtained with this study were done with the computer programme SPSS, version 26. Using SPSS, it was possible to conduct a group of analysis, such as, a reliability analysis, with the Cronbach's Alpha test, Descriptive Analysis, Simple and Multiple Linear Regressions Analysis, and Moderation analysis.

6.2. Survey findings

6.2.1. Sample description

Considering both questionnaires, on the AI robot one, 203 valid responses were collected, which 107 (52.7%) are females and 95 (46.8%) are males. One (0.5%) of the participants preferred not to reveal what was his/her gender. On the questionnaire with an AI software scenario, 97 (48.5%) responses correspond to female gender, and 102 (51%) participants are males. Once more, one (0.5%) of the participants preferred not to reveal what was his/her gender, collecting this way a total of 200 valid answers (Table 6.1.).

Table 6.1. Gender distribution

GENDER DISTRIBUTION				
	AI Robot scenario		AI Software scenario	
	Frequency	Percent	Frequency	Percent
Male	**95**	**46.8**	**102**	**51.0**
Female	107	52.7	97	48.5
Prefer not to say	**1**	**0.5**	**1**	**0.5**
Total	203	100	200	100

Source: Own elaboration based on SPSS outputs

Regarding age groups of the scenario with AI robot, more than half of the sample belongs to the age group 18-24 years old, with 117 respondents in this group, representing 57.6% of responses. The lowest age group is more than 65 years old, with only one respondent, representing 0.5% of the sample. It is also possible to conclude that 41.9% of the sample is comprised between 25 and 64 years old. Finally, as the Mean of the age groups variable in this case is 1.98, it means that the average age of the sample is between the first and second age group, 18-34 years old.

On the questionnaire with AI software, 80.5% of the sample belongs to the first age group, between 18 and 24 years old, with 161 respondents. Only one respondent corresponds to the age group with more than 65 years old. The ages of the remaining 38 respondents are comprised between 25 and 64 years old. With a value of 1.56 for the Mean of the age group variable, it is possible to find that the average of ages is between 18-34 years old (Table 6.2.).

Table 6.2. Age group distribution

AGE GROUP DISTRIBUTION						
	AI Robot scenario			AI Software scenario		
	Frequency	Percent	Cumulative percent	Frequency	Percent	Cumulative percent
18 to 24	**117**	**57.6**	**57.6**	**161**	**80.5**	**80.5**
25 to 34	29	14.3	71.9	13	6.5	87.0
35 to 44	**14**	**6.9**	**78.8**	**4**	**2.0**	**89.0**
45 to 54	31	15.3	94.1	18	9.0	98.0
55 to 64	**11**	**5.4**	**99.5**	**3**	**1.5**	**99.5**
>64	1	0.5	100	1	0.5	100
Total	**203**	**100**		**200**	**100**	
Mean		1.98			1.46	

Source: Own elaboration based on SPSS outputs

As it was already mentioned in this report, only respondents living in Portugal were considered valid, on both questionnaires (Appendixes H IV. a) and H IV. b)).

On the questionnaire with a scenario of an AI robot, 119 respondents, 58.6% of the sample, completed a Bachelor's degree, being this level of education the most common in the sample. The second biggest group is the one that concluded a Master's degree or above it, with 55 (27.1%) respondents. Finally, 26 (12.8%) participants concluded the Highschool level and only three (1.5%) participants answered "Other" education level.

The distribution of respondents on the questionnaire with AI software is similar to the one mentioned above. The biggest group of highest education level completed is the Bachelor's degree, with 119 (59.5%) respondents, the second one is Master's degree or above, 68 (34%)

respondents, and only 13 (6.5%) participants answered that Highschool was the highest education level completed (Figure 6.1.).

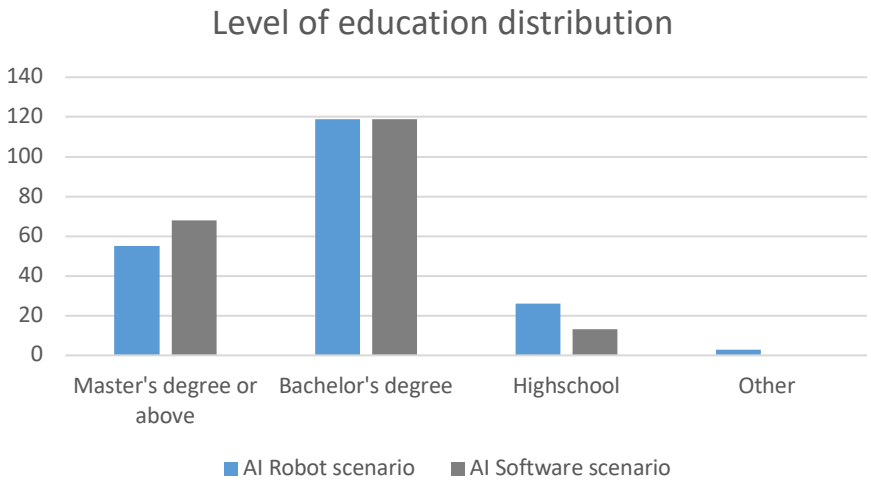

Figure 6.1. Level of education distribution
Source: Own elaboration based on SPSS outputs

Concerning the employment status (Figure 6.2.), on the questionnaire with an AI robot, the majority of the sample is employed, with 111 participants (54.7%), or studying, 58 respondents (28.6%). On the other hand, the smallest groups of this variable are the retired ones, 3 participants (1.5%) and the self-employed with 5 respondents (2.5%).

On the questionnaire with AI software, there are three main groups of this variable. Employed, 84 respondents (42%), student, 62 respondents (31%) and student/employed, 46 of the total of 200 participants (31%). In this case 1 participant is retired (0.5%), 2 participants (1%) are self-employed and 5 respondents (2.5%) are unemployed.

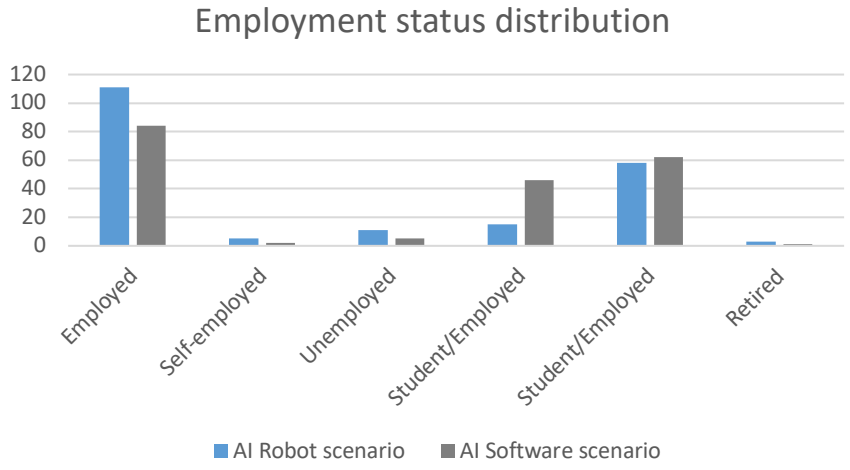

Figure 6.2. Employment status distribution
Source: Own elaboration based on SPSS outputs

Finally, the last sociodemographic variable is the annual household income (Figure 6.3.). On the questionnaire with AI robot, the biggest group of this variable is the one between 25,000€ and 50,000€, composed by 88 participants (43.3%). Followed by the 60 participants (29.6%) with less than 25,000€. Only three participants (1.5%) answered more than 200.000€.

On the questionnaire with AI software, 78 participants (39%) answered less than 25,000€, and 76 respondents (38%) belongs to the group between 25,000€ and 50,000€. These are the two biggest groups. The smallest group is composed by only one participant (0.5%) that answered more than 200,000€.

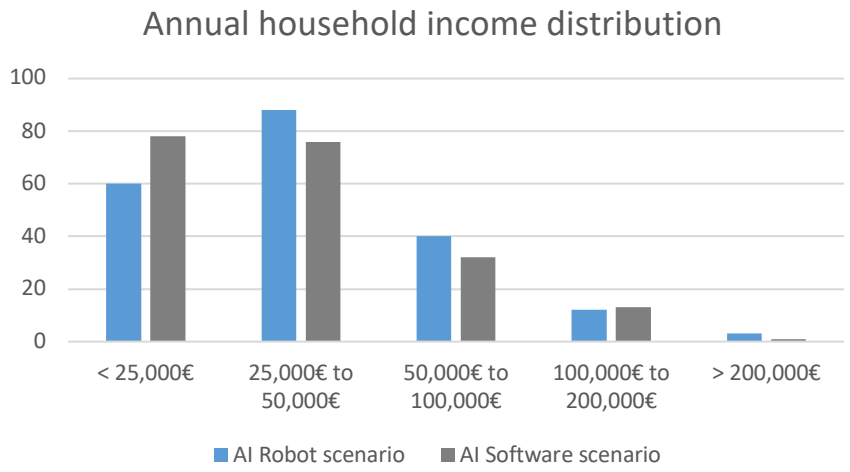

Figure 6.3. Annual household income distribution
Source: Own elaboration based on SPSS outputs

6.2.2. Reliability Analysis

In order to study the internal consistency of each one of the six constructs of the conceptual model, it was conducted a reliability analysis, using the most used tool for this analysis, Cronbach's Alpha (Hair, Black, Babin & Anderson, 2014).

The Cronbach's Alpha is normally between 0 and 1. The closest this is number is to the upper limit (1), the higher is the internal consistency of the construct. Despite some authors defend a minimum valid value of 0,7 for the Cronbach's Alpha, Hair, et al. (2014) consider that a value of 0.6 is enough in explanatory analyses. Moreover, George and Mallery (2003) attribute the following categorization for the Cronbach's Alpha values: ≥ 0.9 → Excellent; ≥ 0.8 → Good; ≥ 0.7 → Acceptable; ≥ 0.6 → Questionable; ≥ 0.5 → Poor; and ≤ 0.5 → Unacceptable.

Table 6.3. Cronbach's Alpha

CRONBACH'S ALPHA		
	AI Robot scenario	AI Software scenario
Social Interaction	0.700	0.613
Anxiety	**0.927**	**0.914**
Stress	0.625	0.703
Happiness	**0.763**	**0.754**
Employee Engagement	0.956	0.950
Self-Esteem	**0.848**	**0.828**

Source: Own elaboration based on SPSS outputs

Observing the Cronbach's Alpha (Table 6.3.) of every construct in both questionnaires, and considering the argumentation of Hair, et al. (2014), it is possible to say that all constructs have an acceptable, or higher, value for this tool in both scenarios of questionnaires.

Analysing the Cronbach's Alfa of each construct of the questionnaire with a scenario of an AI robot, it is possible to conclude that the construct Employee Engagement is the one with highest consistency, having the highest Cronbach's Alpha value, 0.956. On the other hand, Stress, is the construct with the lowest Cronbach's Alpha value, 0.625. For that reason it is possible to conclude that is the construct that presents less consistency.

Making the same analyses for the questionnaire with the scenario of an AI software, once more the construct with more consistent responses is Employee Engagement, with the highest Cronbach's Alpha, 0.950. However, in this scenario, Social Interaction is the construct with the lowest Cronbach's Alpha, 0.613, consequently, it is the construct where respondents were not so consistent.

6.2.3. Descriptive Statistics

After computing the variables by the mean for each dimension, and then for each one of the six constructs of the conceptual model, it is possible to introduce in this section the descriptive analysis, not only for each item but for the variables created for each dimension, and construct as well. This analysis include the examination of the Mean, Standard Deviation, Skewness and Kurtosis.

6.2.3.1. Social Interaction

This construct, Social Interaction (SI), is composed by 16 items grouped in three dimensions: Robot Use Self Efficacy (SIRUSE), Anthropomorphism (SIAN) and Effort Expectancy (SIEEX).

Observing Appendix J I. a), and analysing the questionnaire with the scenario of an AI robot it is possible to conclude that the item SIRUSE2 is the one with the highest agreement by the respondents. This conclusion is possible to be made because of the Mean value of this item, 5.83, that is the highest in this construct meaning that on average respondents answered between "Somewhat agree" and "Agree". On the other hand, the item with lowest Mean, 2.08, is SIAN6, meaning that on average participants answered "Disagree"/"Somewhat disagree".

Regarding Standard Deviation, the item SIEEX4 has the highest value for this parameter, 1.867, meaning that was the item with the highest disparity of answers. In contrast, the item SIRUSE2 is the one where opinions are more similar, having the lowest value of Standard Deviation of the construct, 1.307.

The construct SI has a Mean value of 3.5, "Somewhat disagree"/"Neither agree nor disagree", and a Standard Deviation of 0.607. Besides this parameters, it is possible to assume the normality of data distribution because the values of Skewness, 0.198, and Kurtosis, -0.364, for this construct are both in the range [-2;+2] (George & Mallery, 2010).

The Appendix J II. a), related to the questionnaire with an AI software, presents that item SIRUSE2 is the one with the highest Mean, 5.55, meaning on average the answer was between "Somewhat agree" and "Agree". For that reason, is the item that participants mostly agree with. The lowest Mean, 2.28, "Disagree"/"Somewhat disagree", is assigned to the item with lowest opinions' level of agreement, SIAN6. Analysing Std. Deviation values, it is possible to assume that variable SIAN5 is the one with the lowest value for this parameter, 1.350, so it is the one with more similar answers. The participants' opinions diverge more in item SIAN1, having the greatest Std. Deviation value, 1.718.

The whole construct SI in this case, has a Std. Deviation of 0.577, and a Mean value of 3.698, in other words, on average participants answered between "Somewhat disagree" and "Neither agree nor disagree" in this section. As Skewness is 0.538, is in the range [-2;+2], so it is possible to assume the symmetry of data distribution (George et al., 2010). Regarding Kurtosis value, 2.109, it is out of the range, [-2;+2], that George et al. (2010) defend to be assumed a normal data distribution. However, as the limit is narrowly exceeded, and following Kallner (2018), as this value is in the range [-3;+3] it is possible to assume the normality of distribution.

6.2.3.2. Anxiety

Anxiety (ANX) is the biggest construct, divided in four dimensions: Learning (ANXLE), Job Replacement (ANXJR), Sociotechnical Blindness (ANXSB) and AI Configuration (ANXAIC). These dimensions are grouping a total of 21 items.

Appendix J I. b) presents the descriptive statistics for the Anxiety construct. Analysing the questionnaire with AI robots, it is possible to argue that item ANXSB1 is the one with the highest level of agreement by the respondents, because of the highest Mean value on the construct, 5.55. In the opposite, is the item ANXLE6, with the lowest Mean value, 2.47, meaning that on average respondents answered between "Disagree" and "Somewhat disagree" to this item.

Regarding the similarity between answers, ANXLE3 is the item with the lowest Std. Deviation value, so is the one where answers were more similar. In contrast, with the highest Std. Deviation value, 2.142, ANXSB4 is the item that presents the biggest disparity of answers on the construct ANX. The Mean for the construct is 3.861, "Somewhat disagree"/"Neither agree nor disagree", and the Standard Deviation is 1.164. The normality of the data distribution of this construct is assumed because the values of Skewness, 0.045, and Kurtosis, -0.462, are inside the range [-2;+2] (George et al., 2010).

Doing the same analysis for the questionnaire with AI software, the item ANXSB1 is the one with highest level of agreement by participants, being the one with highest Mean, 4.79. On the other hand, with the lowest Mean value of 2.51, between "Disagree" and "Somewhat disagree", AXLE5 is the item that participants disagree the most. As item ANXLE6 has the lowest Std. Deviation, 1.481, is the one where participants' opinions are more similar. The highest Std. Deviation, 1.927, and consequently with the greatest dispersity of answers, is attributed to the item ANXJR4 (Appendix J II. b)).

On average, participants "Somewhat disagree"/"Neither agree nor disagree" with the construct Anxiety – Mean value: 3.249. The Std. Deviation is 1.022. Finally, it is possible to assume the normality of distribution because Skewness, 0.585, and Kurtosis, 0.413, belong to the range [-2;+2] (George et al., 2010).

6.2.3.3. Stress

Stress (ST) is a construct divided only in two dimensions: Demands (STDE) and Support (STSU), joining a total of 11 items.

In this construct, beginning with the questionnaire with the robot scenario, presented in Appendix J I. c), the item where the agreement level is the highest is STDE4, with the highest Mean value, 4.58, between “Neither agree nor disagree” and “Somewhat agree”. In a different situation is STSU4, with the lowest Mean, 2.26, “Disagree”/”Somewhat agree”.

The Std. Deviation of the item STSU6 is the highest, 1.807, meaning that is the one where answers are more dispersed. In contrast, STDE4 is the item with answers more similar, because of its Std. Deviation value, 1.431, which is the lowest in this construct.

The Mean of this construct is 3.653, meaning that on average participants answered between “Somewhat disagree” and “Neither agree nor disagree”. In this construct the Standard Deviation is 0.782. As Skewness and Kurtosis values are -0.004 and 1.449 respectively, are both belonging to the range [-2;+2], it is possible to assume the normal distribution of Stress construct (George et al., 2010).

Observing Appendix J II. c), it is possible to conclude that item STSU4 is not only the one which participants most “Disagree”/”Somewhat disagree”, because of the lowest Mean, 2.50, but is the one with the highest disparity of opinions by participants, because of being the one with the highest Std. Deviation, as well. In contrast, item STSU6, is the one the highest Mean, 4.96. So is the item with highest level of agreement. As item STSU3 has a Std. Deviation of 1.191, the lowest one, is the variable which generates greater consensus among participants.

Regarding the construct, the Mean is 3.994, and the Std. Deviation 0.660. Following George et al. (2010), the normality of data distribution is assumed because Skewness, 0.492, and Kurtosis, 1.717, belong to the range [-2;+2].

6.2.3.4. Happiness

Happiness (HA) is the construct with less items. Only three. Observing Appendix J I. d), related to the questionnaire with a scenario with AI robots, the item with lowest Mean is HA1, 2.56, between “Disagree” and “Somewhat disagree”. The item HA3 is the one with highest Mean on the construct, with a value of 3.95, meaning that on average participants answered between “Somewhat disagree” and “Neither agree nor disagree”. As the Std. Deviation of HA1 is the lowest, 1.425, it means that this item is the one where answers are more similar. The other two items of the construct have Std. Deviation values very similar. However, HA2 is the item with the highest Std. Deviation, 1.637, so is the one where the disparity of answers is the biggest.

The Mean of the construct is 3.379, so on average the answer was between “Somewhat disagree” and “Neither agree nor disagree”, and the Std. Deviation is 1.292. The Skewness

value of the construct is 0.009, and the Kurtosis value -0.289. As the values are both in the range [-2;+2], it is possible to assume that the distribution of data is normal (George et al., 2010).

Appendix J II. d) presents the descriptive statics of the smallest construct, in AI software questionnaire. Analysing it, it is possible to say that HA1, having the lowest Mean, 3.40, between "Somewhat disagree" and "Neither agree nor disagree", is the item which participants most disagree and at the same time is the one with more similar opinions because of having the smallest Std. Deviation, 1.353. The item HA3 is the one with highest Mean, 4.64, so is the one which participants most agree, and the one with highest disperse of participants' opinions – highest Std. Deviation value: 1.410.

The construct has a Mean of 4.130, meaning that on average participants do not have a concrete opinion about this topic. The Std. Deviation of HA is 1.134. Once more, having values in the range [-2;+2] for Skewness, -0.224, and Kurtosis, 0.178, it is possible to assume the normal distribution of data (George et al., 2010).

6.2.3.5. Employee Engagement

The construct Employee Engagement (EE) is divided in five dimensions: Satisfaction (EESA), Identification (EEID), Commitment (EECO), Loyalty (EELO) and Performance (EEPE), that are grouping a total of 20 items.

Analysing the questionnaire with the AI robot (Appendix J I. e)), the item EELO3 presents the lowest Mean, 2.76, between "Disagree" and "Somewhat disagree", so is the one with which participants agree the less. On the other hand, EELO2 presents a Mean of 4.65, between "Neither agree nor disagree" and "Somewhat agree", and is the highest of the construct. Regarding the disparity of participants' opinions, the item EEID1 is the one with answers more similar because of having the lowest Std. Deviation, 1.532. The item EEID7 is the one with the highest Standard Deviation value, 1.908, so is at the same time the one where the disparity of answers is greater.

On average, participants answered between "Somewhat disagree" and "Neither agree nor disagree" in this construct, observing the Mean value of 3.502. The Std. Deviation is 1.242. Once more Skewness value, 0.55, and Kurtosis value, -0.596 belong to the range [-2;+2], so it is possible to assume the normality of the distribution for the construct (George et al., 2010).

On the questionnaire with an AI software (Appendix J II. e)), the item EEID1 is the one with highest Mean, 4.86, so it was the sentence that participants most agree with. On the other hand is EELO3, which is the one with lowest Mean, 3.31, meaning that is the one with lowest level of agreement. EEID7, with the highest Std. Deviation, 1.668, is the variable where answers are more dispersed. Participants' opinions are more similar in item EEPE1, as it presents the lowest Std. Deviation, 1.173.

As the Mean of the construct EE, is 4.129, it means that on average participants do not have a defined and clear opinion about this topic, answering, on average, between "Neither agree or disagree" and "Somewhat agree". The Std. Deviation is 1.032, and as Skewness value, 0.55, and Kurtosis value, -0.596 belong both to the range [-2;+2], the normality of data distribution is assumed (George et al., 2010).

6.2.3.6. Self-esteem

Self-Esteem (SE) is a construct composed by 10 items. Considering the questionnaire with AI robots (Appendix J I. f)), item SE3 is the one with the highest Mean, 4.47, so, it is the one with the highest agreement level, between "Neither agree nor disagree" and "Somewhat agree". In contrary, and considering that some items are reverted, SE8 is the one with the lowest Mean, (7-3.41=3.59), meaning that is the one which participants agree the less. The highest Std. Deviation value belongs to item SE5, so, is the one that have answers more dispersed. Participants' opinion is more similar in item SE3, having the lowest Std. Deviation.

The construct SE has a Mean value of 3.696, meaning that on average participants answered between "Somewhat disagree" and "Neither agree nor disagree". The Std. Deviation value of the construct is 0.662. As Skewness value, -0.248, belongs to the range [-2;+2], and Kurtosis value, 2.171 belongs to the range [-3;+3], the normality of data distribution is assumed (George et al., 2010) (Kallner 2018).

Analysing the questionnaire with AI software (Appendix J II. f)), SE4 is the item with the highest Mean, 4.85, meaning that is the one with the highest agreement level, between "Neither agree nor disagree" and "Somewhat agree". On the other hand, and considering once more that some items are reverted, SE2 is the one with lowest Mean, (7-3.48=3.52), meaning that is the one which participants agree the less. The highest Std. Deviation value belongs to item SE2 so, is where answers are more dispersed. Answers are more similar in item SE10, having the lowest Std. Deviation.

The Mean of the construct is 3.799, so on average participants answered between "Somewhat disagree" and "Neither agree nor disagree". The Std. Deviation value of the construct is 0.659. With a Skewness value of 0.769, that belongs to the range [-2;+2], and with a Kurtosis value of 3.397, following Hair et al. (2014), as it belongs to the range [-7;+7], the normality of data distribution is assumed (George et al., 2010) (Kallner 2018).

6.2.4. Simple and Multiple Regression Analysis

Linear regression analysis were conducted in order to test the possible associations between the constructs present on the conceptual model. In these analysis, relationships between a dependent, and independent variables were studied. According to Hair et al. (2014), simple regression is a test with the dependent variable, and only one independent variable. On the other hand, multiple regression is used to test the relationship between the dependent variable, and at least two independent variables.

Considering the conceptual model, it was conducted a multiple regression to test the relationship between the independent variables: Social Interaction, Anxiety and Stress; and the dependent variable Employee Engagement. The simple regression was used to analyse the relationship between the dependent variable Happiness, and the independent variable Employee Engagement. These procedures were conducted not only on the questionnaire with AI robot scenario, but on the questionnaire with AI software scenario as well.

6.2.4.1. Multiple regression – Employee Engagement (EE) as dependent variable

6.2.4.1.1. Social Interaction's dimensions as independent variables (H1)

a) Artificial Intelligence Robot scenario (H1.a)

Analysing the ANOVA test (Appendix L I. b)), as Sig. < 0.05, the multiple linear regression under analysis is valid. It is possible to conclude that at least one of the explanatory variables used is important to explain the dependent variable – **EE**

Observing the Model Summary table (Appendix L I. a)), as R^2 value is 0.194, it is possible to argue that 19.4 % of the variability of **EE** is explained by the explanatory variables – **SIRUSE, SIAN** and **SIEEX**.

From the Coefficients table (Appendix L I. c)), it is possible to observe that all Sig. values are < 0.05, meaning that all explanatory variables, and the constant term are needed in the model to explain the dependent variable – **EE**. Besides that, analysing the Standardized Coefficients,

it is concluded that **SIAN** (β = 0.213) is the dimension with the highest impact on **EE**, and in contrast, **SIRUSE** (β = 0.187) is the dimension with lowest impact. With a negative Standardized Coefficient, **SIEEX** (β = -0.255), has a negative impact on the dependent variable – **EE**.

Considering these observations, the following multiple regression model was obtained:

$$\underset{}{\boldsymbol{EE}} = \underset{}{\beta_0} + \underset{(t=2.710)}{\beta_1} \times \underset{(t=0.203)}{\boldsymbol{SIRUSE}} + \underset{(t=0.230)}{\beta_2} \times \underset{}{\boldsymbol{SIAN}} + \underset{(t=-0.269)}{\beta_3} \times \underset{}{\boldsymbol{SIEEX}} + \underset{}{\mathcal{E}}$$

However, it is needed to verify if the assumptions of the model hold. Analysing the Residuals Statistics table (Appendix L I. d)) it is possible to conclude that the assumption holds because the residual component's mean is zero. Moreover, in the Collinearity Statistics section of the Coefficients table (Appendix L I. c)), it is possible to observe that all Tolerance values are > 0.1 and that all VIF (variance inflation factor) values are < 10. With these evidences, it is possible to affirm that the independent variables are not correlated to each other so the assumption holds. The Durbin-Watson value, present in Model Summary table (Appendix L I. a)), is 1.977. As this value is close to two, the residual terms are assumed to be independent, so the assumption holds. Also, observing the Correlations table (Appendix L I. e)), there is no correlation between the explanatory variables, and the residual terms. Finally, it is possible to assume not only the random distribution of residuals, observing the Scatterplot (Appendix L I. h)), but the normality of residuals as well, observing the Histogram (Appendix L I. f)) and Normal P-Plot (Appendix L I. g)).

b) Artificial Intelligence Software/Algorithm scenario (H1.b)

In order to analyse the validation of the multiple linear regression analysis, it is needed to observe the ANOVA test (Appendix L II. b)). As Sig. < 0.05 the regression under analysis is valid, and at least one of the independent variables is relevant to explain the dependent variable – **EE**.

Analysing the Model Summary table (Appendix L II. a)), with a R^2 value of 0.184, it means that 18.4% of the variability of **EE** is explained by the explanatory variables – **SIRUSE, SIAN** and **SIEEX**.

Observing the Coefficients table (Appendix L II. c)), it is possible to understand that Sig. values are < 0.05. However, the Sig. value of **SIEEX** is > 0.05. For that reason, the constant term, and all explanatory variables, except **SIEEX**, are important in the model to explain the dependent variable. Regarding the Standardized Coefficients, it is possible to conclude that

SIRUSE (β = 0.328) is the construct with the highest impact on **EE**. On the other hand, **SIAN** (β = 0.243) is the construct with less impact.

The following multiple regression model was obtained considering the previous assumptions:

$$\underset{}{\boldsymbol{EE} = \beta_0 +} \underset{(t=1.734)}{\beta_1 \times \boldsymbol{SIRUSE}} + \underset{(t=0.299)}{\beta_2 \times \boldsymbol{SIAN}} + \underset{(t=0.283)}{\mathcal{E}}$$

In order to verify if the assumptions of the model hold, observing the Residuals Statistics table (Appendix L II. d)), as the mean of residual component is zero, the assumption holds. Then, in the Coefficients table (Appendix L II. c)), it is observable, in the Collinearity Statistics section, that all Tolerance values are > 0.1, and that all VIF values are < 10. For that reason, there are correlations among the explanatory variables, and the assumption holds. Observing the Model Summary table (Appendix L II. a)), as the Durbin-Watson value = 1.768, is close to two, it is assumed that there are no correlations between the residuals terms, and the assumption holds. Besides that, it is possible to assume the residual terms are not correlated with the independent variables, by observing the Correlations table (Appendix L II. e)). At last, it is possible to assume the random distribution, and the normality of residuals observing the Scatterplot (Appendix L II. h)), and the Histogram (Appendix L II. f)) and Normal P-Plot (Appendix L II. g)), respectively.

6.2.4.1.2. Anxiety's dimensions as independent variables (H2)

a) Artificial Intelligence Robot scenario (H2.a)

Observing ANOVA test (Appendix M I. b)), as Sig. < 0.05 the multiple linear regression under analysis is valid, and at least one of the explanatory variables is important to explain the dependent variable – **EE**

As R^2 value is 0.186, it is possible to argue that 18.6 % of the variability of **EE** is explained by the explanatory variables – **ANXLE**, **ANXJR**, **ANXSB** and **ANXAIC**, by observing the Model Summary table (Appendix M I. a)).

As Sig. values of **ANXLE** and **ANXSB** > 0.05, observed in the Coefficients table (Appendix M I. c)), these variables are not considered important to explain the model. As Sig. values of the constant term, and of the other two variables are < 0.05, , these two explanatory variables, and the constant term, are needed to explain the model. Comparing the Standardized Coefficients, it is concluded that **ANXAIC** (β = -0.244) has a negative impact on the dependent variable. The highest impact is created by the dimension **ANXJR** (β = 0.174).

Considering these observations, the following multiple regression model was obtained:

$$\boldsymbol{EE} = \beta_0 + \beta_1 \times \boldsymbol{ANXJR} + \beta_2 \times \boldsymbol{ANXAIC} + \mathcal{E}$$

(t=4.161) (t=-0.121) (t=-0.157)

Also, to verify if the assumptions of the model hold, analysing the Residuals Statistics table (Appendix M I. d)) it is possible to conclude that the assumption holds because the residual component's mean is zero. Moreover, in the Collinearity Statistics of the Coefficients table (Appendix M I. c)), as all Tolerance values are > 0.1, and that all VIF values are < 10 it is possible to affirm that the independent variables are not correlated to each other, so the assumption holds. As the Durbin-Watson value, present in Model Summary table (Appendix M I. a)), is 1.821 it is close to two, so the residual terms are assumed to be independent. By observing the Correlations table (Appendix M I. e)), it is concluded that the explanatory variables are not correlated with the residual terms. Finally, it is possible to assume the random, and normal distribution of residuals, observing the Scatterplot (Appendix M I. h)), Histogram (Appendix M I. f)), and Normal P-Plot (Appendix M I. g)).

b) Artificial Intelligence Software/Algorithm scenario (H2.b)

Starting with the ANOVA test (Appendix M II. b)), as Sig. < 0.05, the model is valid, and at least one of the explanatory variables is important to explain the model. In the Model Summary table (Appendix M II. a)), as R^2 value is 0.065, it is possible to say that 6.5% of the variability of **EE** is explained by the explanatory variables.

By observing the Coefficients table (Appendix M II. c)), as Sig. values of **ANXJR** and **ANXAIC** > 0.05, these two variables are not considered important in the model. As Sig. values of the constant term, and of the other two variables are < 0.05, these two explanatory variables, and the constant term are needed in the model. Observing the Standardized Coefficients, it is concluded that all variables have a negative impact on the dependent variable.

Considering these observations, the following multiple regression model was obtained:

$$\boldsymbol{EE} = \beta_0 + \beta_1 \times \boldsymbol{ANXLE} + \beta_2 \times \boldsymbol{ANXSB} + \mathcal{E}$$

(t=5.224) (t=-0.140) (t=-0.139)

Analysing the Residuals Statistics table (Appendix M II. d)) the residual component's mean is zero. Moreover, in the Collinearity Statistics of the Coefficients table (Appendix M II. c)), as all Tolerance values are > 0.1, and that all VIF values are < 10 it is possible to affirm that the independent variables are not correlated to each other. As the Durbin-Watson value, present in Model Summary table (Appendix M II. a)), is 1.970 it is close to two, so it is possible to assume that the residual terms are independent. Observing the Correlations table (Appendix M II. e)), it is concluded that there is no correlation between the explanatory variables and the residual

terms. Finally, it is possible to assume the random and normal distribution of residuals, observing the Scatterplot (Appendix M II. h)), Histogram (Appendix M II. f)) and Normal P-Plot (Appendix M II. g)). For all these evidences, all the assumptions hold, and the model is valid.

6.2.4.1.3. Stress's dimensions as independent variables (H3)

a) Artificial Intelligence Robot scenario (H3.a)

As Sig. value < 0.05, in the ANOVA test (Appendix N I. b)), it is concluded that the model is valid, and at least one of the explanatory variables is relevant to the model.

Observing the Model Summary table (Appendix N I. a)), it is possible to conclude that 48.8% of the variability of **EE** is explained by the independent variables – **STDE** and **STSU**, because R^2 value is 0.488.

In the Coefficients table (Appendix N I. c)), it is observable that only **STSU**'s Sig. < 0.05, so it is assumed that **STDE,** and the constant term are not statistical significant in the model. This way, the following model is obtained only with one independent variable:

$$\boldsymbol{EE} = \beta_1 \times \boldsymbol{STSU} + \mathcal{E}$$

(t=0.744)

All assumptions hold, and the model is valid because: analysing the Residuals Statistics table (Appendix N I. d)) the residual component's Mean is zero, in the Collinearity Statistics of the Coefficients table (Appendix N I. c)), all Tolerance values are > 0.1, and all VIF values are < 10, so the independent variables are not correlated to each other. Besides that as the Durbin-Watson value is close to two, 1.837, observing Model Summary table (Appendix N I. a)), the residual terms are assumed to be independent. There is no correlation between the explanatory variables, and the residual terms, analysing the Correlations table (Appendix N I. e)). At last, the random, and normal distribution of residuals is assumed, observing the Scatterplot (Appendix N I. h)), Histogram (Appendix N I. f)) and Normal P-Plot (Appendix N I. g)).

b) Artificial Intelligence Software/Algorithm scenario (H3.b)

Observing the ANOVA test (Appendix N II. b)), as Sig. < 0.05, the model is considered valid, and at least one of the independent variables is relevant in the model. In the Model Summary table (Appendix N II. a)), as R^2 value is 0.51, it is possible to argue that 51.0% of the variability of **EE** is explained by the explanatory variables – **STDE** and **STSU**.

From the Coefficients table (Appendix N II. c)), it is possible to observe that all Sig. values are < 0.05, meaning that all explanatory variables are needed in the model to explain the

dependent variable – **EE.** However, constant term's Sig. > 0.05, so the constant term is not relevant in the model. Comparing the Standardized Coefficients (Appendix N II. c)) it is possible to conclude that **STSU** (β = 0.666) is the dimension with the highest impact on **EE**. The following multiple regression model was obtained:

$$\underset{}{\boldsymbol{EE}} = \underset{(t=0.219)}{\beta_1} \times \boldsymbol{STDE} + \underset{(t=0.794)}{\beta_2} \times \boldsymbol{STSU} + \mathcal{E}$$

Once more, all assumptions hold, and the model is valid because: the residual component's Mean is zero, analysing the Residuals Statistics table (Appendix N II. d)), all Tolerance values are > 0.1, and all VIF values are < 10, so the independent variables are not correlated to each other, analysing the Collinearity Statistics of the Coefficients table (Appendix N II. c)). Durbin-Watson value is close to two, 1.780, observing Model Summary table (Appendix N II. a)), so it is possible to assume that the residual terms are independent. Analysing the Correlations table (Appendix N II. e)) the explanatory variables are not correlated with the residual terms. Finally, it is possible to assume the random and normal distribution of residuals, observing the Scatterplot (Appendix N II. h)), Histogram (Appendix N II. f)) and Normal P-Plot (Appendix N II. g)).

6.2.4.2. Simple regression – Happiness (HA) as dependent variable (H4)

a) Artificial Intelligence Robot scenario (H4.a)

In ANOVA test table (Appendix O I. b)) is possible to observe that Sig. = 0, so < 0.05, meaning that the model is valid. Then, observing Model Summary table (Appendix O I. a)), as R^2 = 0.541, it is possible to conclude that 54.1% of the variability of the dependent variable – **HA** – is explained by the explanatory variable – **EE**. Analysing the Coefficients table (Appendix O I. c)), it is assumed that **EE** construct, and the constant term should be included in the linear regression model because Sig. < 0.05, for both items. By the Unstandardized Coefficients, it is possible to argue that when **EE** increases a unit, **HA** increases 0.765 (β = 0.765). With these evidences it is possible to build the following regression model:

$$\underset{}{\boldsymbol{HA}} = \underset{(t=0.700)}{\beta_0} + \underset{(t=0.765)}{\beta_1} \times \boldsymbol{EE} + \mathcal{E}$$

Observing the Residuals Statistics table (Appendix O I. d)), as residual term's mean is zero the assumption holds. In Coefficients table (Appendix O I. c)), Collinearity Statistics, it is possible to observe a Tolerance value > 0.1, and a VIF value < 10. Considering the Durbin-Watson in Model Summary table (Appendix O I. a)), as it is a value close to two, 1.635, it is

assumed that there is no correlation between the residual terms. Besides that, observing the Correlations table (Appendix O I. e)), it is possible to affirm that the independent variable is not correlated with the residual terms. Finally, the normality of residuals is graphically presented in the Histogram (Appendix O I. f)) and Normal P-Plot (Appendix O I. g)), and the Scatterplot (Appendix O I. h)) presents the random distribution of residuals. As all the assumption hold, the model is valid.

Furthermore, conducting an additional linear multiple regression analysis with the five dimensions of **EE**: **EESA**, **EEID**, **EECO**, **EELO** and **EEPE** (Appendix P I.), it is possible to analyse the impact of each dimension on the dependent variable - **HA**. As all assumptions hold, it is possible to conclude that only **EESA** and **EEID** are relevant in the model, as are the ones with Sig. < 0.05 (Appendix P I. c)). Analysing the Standardized Coefficients (Appendix P I. c)), are all positive, so variables influence the dependent variable in a positive way. As **EESA** is the variable with the highest Standardized Coefficients (β = 0.438) (Appendix P I. c)) is the one with the highest impact.

b) Artificial Intelligence Software/Algorithm scenario (H4.b)

Firstly, observing the ANOVA test table (Appendix O II. b)), as Sig. < 0.05, the model is valid. In the Model Summary table (Appendix O II. a)), with a R^2 = 0.551, it is possible to conclude that 55.1% of the variability of **HA** is explained by **EE**. Besides that, as **EE** and the constant term have Sig. values < 0.05, it is possible to assume that both, **EE** and constant term, should be present in the model, because are relevant to explain the dependent variable. Analysing the Unstandardized Coefficient's column (Appendix O II. c)), it is possible to conclude that when **EE** increases a unit, **HA** increases 0.815 units (β = 0.815). The following equation of the linear regression model was obtained:

$$\boldsymbol{HA} = \beta_0 + \beta_1 \times \boldsymbol{EE} + \mathcal{E}$$

(t=0.765) (t=0.815)

Verifying if the assumptions of the model hold, as the residual's mean presented in the Residuals Statistics table (Appendix O II. d)) is zero, this assumption holds. Then, analysing the Collinearity Statistics in Coefficients table (Appendix O II. c)), it is observable a Tolerance value > 0.1 and, a VIF value < 10. Observing the Durbin-Watson value in the Model Summary table (Appendix O II. a)), as it is 2.024, a value close to two, it is concluded that the residual terms are not correlated. Analysing the Correlations table (Appendix O II. e)), it is assumed that there is no correlation between the independent variable and the residual terms. At last, it is

possible to assume the normality of residuals, observing the Histogram (Appendix O II. f)) and Normal P-Plot (Appendix O II. g)), and the random distribution of residuals, observing the Scatterplot (Appendix O II. h)). Concluding, as all assumptions hold, the model is valid.

Realizing the additional linear multiple regression analysis done in scenario a), and as all assumptions hold (Appendix P II.), it is concluded that only **EESA**, **EELO** and **EEPE** are relevant in the model, because are the ones with Sig. < 0.05 (Appendix P II. c)). Comparing Standardized Coefficients (Appendix P II. c)), as they are all positive, all variables positively influence the dependent variable. **EESA** is the one with the highest impact, as it is the one with the highest Standardized Coefficients (β = 0.282) (Appendix P II. c)).

6.2.5. Self-Esteem as a moderator

This analysis is conducted in order to verify if the inclusion of a third variable, the moderator, has a statistical effect on the variance of the dependent variable (Borau, El Akremi, Elgaaied-Gambier, Hamdi-Kidar & Ranchoux, 2015). This analysis was conducted with the PROCESS tool created by Andrew F. Hayes, in SPSS, and it tests, in both scenarios if:

⇒ Self-Esteem (SE) moderates the relationship between **Social Interaction (SI)** and **Employee Engagement (EE) – (H5)**;

⇒ Self-Esteem (SE) moderates the relationship between **Anxiety (ANX)** and **Employee Engagement (EE) – (H6)**;

⇒ Self-Esteem (SE) moderates the relationship between **Stress (ST)** and **Employee Engagement (EE) – (H7)**;

⇒ Self-Esteem (SE) moderates the relationship between **Employee Engagement (EE)** and **Happiness (HA) – (H8)**.

a) Artificial Intelligence Robot scenario

Table 6.4. Moderation test - EE - Scenario a)

EMPLOYEE ENGAGEMENT AS DEPENDENT VARIABLE					
Independent variable	**Effect on EE**	**Coefficient**	**P-value**	**Confidence Interval**	
				Lower Limit	**Upper Limit**
Social Interaction (SI)	SE	0.863	0.000	0.628	1.099
	SI * SE	**-0.117**	**0.491**	**-0.451**	**0.217**
Anxiety (ANX)	SE	0.890	0.000	0.687	1.092
	ANX * SE	**-0.013**	**0.876**	**-0.172**	**0.147**
Stress (ST)	SE	0.621	0.000	0.417	0.824
	ST * SE	**-0.025**	**0.817**	**-0.241**	**0.191**

Source: Own elaboration based on SPSS outputs

Table 6.4. presents results of three moderation tests. The results are similar for all three hypothesis in the referred table. For all three hypothesis, **SE**'s P-value < 0.05, so **SE** takes a relevant impact on the dependent variable. However, this is not the propose of this test. For all three situations, the P-value of the combination of the independent variable and **SE** is > 0.05 so, this interaction is not significant to explain the dependent variable – **EE**, meaning that **SE** is not moderator of three relationships between **SI**, **ANX** and **ST**, and **EE**. Concluding, the following hypothesis are rejected: **H5.a**, **H6.a** and **H7.a**.

Table 6.5. Moderation test - HA - Scenario a)

HAPPINESS AS DEPENDENT VARIABLE					
Independent variable	**Effect on HA**	**Coefficient**	**P-value**	**Confidence Interval**	
				Lower Limit	**Upper Limit**
Employee Engagement (EE)	SE	0.045	0.862	-0.466	0.556
	EE * SE	**-0.057**	**0.432**	**-0.199**	**0.086**

Source: Own elaboration based on SPSS outputs

Observing Table 6.5., it is possible to conclude not only **SE** is not relevant to explain the dependent variable – **HA**, because P-value (=0.862) > 0.05, but it is concluded as well that the interaction between **EE** and **SE** is not statistically significant to explain the relationship between **EE** and **HA**, because once more, P-value (=0.432) > 0.05. For that reason, **SE** is not a moderator of the relationship between **EE** and **HA** and hypothesis **H8.a** is rejected.

b) Artificial Intelligence Software/Algorithm scenario

Table 6.6. Moderation test - EE - Scenario b)

EMPLOYEE ENGAGEMENT AS DEPENDENT VARIABLE					
Independent variable	**Effect on EE**	**Coefficient**	**P-value**	**Confidence Interval**	
				Lower Limit	**Upper Limit**
Social Interaction (SI)	SE	1.149	0.002	0.433	1.865
	SI * SE	**-0.091**	**0.312**	**-0.267**	**0.086**
Anxiety (ANX)	SE	0.916	0.001	0.473	1.360
	ANX * SE	**0.013**	**0.823**	**-0.103**	**0.129**
Stress (ST)	SE	1.420	0.001	0.840	1.999
	ST * SE	**-0.206**	**0.002**	**-0.338**	**-0.074**

Source: Own elaboration based on SPSS outputs

Analysing Table 6.6., which presents results of three moderation tests. For all three hypothesis, **SE**'s P-value < 0.05, so **SE** takes a relevant impact on the dependent variable. But these tests

were conducted to analyse if the interaction between each independent variable – **SI**, **ANX** and **ST** – and **SE** influences the variance of **EE**. As P-value of the interactions between **SI** and **ANX** with **SE** is > 0.05, both interactions do not have a significant impact on the dependent variable **EE**, and hypothesis **H5.b** and **H6.b** are rejected. So, **SE** is not a moderator of the relationships between **SI** and **ANX**, and **EE**.

On the other hand, the interaction between **ST** and **SE** has a P-value < 0.05, so this interaction is relevant to explain the variance of **EE**. Hypothesis **H7.b** is verified, and **SE** is considered a moderator of the relationship between **ST** and **EE**, for the AI software scenario.

Table 6.7. Moderation test - HA - Scenario b)

HAPPINESS AS DEPENDENT VARIABLE					
Independent variable	**Effect on HA**	**Coefficient**	**P-value**	**Confidence Interval**	
				Lower Limit	**Upper Limit**
Employee Engagement (EE)	SE	0.207	0.436	-0.317	0.732
	EE * SE	**-0.032**	**0.565**	**-0.141**	**0.077**

Source: Own elaboration based on SPSS outputs

Making the same test to verify if the interaction between **EE** and **SE** is relevant to explain the dependent variable **HA**, as P-values > 0.05 (Table 6.7.) not only for **SE** variable but for the interaction between **EE** and **SE** as well, it is possible to conclude that the interaction is not important to explain the dependent variable – **HA**. For that reason **SE** is not a moderator of the relationship between **EE** and **HA,** and hypothesis **H8.b** is rejected.

7. Conclusions

7.1. Discussion

This dissertation was developed to study the impact of social interactions, anxiety and stress, in employee engagement. Besides that, it was studied the influence of employee engagement in the perception of well-being. In this chapter, all hypothesis and objectives, proposed in Chapter 5. Conceptual Model and Investigation Hypothesis, achieved along this report, will be clarified.

With the Descriptive Statistics, it is possible to conclude which constructions have the highest, and lowest agreement levels. Considering the AI robot scenario, Anxiety is the construction with the highest mean (3.861), so is the one which participants most agreed. However, ANX is one of the constructs with a high Std. Deviation value (1.164), meaning that answers were not similar to each other. Furthermore, Sociotechnical Blindness is the dimension of ANX to which participants most agree with (mean: 4.8941). This can be explained with the fear of artificial intelligence revealed in this study.

On the other hand, Social Interaction is the construct with lowest mean (3.500), and lowest Std. Deviation as well. Meaning that is the construct where answers are more similar, and the level of agreement is the lowest. This evidences are explained by the deficit of information, and knowledge about AI found on the studies conducted, mainly about physical devices like robots.

Taking the same conclusions for the AI software scenario, Happiness it he construction with highest mean (4.130) so is the one which participants agree the most. In this case, ANX is the construct with lowest mean value. These facts are congruent with the studies conducted previously, where was concluded that participants are not only better informed about AI software, and in some cases already using AI software, but feel more comfortable with these type of devices comparing to AI robots. However, once more because of the fear always related with artificial intelligence, Sociotechnical Blindness is the dimension of ANX to which participants most agree with (mean: 4.104).

The most relevant conclusions of this dissertation can be retrieved from the multiple and simple linear regression analysis. Firstly, is concluded that SI is a driver of EE (H1) on both scenarios. In the AI robot scenario (H1.a), all three dimensions of SI are relevant to explain the model. SIAN is the dimension with the highest impact on EE because it is related to the physical aspect and attitudes of the robot. The most similar to humans it is, the highest engagement level it will generate. In contrast, SIEEX takes a negative impact in EE, meaning that when SIEE increases, EE decreases, which is normal because if the introduction of these devices will bring

more effort to employees, engagement will decrease. Considering the scenario with AI software (H1.b), only SIRUSE, which is the dimension with the highest impact on EE, and SIAN are relevant to explain the model. SIEEX is not relevant to explain EE, so it is not in the equation. Both conclusions are explained because as it was already found on the previous studies, people, and in particular the participants of the study, are already better informed, and more engaged with AI software. For that reason the effort expended to learn about it is not relevant for EE, and at the same time knowing how to use these type of software, (SIRUSE with a high mean, 4.785) takes a positive impact on EE. Concluding, SI is positively associated with EE on both scenarios. Physical characteristics, and aspect is the most relevant in AI robot scenario, and use skills the most relevant in AI software scenario. Considering the impact of Anxiety in EE (H2), it is negative on both scenarios, as it was already predictable, by observing the Unstandardized Coefficients present in both equations. In the AI robot scenario (H2.a), only ANXJR and ANXAIC are relevant to explain the model. ANXJR is a key factor here because it represents one of the biggest problems of AI, job replacement, that is more significant with AI robots comparing with AI software. In the AI software scenario (H2.b), the dimensions ANXLE and ANXSB are the ones important to explain EE, because of the fear of AI once more, and because the need to learn how to use AI software, makes employees anxious, contributing this way to a decrease of employee engagement. Regarding the impact of Stress on EE (H3), considering the scenario with AI robot (H3.a), there is only one dimension, STSU, important to explain the model. In the scenario with AI software (H3.b) both dimensions are relevant in the model, STDE and STSU, however once more, Support is the dimension with highest impact on EE. This dimension is related to the relationship and interactions between employees and AI devices, explaining this way the importance of this topic to explain Employee Engagement.

Considering the simple linear regression analysis, in order to test if EE is positively associated with the perception of well-being, Happiness (H4), it is concluded that for each unit of EE that increases, HA increases 0.765 in the scenario with AI robot (H4.a), and 0.815 in the scenario with AI software (H4.b). When analysing the impact of the dimensions of EE on HA, it is concluded that in the scenario with AI robot only EESA and EEID are important to explain HA, and in the scenario with AI software EESA, EELO and EEPE are relevant in the model, to explain HA. In both cases, Satisfaction is the dimension with the highest impact on HA, which is an expected result, because the satisfaction with their job, colleagues and organization (Heskett et al., 1994) is crucial to reach the perspective of well-being.

Regarding the moderation tests, self-esteem can be considered a moderator of the relationship between stress and employee engagement, in the scenario with AI software. On all other relationships, self-esteem was not considered as a moderator of them.

7.2. Theoretical contribution

Combining the current investigation of Relationship Marketing and Artificial Intelligence available, this dissertation contributes with insights about the impact of the introduction of AI devices inside organizations, and the pros and cons of it, for the employees. The current study was conducted in order to comprehend what are the positive and negative aspects in organizations using artificial intelligence devices. For that, it was studied what is the relationship between: (1) Social Interactions, (2) Anxiety and (3) Stress, and Employee Engagement, in scenarios using AI at work. This way, and for the first time, these two topics, were analysed together, understanding if artificial intelligence is a driver for engagement (Kumar et al., 2014) or an objection.

Furthermore, it was analysed if engagement has any contribution for the "subjective well-being perspective" represented by happiness studied by Loureiro et al. (2019). Finally, it was tested if self-esteem is a moderator of all the relationships already described.

Concluding, the present study contributes with investigation in order to understand not only if employee engagement is dependent of the use of artificial intelligence inside organizations, and the impact of it in the following topics: (1) Social Interactions, (2) Anxiety and (3) Stress, but if engagement is a driver for happiness. As all studies were conducted in two scenarios, one with AI robots, and the other one with AI software, this dissertation also provides information about the differences on users perspectives, expectations, and feelings.

7.3. Managerial implication

As this study combines topics that were only studied separately in the past, it is possible to reach new insights, and conclusions. The first point that should be touched is the findings regarding artificial intelligence in general. The study concluded that people is not already well informed about AI characteristics, even about what AI is in many cases. However, when comparing both scenarios, AI robots and AI software, the study demonstrates that participants are better informed about AI software. This fact is easily comprehended because this type of artificial intelligence is already present in daily tasks and activities, including at work, for most participants.

While asked, directly and indirectly, participants affirmed that the main positive aspect of AI is to turn tasks easier. On the other hand, from the point of view of employees, organizations will face a big objection, the fear of job replacement. Once more comparing both scenarios, this fear is higher with AI robots, because participants consider that AI robots can replace humans in some work tasks, and activities, instead of AI software. So, turn tasks easier and job replacement are two factors that influence engagement. Besides that, participants consider that if it is needed too many time and effort to understand, and to learn how to interact with artificial intelligence, the introduction of it, is not considered a positive contribution for them. As one of the conclusions of this study, is the lack of information about AI in society, in general, this is an aspect that should be analysed and studied for the future. Finally, engagement is dependent as well, of relationships at work environment. Participants consider that there are differences between the interaction with AI, and with human colleagues. However this is a prediction, as no one in the sample already interacted with AI robots in work context. Thus, it is possible to affirm that the interaction, and the relationship between human employees and artificial intelligence devices, is another factor that influence employee engagement.

Analysing the influence of the five dimensions of engagement (Kumar et al., 2014) on happiness, it is concluded that satisfaction is a key factor that influence happiness. This satisfaction is related with the topics referred above. An employee will present high levels of satisfaction if the introduction of AI would turn his/her work tasks easier, if there is no risk of being replaced by a robot or a software, if the learning process of interacting with AI is easy and fast, and if the relationship of humans and AI is as normal as possible, and do not disturb the current relationships between humans.

Finally, it was concluded that self-esteem can be considered as a moderator of the relation between stress and employee engagement in the scenario with AI software, meaning that it influences this relation. This can be explained, firstly because working with an AI software can be a though work, sitting down in a chair in front of a computer, for that reason, self-esteem developed by an employee working with AI, can influence this relationship between stress and engagement.

7.4. Limitations and suggestions for future research

During the elaboration of this dissertation some limitations were faced regarding the theoretical investigation and the practical studies. On this section, these limitations will be explained, and suggestions for the future regarding the findings of the study will be approached.

Given the novelty of the topic, and as no one already combined artificial intelligence with employee engagement before, there was a lack of information about the topic studied. For that reason, in literature review, topics were approached separately, and there was a necessity to conduct preliminary studies, such as, interviews and focus groups. Thus, as the topic is new, most of the participants revealed a lack of information mainly about artificial intelligence. However, this point was useful at the same time to take conclusions as it was already explained in this dissertation.

Regarding the sample, on both scenarios, there was a difficulty to find older participants. For that reason, only 21.2% of the sample is older than 45 years old in the AI robot scenario, and 11% in the AI software scenario for the same age group. At the same time, on both cases more than a half of participants are younger than 24 years old. It would be interesting for the study to compare behaviours between age groups with similar number of participants, but balance the age groups size was a limitation of the study.

Still regarding the sample, all participants are Portuguese and resident in Portugal, restricting this study only for the Portuguese reality. It would be interesting to realize the same study in other countries and cultures, for example in Japan, where artificial intelligence is better developed, and used more frequently in daily tasks.

Nevertheless, the conclusions obtained with this study, allow to think about suggestions for the future. Living a pandemic time, where world economy is really damaged mainly because services, and commerce closed because of social contacts, artificial intelligence can be faced as a way to avoid these contacts. However, job replacement is an objection, and one of the main negative aspects from the point of view of employees that negatively influences engagement. Another suggestion, and taking in count the lack of information about AI revealed by society in general, is to study and investigate ways to teach, and educate the population about it, and to show an idea that AI is safe, meaning that all possible problems related to it are avoidable. Artificial intelligence is inevitably, a reality for the future, so this introduction needs to be prepared, avoiding rejections by the possible users. For all that reasons, a group of questions that have no answer yet should be investigated and studied. How to avoid job replacement with the introduction of artificial intelligence? How to educate and teach population to use artificial intelligence? How to tranquilise people regarding the potential problems regarding AI (the capacity to become autonomous for example)?

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Appendixes

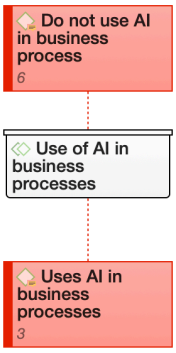
Appendix A. Interviews' guide

1. How would you characterize AI? What does AI mean for you?
2. In your current workplace, is AI integrated into the business process? If so, how? And in which functional area(s)?
3. Have you and/or your team been directly impacted by AI implementation?
4. Considering your own line of work, what types of AI should be integrated into the business process and why?
5. Considering your own line of work, which do you consider to be the most effective AI integration: AI to supplement human employees or to replace them? Please explain and give examples.
6. Are you working in (if employee) / managing a team (if manager)?
7. What kinds of capabilities/skills/specialism do you, in your own opinion, bring to the teams you currently work in/manage?
8. Please describe an ideal teammate (if employee) / team members (if manager).
9. Do you think any of your team members can be replaced by AI? Why or why not? And if so, how do you think they would feel about it?
10. How about yourself? Can you be replaced by AI? Why or why not? And if so, how would you feel about it?
11. Do you see a way for AI to be able to augment your job? How about those of your team members?
12. Do you see the potential of AI as collaborators in the workplace? In other words, what is the potential of AI working side by side with humans?
13. If AI was to be part of your team, what would be the ideal AI capabilities? What types of AI capabilities would supercharge your team? (cognitive, insights/analytics, etc.).
14. What would be the outcome of human employees teaming up with AI in the workplace?
15. How would working alongside AI impact your work and productivity/company's productivity?

16. Would working alongside AI allow you to optimize your talent and potential/employees' talent and potential?
17. How would working alongside AI impact your well-being/the well-being of your employees?
18. Do you think that the relationship in a team with humans and AI will be different than the relationship in a team with only humans? Why or why not?
19. How easy or difficult do you think it will be to adapt to such a mix-team? Why?
20. How would you feel being part of such a team?
21. If you would work in a team that is directed by an AI, how would you feel about it? Would you accept and respect instructions from an AI?
22. If you would direct a team that consists of humans and AI, how would you feel about it? Would you communicate to an AI (e.g., give instructions) in the same way as you would communicate to human members of the team?
23. Do you consider more identified with the job in a team with AI?
24. Do you consider that you are more committed in a team with AI ?
25. If you work in a team with an AI that makes mistakes in its work, would you address these mistakes to the AI? If yes, how would you communicate it and do you think there are differences to how you communicate mistakes to a human?
26. If an AI positively surprised you with its work, would you compliment the AI?
27. What kinds of challenges / issues do you see arising from teaming up with AI in the workplace? How might these challenges / issues be addressed?
28. How do you think initiatives for augmentation / collaboration would be received by your team / company? Have you already participated in such discussions?
29. If you had no (monetary) limits and you could "draw" your perfect super team, what would it look like? How would your customers think about this team? Would any of your stakeholders have a problem with this team? Please explain.

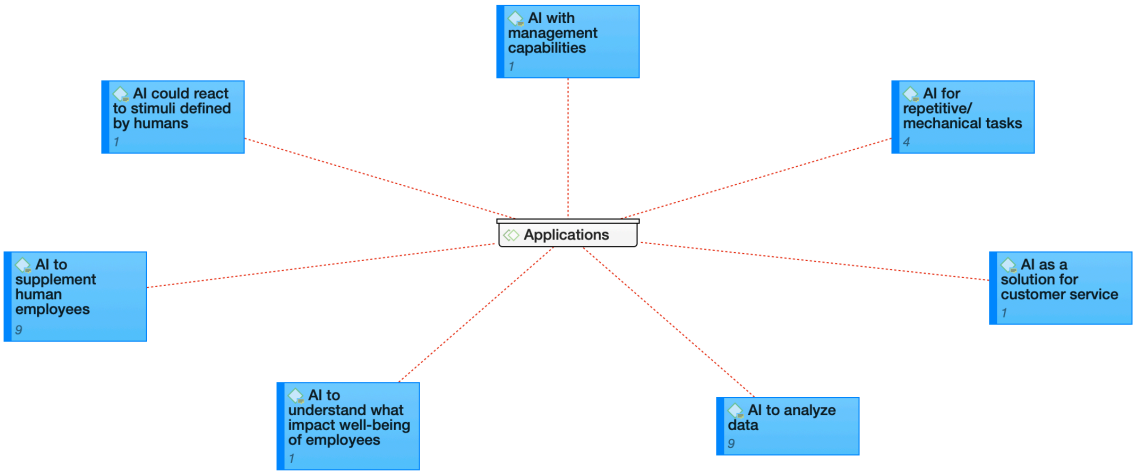
Appendix B. Interviews analysis

I. Use of AI in business processes



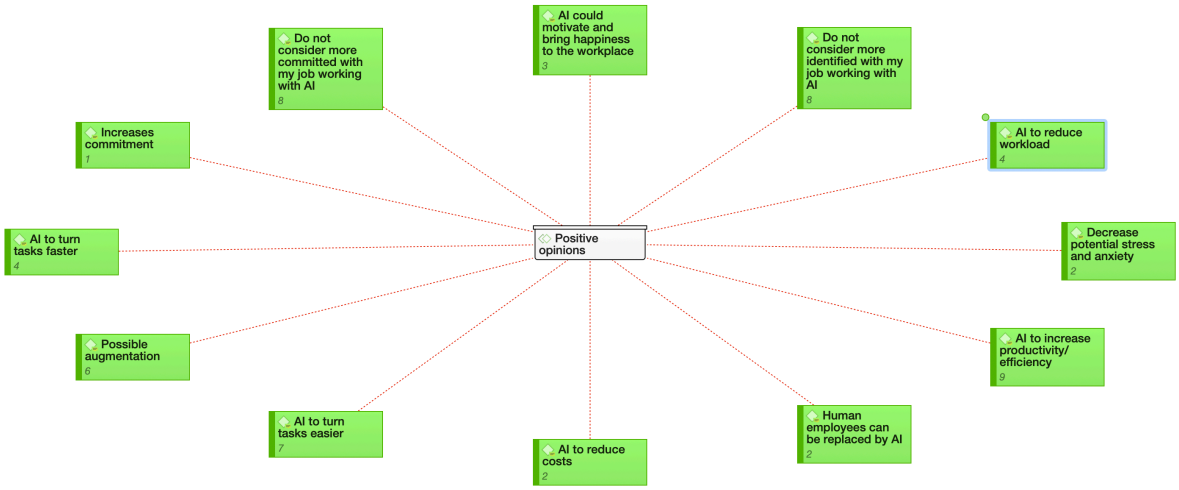
Source: ATLAS TI output

II. Applications



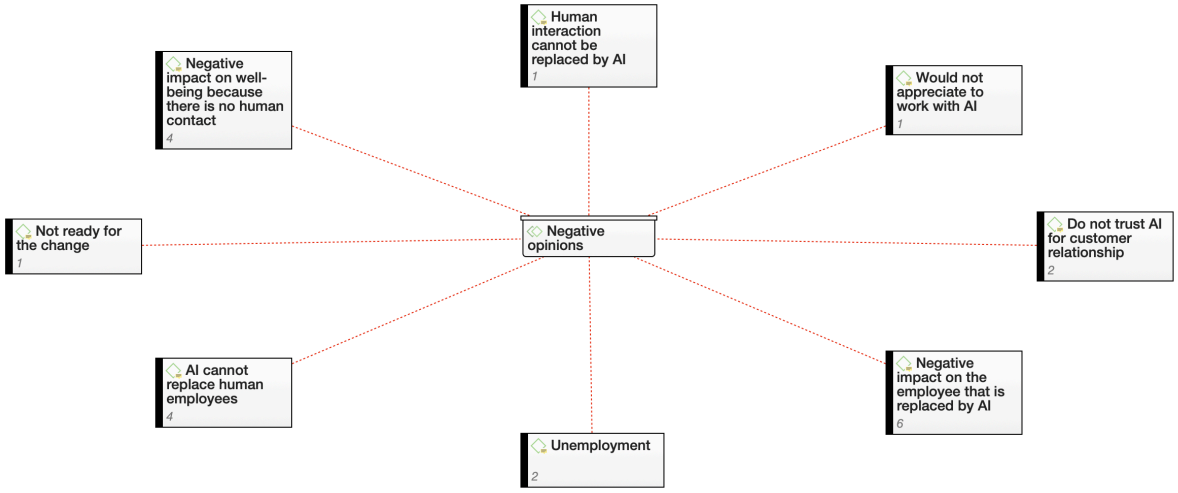
Source: ATLAS TI output

III. Positive opinions



Source: ATLAS TI output

IV. Negative opinions



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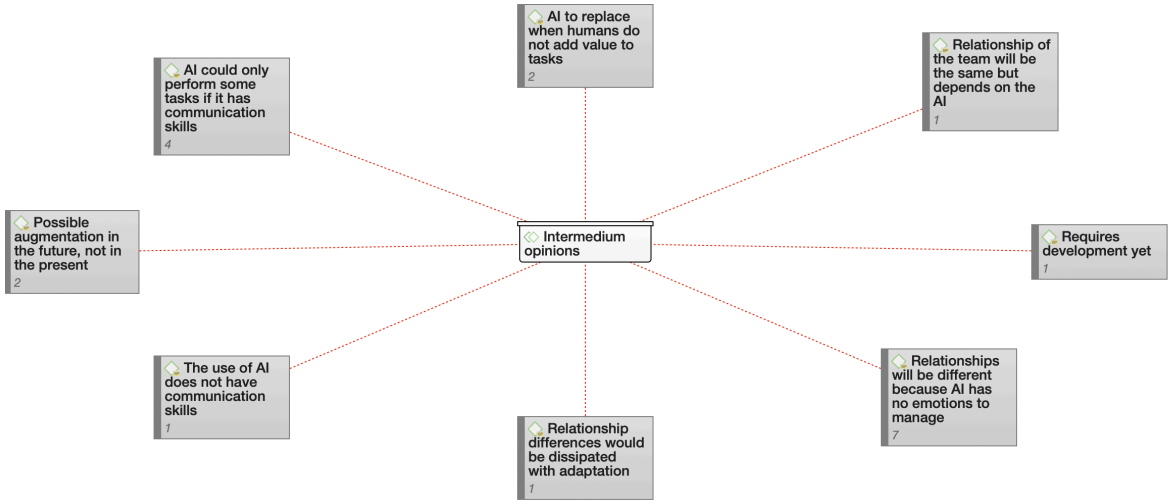
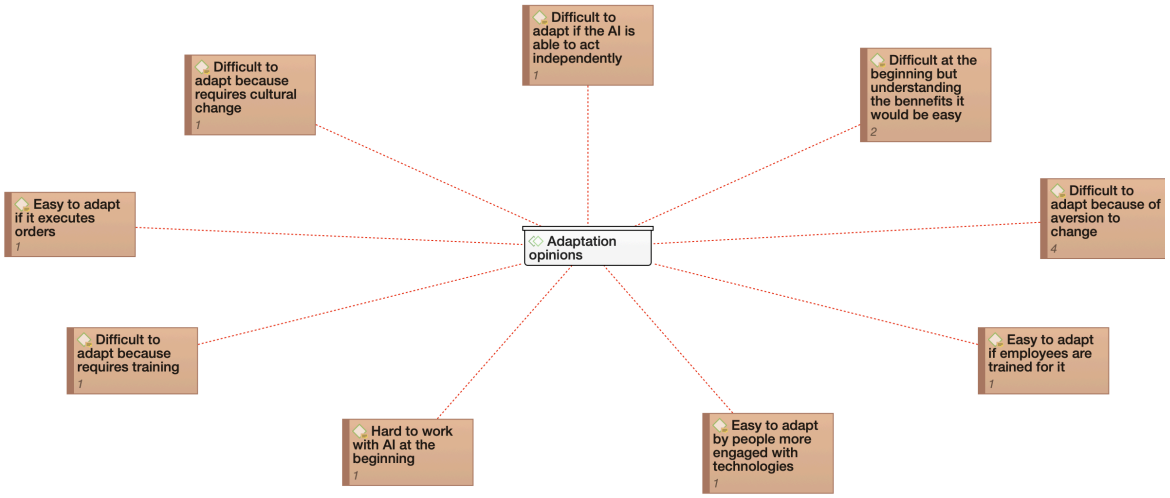
V. Intermedium opinions



Source: ATLAS TI output

VI. Adaptation opinions



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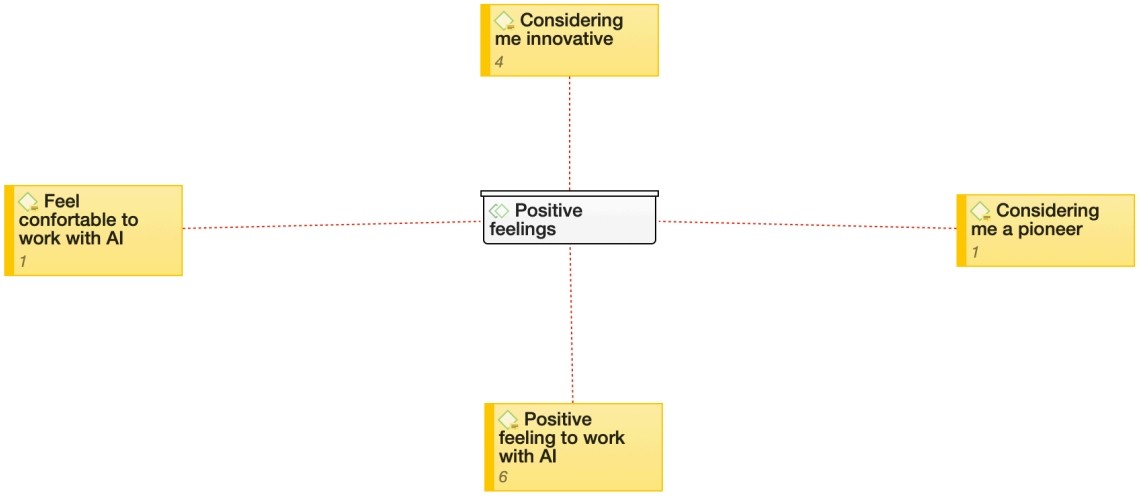
VII. Positive feelings



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Appendix C. Focus groups' guide

1st scenario: operations team

John is a head chef at the Hotel X restaurant. The company has recently acquired and implemented several robotic arms to automate food preparation and minimise human involvement in the cooking processes in the restaurant's kitchen. These robots are capable of precisely and consistently measuring, sorting, cutting, and chopping ingredients; mixing ingredients with sauces and condiments; and cooking the food, adjusting to personalised orders from customers. One (human) kitchen staff is responsible for plating and a waiter for serving the food and also interacting with customers. With the help of an AI system, John oversees the menu, recipes, and kitchen inventory, making sure that taste and freshness of the food served are guaranteed.

1. From this description, which intelligence do you think the AI system possesses: mechanical, analytical, intuitive, or empathetic? (describe the difference)
2. What do you think of this super team?
3. Is this super team desirable for your workplace? For the industry in general? Why?

2nd scenario: digital marketing team

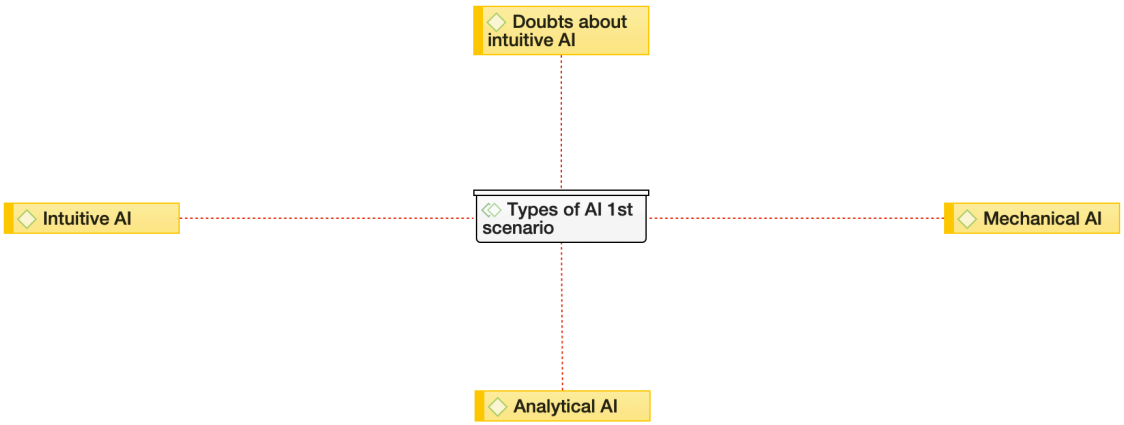
Jane has been tasked with launching a new marketing campaign. The hotel she works for wants to extend their brand recognition and to reach new market segments, although it's still unclear who exactly they should go after first. Business travellers? Families? Day-trippers? To get some much-needed clarity on the issue, Jane decides to do some quick benchmarking by giving a try to the hotel's new analytics tool. The hotel has recently bought a license for a piece of software that sifts through and analyses massive amounts of data from social media, turning it into tangible insight that is easy to understand and make use of. Jane selects the social media channels she'd like to monitor, enters a few keywords, and presses 'find results'. In a few seconds she's presented with an in-depth analysis of what customers are talking about in relation to the type of hotel she works at. Her search seems to have been successful: it's captured over 2.4 million unique posts from the last 6 months. Jane is presented with clear information on the types of customers engaging with similar brands, complete with customer profiles and graphs on type and time of engagement. It seems that the most vocal, and hence probably most socially influential, customer segments are wealthy Asian single-parents who stay for two to four nights, and tend to order room service at least once during their stay. Jane is somewhat

surprised by the conclusion, but decides to trust the information she's been given. She starts to sketch a marketing campaign around these new insights.

1. From this description, which intelligence do you think the AI system possesses: mechanical, analytical, intuitive, or empathetic? (describe the difference)
2. What do you think of this super team?
3. Is this super team desirable for your workplace? For the industry in general? Why?

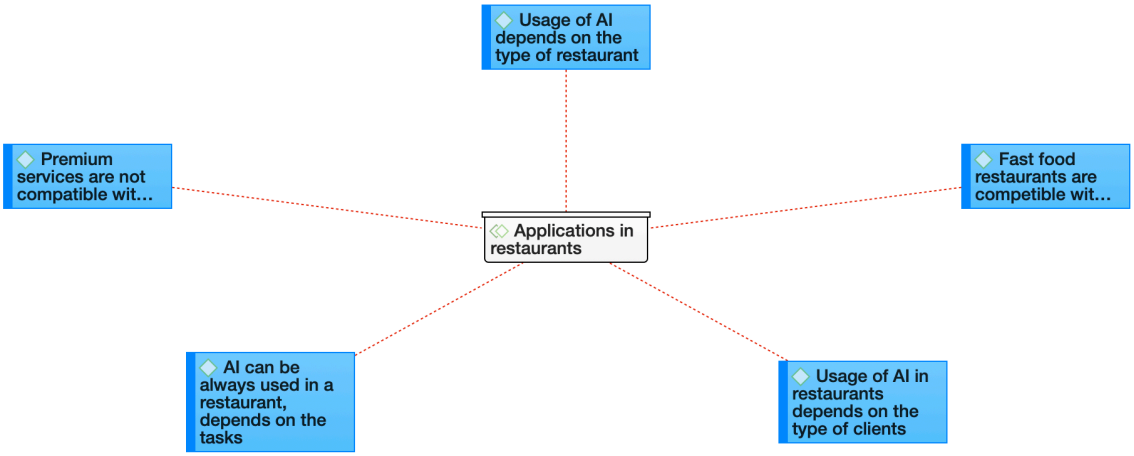
Appendix D. Focus group I analysis

I. Types of AI 1st scenario



Source: ATLAS TI output

II. Applications in restaurants



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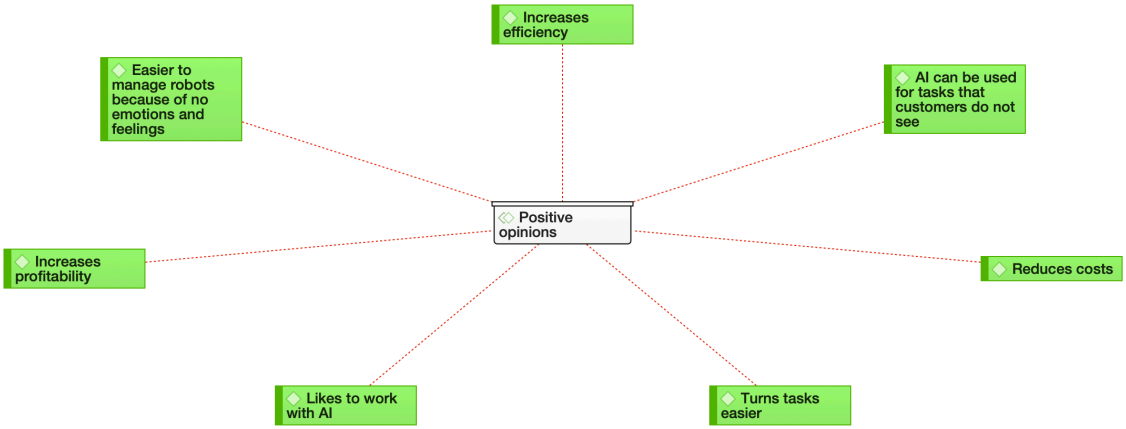
III. Positive opinions



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IV. Negative opinions

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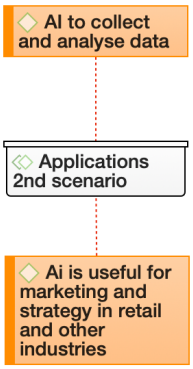
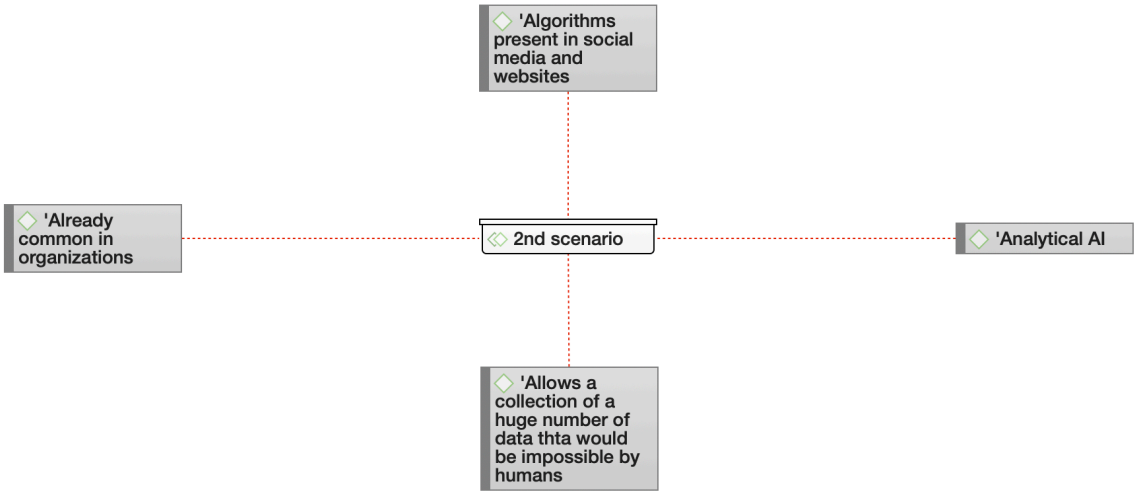
V. Applications 2nd scenario



Source: ATLAS TI output

VI. 2nd scenario



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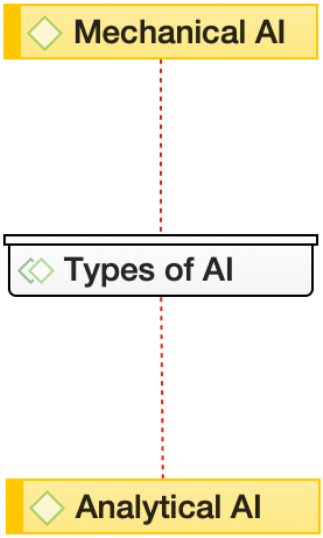
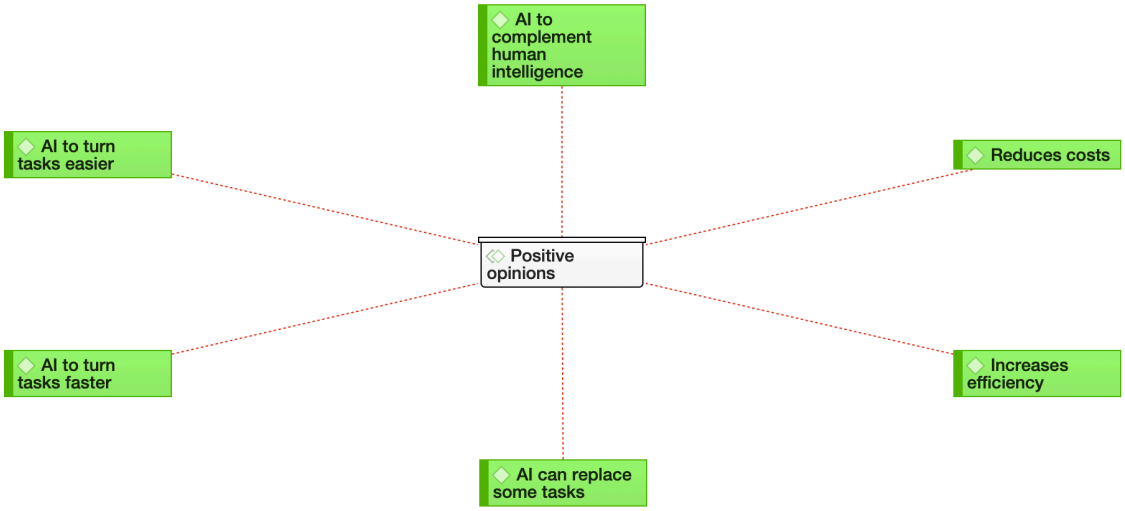
Appendix E. Focus group II analysis

I. Types of AI



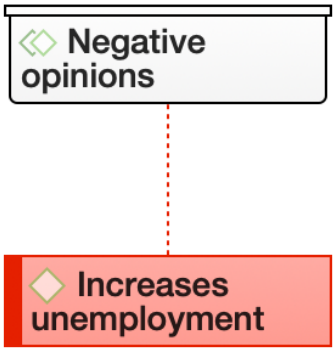
Source: ATLAS TI output

II. Positive opinions



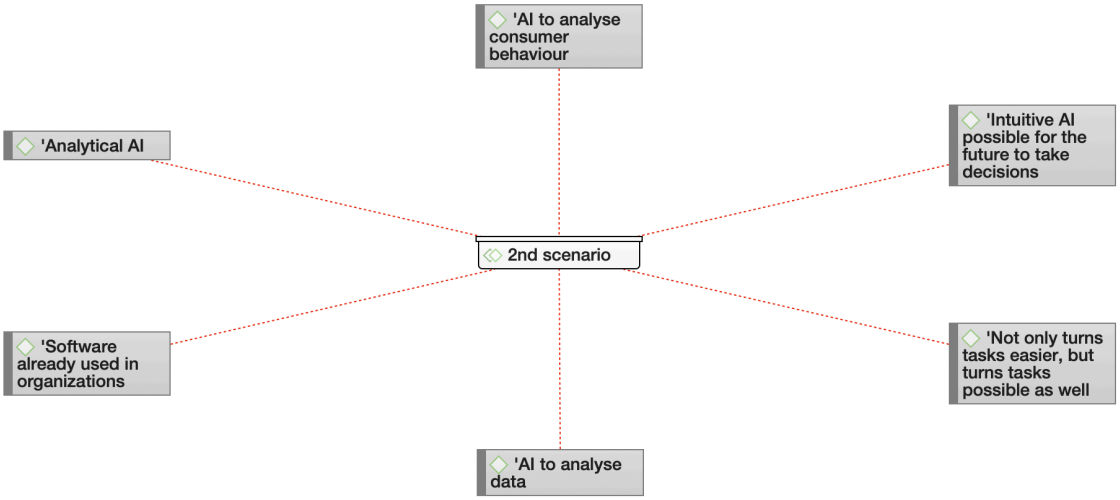
Source: ATLAS TI output

III. Negative opinions



Source: ATLAS TI output

IV. 2nd scenario



Source: ATLAS TI output

Appendix F. Questionnaire with an AI robot

I. English version

ISCTE Instituto Universitário de Lisboa

English

The goal of this questionnaire is to study the influence of Artificial Intelligence robots in organizations.

The following questionnaire was developed to gather information in the scope of the Master in Marketing' thesis.

Your participation is highly valuable and the data collected is strictly anonymous and confidential. The answers will be analyzed collectively and never individually.

Please consider that there are no right or wrong answers.

Thank you in advance for your time.

Please consider the following scenario:

Imagine you are a head chef at the Hotel X restaurant. The company has recently acquired and implemented several robotic arms to automate food preparation and minimize human involvement in the cooking processes in the restaurant's kitchen. These robots are capable of precisely and consistently measuring, sorting, cutting, and chopping ingredients; mixing ingredients with sauces and condiments; and cooking the food, adjusting to personalized orders from customers. One (human) kitchen staff is responsible for plating and a waiter for serving the food and also interacting with customers. With the help of an artificial intelligence (AI) system, you oversee the menu, recipes, and kitchen inventory, making sure that taste and freshness of the food served are guaranteed.

Keeping in mind this scenario, please answer the following questions:

Robot Use-Self Efficacy

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I know how to interact with this specific artificial intelligence (AI) robot.	○	○	○	○	○	○	○
I could interact with this AI robot if someone showed me how to do it first.	○	○	○	○	○	○	○
I could interact with this AI robot if I could call someone for help if I got stuck.	○	○	○	○	○	○	○
I could interact with this AI robot if I had seen someone else using it before trying it myself.	○	○	○	○	○	○	○
I could interact with this AI robot if I had just the built-in help facility for assistance.	○	○	○	○	○	○	○

Effort Expectancy

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
It will take me too long to learn how to interact with these kind of AI robots.	○	○	○	○	○	○	○
Interacting with AI robots will be unnecessarily difficult and complex in a restaurant.	○	○	○	○	○	○	○
Interactions with AI robots will take too much of my time.	○	○	○	○	○	○	○
AI robots will be intimidating to me.	○	○	○	○	○	○	○

Learning

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
Learning to understand all of the special functions associated with an AI robot makes me anxious.	○	○	○	○	○	○	○
Learning to use AI robots makes me anxious.	○	○	○	○	○	○	○
Learning to use specific functions of an AI robot makes me anxious.	○	○	○	○	○	○	○
Learning how an AI robot works makes me anxious.	○	○	○	○	○	○	○
Learning to interact with an AI robot makes me anxious.	○	○	○	○	○	○	○
Taking a class about the development of AI robots makes me anxious.	○	○	○	○	○	○	○
Reading an AI robot manual makes me anxious.	○	○	○	○	○	○	○
Being unable to keep up with the advances associated with AI robot makes me anxious.	○	○	○	○	○	○	○

Job replacement

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I am afraid that an AI robot may make us dependent.	○	○	○	○	○	○	○
I am afraid that an AI robot may make us even lazier.	○	○	○	○	○	○	○
I am afraid that an AI robot may replace humans.	○	○	○	○	○	○	○
I am afraid that widespread use of humanoid robots will take jobs away from people.	○	○	○	○	○	○	○
I am afraid that if I begin to work with AI robots I will become dependent upon them and lose some of my reasoning skills.	○	○	○	○	○	○	○
I am afraid that AI robots will replace someone's job.	○	○	○	○	○	○	○

Sociotechnical blindness

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I am afraid that an AI robot may be misused.	○	○	○	○	○	○	○
I am afraid of various problems potentially associated with AI robots.	○	○	○	○	○	○	○
I am afraid that an AI robot may get out of control and malfunction.	○	○	○	○	○	○	○
I am afraid that an AI robot may lead to robot autonomy.	○	○	○	○	○	○	○

AI configuration

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I find humanoid AI techniques/products (e.g. humanoid robots) scary.	○	○	○	○	○	○	○
I find humanoid AI techniques/products (e.g. humanoid robots) intimidating.	○	○	○	○	○	○	○
I don't know why, but humanoid AI techniques/products (e.g. humanoid robots) scare me.	○	○	○	○	○	○	○

Demands

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
With artificial intelligence, I need to work very fast.	○	○	○	○	○	○	○
With artificial intelligence, I need to work very intensively.	○	○	○	○	○	○	○
With artificial intelligence, I need more effort in my job.	○	○	○	○	○	○	○
With artificial intelligence, I have enough time to do my tasks.	○	○	○	○	○	○	○
With artificial intelligence, I have conflicts in the team.	○	○	○	○	○	○	○

Support

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
There is a calm and pleasant atmosphere working with artificial intelligence.	○	○	○	○	○	○	○
I get on well with my artificial intelligence co-workers.	○	○	○	○	○	○	○
My artificial intelligence co-workers support me.	○	○	○	○	○	○	○
My artificial intelligence co-workers understand if I have a bad day.	○	○	○	○	○	○	○
I get on well with my supervisors in a team with AI robots.	○	○	○	○	○	○	○
I enjoy working with AI robots.	○	○	○	○	○	○	○

Happiness

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
The experience of working with AI contributes very much to my happiness in life.	○	○	○	○	○	○	○
The experience of working with AI is very meaningful.	○	○	○	○	○	○	○
The experience of working with AI is very personally fulfilling.	○	○	○	○	○	○	○

Satisfaction

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
When I work with AI robots, I receive recognition for a job well done.	○	○	○	○	○	○	○
In a team with AI robots, I feel close to people at work.	○	○	○	○	○	○	○
While I work with AI robots, I feel good about working at the company.	○	○	○	○	○	○	○
When I work with AI robots, I feel secure about my job.	○	○	○	○	○	○	○
Giving me the possibility to work with AI robots, I believe management is concerned about me.	○	○	○	○	○	○	○

Identification

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I am proud to tell others that I am part of the organization that uses with artificial intelligence.	○	○	○	○	○	○	○
I feel a sense of ownership toward this organization that uses AI.	○	○	○	○	○	○	○
My sense of pride toward the organizational brand is reinforced by working with AI robots.	○	○	○	○	○	○	○
While I work with AI robots, I view the success of the company as my own success.	○	○	○	○	○	○	○
While I work with AI robots, the organization is like a family to me.	○	○	○	○	○	○	○
If I work in a company with AI I would talk about this organization, usually saying “we” rather than “they.”.	○	○	○	○	○	○	○
When someone praises this company because of using AI, it feels like a personal compliment.	○	○	○	○	○	○	○

Commitment

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
My commitment to the company, increases because of the use of artificial intelligence	○	○	○	○	○	○	○
Working with AI robots, I am very committed to delivering the brand promise to our customers.	○	○	○	○	○	○	○
Working with AI robots, this organization has a great deal of personal meaning for me.	○	○	○	○	○	○	○

Loyalty

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I will be happy to spend the rest of my career working with AI.	○	○	○	○	○	○	○
I do not have an intention to stop using AI robots in my workplace at this moment.	○	○	○	○	○	○	○
My intention to stay is driven by the fact that I like to work with AI.	○	○	○	○	○	○	○

Performance

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
My performance in a team with AI robots exceeded expectations.	○	○	○	○	○	○	○
Working with AI, the amount of opportunity for my performance improvement at my organization is high.	○	○	○	○	○	○	○

Self-esteem

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
On the whole, I am satisfied with myself, interacting with AI robots in my workplace.	○	○	○	○	○	○	○
At times I think I am no good at all interacting with AI robots at my workplace.	○	○	○	○	○	○	○
I feel that I have a number of good skills to interact with AI robots.	○	○	○	○	○	○	○
I am able to interact with AI robots in my workplace as well as most other people.	○	○	○	○	○	○	○
While I work with AI, I feel I do not have much to be proud of.	○	○	○	○	○	○	○
I certainly feel useless in a teamwork with AI robots.	○	○	○	○	○	○	○
In a team with AI robots, I feel that I'm a person of worth.	○	○	○	○	○	○	○
In a team with AI robots, I wish I could have more respect for myself.	○	○	○	○	○	○	○
In a team with AI robots, I am inclined to think that I am a failure.	○	○	○	○	○	○	○
In a team with AI robots, I take a positive attitude toward myself.	○	○	○	○	○	○	○

Anthropomorphism

	Artificial (1)	2	3	4	5	6	Lifelike (7)
I personally feel these type of AI robots are:	○	○	○	○	○	○	○

Anthropomorphism

	Machinelike (1)	2	3	4	5	6	Humanlike (7)
I personally feel these type of AI robots are:	○	○	○	○	○	○	○

Anthropomorphism

	Fake (1)	2	3	4	5	6	Natural (7)
I personally feel these type of AI robots are:	○	○	○	○	○	○	○

Anthropomorphism

	Unconscious (1)	2	3	4	5	6	Conscious (7)
I personally feel these type of AI robots are:	○	○	○	○	○	○	○

Anthropomorphism

	Moving rigidly (1)	2	3	4	5	6	Moving elegantly (7)
I personally feel these type of AI robots are:	○	○	○	○	○	○	○

Anthropomorphism

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
These kind of AI robots experience emotions.	○	○	○	○	○	○	○
These kind of AI robots have a mind of their own.	○	○	○	○	○	○	○

Gender:

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

Age group:

- ○ 18 to 24 years old
- ○ 25 to 34 years old
- ○ 35 to 44 years old
- ○ 45 to 54 years old
- ○ 55 to 64 years old
- ○ More than 65 years old

Country of residence:

Highest education level achieved:

- ○ Master's degree or above
- ○ Bachelor's degree
- ○ Highschool
- ○ Other

Employment status:

- ○ Employed
- ○ Self-employed
- ○ Unemployed
- ○ Student/Employed
- ○ Student
- ○ Retired

Annual household income:

- ○ Less than 25.000€
- ○ 25.000€ to 50.000€
- ○ 50.000€ to 100.000€
- ○ 100.000€ to 200.000€
- ○ More than 200.000€

Source: Qualtrics questionnaire layout

II. Portuguese version

ISCTE Instituto Universitário de Lisboa

Português

O objetivo deste questionário é estudar a influência da utilização de robôs de inteligência artificial em organizações.

O seguinte questionário foi desenvolvido para recolher informação no âmbito da minha tese de Mestrado em Marketing.

A sua participação é muito importante. Este questionário é anónimo e confidencial. As respostas serão analisadas coletivamente e nunca individualmente.

Por favor considere que não há respostas corretas nem erradas.

Agradeço desde já a sua disponibilidade.

Por favor considere o seguinte cenário:

Imagine que é chefe de cozinha do restaurante do Hotel X. Recentemente, a empresa adquiriu e implementou diversos "braços robóticos" de modo a automatizar e diminuir o envolvimento humano nos processos de confecção de pratos na cozinha do restaurante. Estes robôs são capazes, de forma precisa e consistente, de medir, ordenar e cortar ingredientes, misturar ingredientes com molhos e condimentos; e cozinhar a comida de forma ajustada consoante pedidos personalizados dos clientes. Um membro da cozinha (humano) é responsável por empratar, e um empregado de mesa encarrega-se de servir e comunicar com os clientes. Com a ajuda de um sistema de inteligência artificial, supervisiona o menu, receitas e o inventário de produtos na cozinha, fazendo com que o sabor e frescura da comida servida estejam assegurados.

Tendo em conta este cenário, por favor responda às seguintes questões:

Interação

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Eu saberia como interagir com este robô de inteligência artificial.	○	○	○	○	○	○	○
Eu conseguiria interagir com este robô se me for explicado previamente.	○	○	○	○	○	○	○
Eu conseguiria interagir com este robô se pudesse pedir ajuda a alguém.	○	○	○	○	○	○	○
Eu conseguiria interagir com este robô se visse alguém usá-lo previamente.	○	○	○	○	○	○	○
Eu conseguiria interagir com este robô se este tivesse uma componente para ajuda/assistência.	○	○	○	○	○	○	○

Esforço

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Vai demorar muito tempo até que consiga aprender a interagir com estes robôs.	○	○	○	○	○	○	○
Interagir com robôs será desnecessariamente difícil e complexo num restaurante.	○	○	○	○	○	○	○
Interagir com robôs de inteligência artificial irá tomar muito do meu tempo.	○	○	○	○	○	○	○
Robôs de inteligência artificial intimidam-me.	○	○	○	○	○	○	○

Aprendizagem

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Aprender e compreender todas as funções especiais associadas a robôs de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Aprender a usar robôs de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Aprender funções específicas associadas a robôs de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Aprender como um robô de inteligência artificial funciona deixa-me ansioso.	○	○	○	○	○	○	○
Aprender a interagir com robôs de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Assistir a uma aula sobre o desenvolvimento de robôs de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Ler um manual de instruções de um robô de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Não conseguir acompanhar os avanços tecnológicos associados a robôs de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○

Substituição de trabalho

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Tenho medo de ficar dependente de um robô.	○	○	○	○	○	○	○
Tenho medo de ficar mais preguiçoso ao trabalhar com um robô.	○	○	○	○	○	○	○
Tenho medo que robôs de inteligência artificial substituam humanos.	○	○	○	○	○	○	○
Tenho medo que a utilização de robôs com semelhanças a humanos retire trabalhadores humanos de postos de trabalho.	○	○	○	○	○	○	○
Tenho medo de ao começar a trabalhar com robôs, ficar dependente dos mesmos e de perder algumas das minhas capacidades de raciocínio.	○	○	○	○	○	○	○
Tenho medo que robôs de inteligência artificial substituam alguém no trabalho.	○	○	○	○	○	○	○

Socio-técnica

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Tenho medo que um robô seja usado para fins menos corretos.	○	○	○	○	○	○	○
Tenho medo de vários problemas potencialmente associados a robôs de inteligência artificial.	○	○	○	○	○	○	○
Tenho medo que um robô fuja de controlo humano.	○	○	○	○	○	○	○
Tenho medo que um robô se torne autónomo.	○	○	○	○	○	○	○

Configuração

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Considero robôs idênticos a humanos assustadores.	○	○	○	○	○	○	○
Considero robôs idênticos a humanos intimidadores.	○	○	○	○	○	○	○
Não sei porquê, mas robôs idênticos a humanos assustam-me.	○	○	○	○	○	○	○

Exigências

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Com inteligência artificial, teria de trabalhar muito rápido.	○	○	○	○	○	○	○
Com inteligência artificial, teria de trabalhar muito intensamente.	○	○	○	○	○	○	○
Com inteligência artificial, teria de trabalhar com mais empenho.	○	○	○	○	○	○	○
Com inteligência artificial, teria tempo para realizar todas as minhas tarefas.	○	○	○	○	○	○	○
Com inteligência artificial, teria conflitos na equipa de trabalho.	○	○	○	○	○	○	○

Suporte

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Haverá um clima calmo e prazeroso ao trabalhar com inteligência artificial.	○	○	○	○	○	○	○
Dar-me-ia bem com os meus colegas robôs.	○	○	○	○	○	○	○
Os meus colegas robôs apoiar-me-iam no trabalho.	○	○	○	○	○	○	○
Os meus colegas robôs entenderiam, se eu tenho um mau dia.	○	○	○	○	○	○	○
Dar-me-ia bem com os meus superiores numa equipa com robôs.	○	○	○	○	○	○	○
Eu gostaria de trabalhar com robôs de inteligência artificial.	○	○	○	○	○	○	○

Felicidade

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
A experiência de trabalhar com inteligência artificial será muito importante para a minha alegria na minha vida.	○	○	○	○	○	○	○
A experiência de trabalhar com inteligência artificial será muito significativa.	○	○	○	○	○	○	○
A experiência de trabalhar com inteligência artificial será pessoalmente enriquecedora.	○	○	○	○	○	○	○

Satisfação

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Se trabalhar, com robôs de inteligência artificial serei reconhecido por executar bem as minhas tarefas.	○	○	○	○	○	○	○
Numa equipa de trabalho com robôs de inteligência artificial sentir-me-ei próximo das pessoas no trabalho.	○	○	○	○	○	○	○
Gosto de trabalhar na empresa, quando trabalhar com robôs de inteligência artificial.	○	○	○	○	○	○	○
Quando trabalhar com robôs de inteligência artificial sentir-me-ei seguro em relação ao meu trabalho.	○	○	○	○	○	○	○
Quando me dão a oportunidade de trabalhar com robôs de inteligência artificial, eu acredito que a empresa se preocupa comigo.	○	○	○	○	○	○	○

Identificação

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Terei orgulho em dizer que pertenço a uma empresa que utiliza inteligência artificial.	○	○	○	○	○	○	○
Terei um sentimento de pertença sobre esta empresa que usa inteligência artificial.	○	○	○	○	○	○	○
O meu orgulho por esta empresa será reforçado por trabalhar com robôs de inteligência artificial.	○	○	○	○	○	○	○
Quando trabalhar com robôs de inteligência artificial, encararei o sucesso da empresa como o meu próprio sucesso.	○	○	○	○	○	○	○
Quando trabalhar com robôs de inteligência artificial, considerarei a empresa uma família para mim.	○	○	○	○	○	○	○
Se eu trabalhar numa empresa com inteligência artificial, refiro-me à empresa dizendo "nós" em vez de "eles".	○	○	○	○	○	○	○
Quando alguém elogia a empresa por usar inteligência artificial, considero como um elogio pessoal.	○	○	○	○	○	○	○

Comprometimento

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
O meu comprometimento com a empresa aumenta pela utilização de robôs de inteligência artificial.	○	○	○	○	○	○	○
Trabalhando com robôs de inteligência artificial, estou muito comprometido em passar a mensagem da empresa aos consumidores.	○	○	○	○	○	○	○
Trabalhando com robôs de inteligência artificial, esta empresa terá um grande significado para mim.	○	○	○	○	○	○	○

Lealdade

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Serei feliz ao passar o resto da minha carreira a trabalhar com inteligência artificial.	○	○	○	○	○	○	○
Não tenho a intenção de rejeitar trabalhar com robôs de inteligência artificial neste momento.	○	○	○	○	○	○	○
A minha intenção de continuar na empresa, deve-se ao facto de trabalhar com inteligência artificial.	○	○	○	○	○	○	○

Performance

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
A minha performance numa equipa com robôs de inteligência artificial excederá as expectativas.	○	○	○	○	○	○	○
Trabalhando com robôs de inteligência artificial, as oportunidades de melhorar a minha performance serão muitas.	○	○	○	○	○	○	○

Auto-estima

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
No geral, eu ficaria satisfeito comigo próprio por interagir com robôs no local de trabalho.	○	○	○	○	○	○	○
Por vezes, eu penso que não tenho aptidão para interagir com robôs no local de trabalho.	○	○	○	○	○	○	○
Eu sinto que tenho boas capacidades para interagir com robôs de inteligência artificial.	○	○	○	○	○	○	○
Sou tão capaz de interagir com robôs de inteligência artificial no meu local de trabalho, como tantas outras pessoas.	○	○	○	○	○	○	○
Não sinto orgulho se trabalhar com inteligência artificial.	○	○	○	○	○	○	○
Sentir-me-ei inútil numa equipa de trabalho com robôs.	○	○	○	○	○	○	○

Numa equipa de trabalho com robôs de inteligência artificial sentir-me-ei uma pessoa com valor.	○	○	○	○	○	○	○
Numa equipa de trabalho com robôs de inteligência artificial eu desejaria poder ser mais respeitado.	○	○	○	○	○	○	○
Numa equipa de trabalho com robôs de inteligência artificial sentir-me-ei um fracasso.	○	○	○	○	○	○	○
Numa equipa de trabalho com robôs de inteligência artificial terei uma atitude positiva sobre mim próprio.	○	○	○	○	○	○	○

Antropomorfismo

	Artificiais (1)	2	3	4	5	6	Reais (7)
Eu considero que este tipo de robôs são:	○	○	○	○	○	○	○

Antropomorfismo

	Parecidos com máquinas (1)	2	3	4	5	6	Parecidos com humanos (7)
Eu considero que este tipo de robôs são:	○	○	○	○	○	○	○

Antropomorfismo

	Falsos (1)	2	3	4	5	6	Naturais (7)
Eu considero que este tipo de robôs são:	○	○	○	○	○	○	○

Antropomorfismo

	Inconscientes (1)	2	3	4	5	6	Conscientes (7)
Eu considero que este tipo de robôs são:	○	○	○	○	○	○	○

Antropomorfismo

	Movem-se roboticamente (1)	2	3	4	5	6	Movem-se naturalmente (7)
Eu considero que este tipo de robôs:	○	○	○	○	○	○	○

Antropomorfismo

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Este tipo de robôs expressam emoções.	○	○	○	○	○	○	○
Este tipo de robôs tem capacidade de pensar por si próprio.	○	○	○	○	○	○	○

Género:

- ◯ Masculino
- ◯ Feminino
- ◯ Outro
- ◯ Prefiro não revelar

Grupo etário

- ◯ 18 aos 24 anos
- ◯ 25 aos 34 anos
- ◯ 35 aos 44 anos
- ◯ 45 aos 54 anos
- ◯ 55 aos 64 anos
- ◯ Mais de 65 anos

País de residência

Nível de escolaridade mais alto obtido:

- ◯ Mestrado ou superior
- ◯ Licenciatura
- ◯ Ensino Secundário
- ◯ Outro

Situação de emprego:

- ◯ Empregado
- ◯ Trabalhador por conta própria
- ◯ Desempregado
- ◯ Estudante/Trabalhador
- ◯ Estudante
- ◯ Reformado

Rendimento anual do agregado familiar:

- ◯ Menos de 25.000€
- ◯ 25.000€ a 50.000€
- ◯ 50.000€ a 100.000€
- ◯ 100.000€ a 200.000€
- ◯ Mais de 200.000€

Source: Qualtrics questionnaire layout

Appendix G. Questionnaire with an AI software

I. English version

ISCTE Instituto Universitário de Lisboa

English

The goal of this questionnaire is to study the influence of Artificial Intelligence software/algorithms in organizations.

The following questionnaire was developed to gather information in the scope of the Master in Marketing' thesis.

Your participation is highly valuable and the data collected is strictly anonymous and confidential. The answers will be analyzed collectively and never individually.

Please consider that there are no right or wrong answers.

Thank you in advance for your time.

Please consider the following scenario:

Imagine you are a marketing manager in a Hotel. You have been tasked with launching a new marketing campaign. The hotel where you work for wants to extend their brand recognition and to reach new market segments, although it's still unclear who exactly they should go after first. Business travelers? Families? Daytrippers? To get some much-needed clarity on the issue, you decide to do some quick benchmarking by giving a try to the hotel's new analytics tool. The hotel has recently bought a license for a piece of software that sifts through and analyses massive amounts of data from social media, turning it into tangible insight that is easy to understand and make use of. You select the social media channels you would like to monitor, enter a few keywords, and press 'find results'. In a few seconds you are presented with an in-depth analysis of what customers are talking about in relation to the type of hotel you work at. Your search seems to have been successful: it's captured over 2.4 million unique posts from the last 6 months. You are presented with clear information on the types of customers engaging with similar brands, complete with customer profiles and graphs on type and time of engagement. It seems that the most vocal, and hence probably most socially influential, customer segments are wealthy Asian single-parents who stay for two to four nights, and tend to order room service at least once during their stay. You are somewhat surprised by the conclusion, but decide to trust the information you have been given. You start to sketch a marketing campaign around these new insights.

Keeping in mind this scenario, please answer the following questions:

Robot Use-Self Efficacy

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I know how to use this specific artificial intelligence (AI) software/algorithm.	○	○	○	○	○	○	○
I could use this AI software/algorithm if someone showed me how to do it first.	○	○	○	○	○	○	○
I could use this AI software/algorithm if I could call someone for help if I got stuck.	○	○	○	○	○	○	○
I could use this AI software/algorithm if I had seen someone else using it before trying it myself.	○	○	○	○	○	○	○
I could use this AI software/algorithm if I had just the built-in help facility for assistance.	○	○	○	○	○	○	○

Effort Expectancy

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
It will take me too long to learn how to use these kind of AI software/algorithms.	○	○	○	○	○	○	○
Using AI software/algorithms will be unnecessarily difficult and complex in a company.	○	○	○	○	○	○	○
Use of AI software/algorithms will take too much of my time.	○	○	○	○	○	○	○
AI software/algorithms will be intimidating to me.	○	○	○	○	○	○	○

Learning

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
Learning to understand all of the special functions associated with an AI software/algorithm makes me anxious.	○	○	○	○	○	○	○
Learning to use AI software/algorithms makes me anxious.	○	○	○	○	○	○	○
Learning to use specific functions of an AI software/algorithm makes me anxious.	○	○	○	○	○	○	○
Learning how an AI software/algorithm works makes me anxious.	○	○	○	○	○	○	○
Learning to interact with an AI software/algorithm makes me anxious.	○	○	○	○	○	○	○
Taking a class about the development of AI software/algorithms makes me anxious.	○	○	○	○	○	○	○
Reading an AI software/algorithm manual makes me anxious.	○	○	○	○	○	○	○
Being unable to keep up with the advances associated with AI software/algorithms makes me anxious.	○	○	○	○	○	○	○

Job replacement

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I am afraid that an AI software/algorithm may make us dependent.	○	○	○	○	○	○	○
I am afraid that an AI software/algorithm may make us even lazier.	○	○	○	○	○	○	○
I am afraid that an AI software/algorithm may replace humans.	○	○	○	○	○	○	○
I am afraid that widespread use of AI software/algorithms capable to perform tasks usually made by humans, will take jobs away from people.	○	○	○	○	○	○	○
I am afraid that if I begin to work using AI software/algorithms I will become dependent upon them and lose some of my reasoning skills.	○	○	○	○	○	○	○
I am afraid that AI software/algorithms will replace someone's job.	○	○	○	○	○	○	○

Sociotechnical blindness

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I am afraid that an AI software/algorithm may be misused.	○	○	○	○	○	○	○
I am afraid of various problems potentially associated with AI software/algorithms.	○	○	○	○	○	○	○
I am afraid that an AI software/algorithm may get out of control and malfunction.	○	○	○	○	○	○	○
I am afraid that an AI software/algorithm may lead to robot autonomy.	○	○	○	○	○	○	○

AI configuration

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I find humanoid AI techniques/products (e.g. AI software/algorithms capable to perform tasks usually made by humans) scary.	○	○	○	○	○	○	○
I find humanoid AI techniques/products (e.g. AI software/algorithms capable to perform tasks usually made by humans) intimidating.	○	○	○	○	○	○	○
I don't know why, but humanoid AI techniques/products (e.g. AI software/algorithms capable to perform tasks usually made by humans) scare me.	○	○	○	○	○	○	○

Demands

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
Using AI software/algorithms, I need to work very fast.	○	○	○	○	○	○	○
Using AI software/algorithms, I need to work very intensively.	○	○	○	○	○	○	○
Using AI software/algorithms, I need more effort in my job.	○	○	○	○	○	○	○
Using AI software/algorithms, I have enough time to do my tasks.	○	○	○	○	○	○	○
Using AI software/algorithms, I have conflicts in the team.	○	○	○	○	○	○	○

Support

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
There is a calm and pleasant atmosphere working with AI software/algorithms.	○	○	○	○	○	○	○
I get on well with my co-workers using AI software/algorithms.	○	○	○	○	○	○	○
Use of AI software/algorithms supports me.	○	○	○	○	○	○	○
AI software/algorithms understand if I have a bad day.	○	○	○	○	○	○	○
I get on well with my supervisors in a team with AI software/algorithms.	○	○	○	○	○	○	○
I enjoy working with AI software/algorithms.	○	○	○	○	○	○	○

Happiness

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
The experience of working with AI software/algorithms contributes very much to my happiness in life.	○	○	○	○	○	○	○
The experience of working with AI software/algorithms is very meaningful.	○	○	○	○	○	○	○
The experience of working with AI software/algorithms is very personally fulfilling.	○	○	○	○	○	○	○

Satisfaction

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
When I work with AI software/algorithms, I receive recognition for a job well done.	○	○	○	○	○	○	○
In a team with AI software/algorithms, I feel close to people at work.	○	○	○	○	○	○	○
While I work with AI software/algorithms, I feel good about working at the company.	○	○	○	○	○	○	○
When I work with AI software/algorithms, I feel secure about my job.	○	○	○	○	○	○	○
Giving me the possibility to work with AI software/algorithms, I believe management is concerned about me.	○	○	○	○	○	○	○

Identification

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I am proud to tell others that I am part of the organization that uses AI software/algorithms.	○	○	○	○	○	○	○
I feel a sense of ownership toward this organization that uses AI software/algorithms.	○	○	○	○	○	○	○
My sense of pride toward the organizational brand is reinforced by using AI software/algorithms at work.	○	○	○	○	○	○	○
While I work with AI software/algorithms, I view the success of the company as my own success.	○	○	○	○	○	○	○
While I work with AI software/algorithms, the organization is like a family to me.	○	○	○	○	○	○	○
If I work in a company using AI software/algorithms I would talk about this organization, usually saying “we” rather than “they.”.	○	○	○	○	○	○	○
When someone praises this company because of using AI software/algorithms, it feels like a personal compliment.	○	○	○	○	○	○	○

Commitment

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
My commitment to the company, increases because of the use of artificial intelligence	○	○	○	○	○	○	○
Working with AI software/algorithms, I am very committed to delivering the brand promise to our customers.	○	○	○	○	○	○	○
Working with AI software/algorithms, this organization has a great deal of personal meaning for me.	○	○	○	○	○	○	○

Loyalty

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
I will be happy to spend the rest of my career working with AI software/algorithms.	○	○	○	○	○	○	○
I do not have an intention to stop using AI software/algorithms in my workplace at this moment.	○	○	○	○	○	○	○
My intention to stay is driven by the fact that I like to work with AI software/algorithms.	○	○	○	○	○	○	○

Performance

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
My performance in a team with AI software/algorithms exceeded expectations.	○	○	○	○	○	○	○
Working with AI software/algorithms, the amount of opportunity for my performance improvement at my organization is high.	○	○	○	○	○	○	○

Self-esteem

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
On the whole, I am satisfied with myself, using AI software/algorithms in my workplace.	○	○	○	○	○	○	○
At times I think I am no good at all using AI software/algorithms at my workplace.	○	○	○	○	○	○	○
I feel that I have a number of good skills to use AI software/algorithms.	○	○	○	○	○	○	○
I am able to use AI software/algorithms in my workplace as well as most other people.	○	○	○	○	○	○	○
While I work using AI software/algorithms, I feel I do not have much to be proud of.	○	○	○	○	○	○	○
I certainly feel useless in a teamwork using AI software/algorithms.	○	○	○	○	○	○	○
In a team using AI software/algorithms, I feel that I am a person of worth.	○	○	○	○	○	○	○
In a team using AI software/algorithms, I wish I could have more respect for myself.	○	○	○	○	○	○	○

In a team using AI software/algorithms, I am inclined to think that I am a failure.	○	○	○	○	○	○	○
In a team using AI software/algorithms, I take a positive attitude toward myself.	○	○	○	○	○	○	○

Anthropomorphism

	Artificial (1)	2	3	4	5	6	Lifelike (7)
I personally feel these type of AI software/algorithms are:	○	○	○	○	○	○	○

Anthropomorphism

	Machines (1)	2	3	4	5	6	Humans (7)
I personally feel these type of AI software/algorithms perform tasks that are already made by:	○	○	○	○	○	○	○

Anthropomorphism

	Fake (1)	2	3	4	5	6	Natural (7)
I personally feel these type of AI software/algorithms are:	○	○	○	○	○	○	○

Anthropomorphism

	Unconscious (1)	2	3	4	5	6	Conscious (7)
I personally feel these type of AI software/algorithms are:	○	○	○	○	○	○	○

Anthropomorphism

	Difficult to use (1)	2	3	4	5	6	User friendly (7)
I personally feel these type of AI software/algorithms are:	○	○	○	○	○	○	○

Anthropomorphism

	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree
These kind of AI software/algorithms experience emotions.	○	○	○	○	○	○	○
These kind of AI software/algorithms have a mind of their own.	○	○	○	○	○	○	○

Gender:

- ◯ Male
- ◯ Female
- ◯ Non-binary / third gender
- ◯ Prefer not to say

Age group:

- ◯ 18 to 24 years old
- ◯ 25 to 34 years old
- ◯ 35 to 44 years old
- ◯ 45 to 54 years old
- ◯ 55 to 64 years old
- ◯ More than 65 years old

Country of residence:

Highest education level achieved:

- ◯ Master's degree or above
- ◯ Bachelor's degree
- ◯ Highschool
- ◯ Other

Employment status:

- ◯ Employed
- ◯ Self-employed
- ◯ Unemployed
- ◯ Student/Employed
- ◯ Student
- ◯ Retired

Annual household income:

- ◯ Less than 25.000€
- ◯ 25.000€ to 50.000€
- ◯ 50.000€ to 100.000€
- ◯ 100.000€ to 200.000€
- ◯ More than 200.000€

Source: Qualtrics questionnaire layout

II. Portuguese version

ISCTE Instituto Universitário de Lisboa

Português

O objetivo deste questionário é estudar a influência da utilização de software/algoritmos de inteligência artificial em organizações.

O seguinte questionário foi desenvolvido para recolher informação no âmbito da minha tese de Mestrado em Marketing.

A sua participação é muito importante. Este questionário é anónimo e confidencial. As respostas serão analisadas coletivamente e nunca individualmente.

Por favor considere que não há respostas corretas nem erradas.

Agradeço desde já a sua disponibilidade.

Por favor considere o seguinte cenário:

Imagine que é gestor(a) de marketing num hotel. Foi-lhe atribuída a tarefa de lançar uma nova campanha de marketing. O hotel pretende aumentar o reconhecimento da marca e alcançar novos segmentos de mercado, apesar de não ser claro qual o alvo exato desta campanha. Viajantes de negócios? Famílias? Viajantes de um dia? De modo a clarificar este assunto, é feito um estudo utilizando a nova ferramenta de análise do hotel. O hotel decidiu adquirir uma licença de um software capaz de selecionar e analisar dados e informação, retirados de redes sociais, obtendo resultados e conclusões capazes de o ajudar a definir a campanha de marketing. Ao utilizar esta ferramenta, selecionou a rede social onde pretendia obter informações. Em poucos segundos obteve uma análise profunda sobre aquilo que os consumidores comentam sobre hotéis deste género. A sua análise foi um sucesso obtendo mais de 2 milhões de comentários de utilizadores dos últimos 6 meses.
Este software/algoritmo permitiu obter um padrão do género de consumidores de hotéis deste tipo, conseguindo assim elaborar uma campanha direcionada a este género de clientes.

Tendo em conta este cenário, por favor responda às seguintes questões:

Interação

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Eu saberia como usar este software/algoritmo de inteligência artificial.	○	○	○	○	○	○	○
Eu conseguiria usar este software/algoritmo de inteligência artificial se me for explicado previamente.	○	○	○	○	○	○	○
Eu conseguiria usar este software/algoritmo de inteligência artificial se pudesse pedir ajuda a alguém.	○	○	○	○	○	○	○
Eu conseguiria usar este software/algoritmo de inteligência artificial se visse alguém usá-lo previamente.	○	○	○	○	○	○	○
Eu conseguiria usar este software/algoritmo de inteligência artificial se este tivesse uma componente para ajuda/assistência.	○	○	○	○	○	○	○

Esforço

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Vai demorar muito tempo até que consiga aprender a usar este tipo de software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Usar este tipo de software/algoritmos de inteligência artificial será desnecessariamente difícil e complexo numa empresa.	○	○	○	○	○	○	○
A utilização deste tipo de software/algoritmos de inteligência artificial irá tomar muito do meu tempo.	○	○	○	○	○	○	○
Software/algoritmos de inteligência artificial intimidam-me.	○	○	○	○	○	○	○

Aprendizagem

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Aprender e compreender todas as funções especiais associadas a software/algoritmos de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Aprender a usar software/algoritmos de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Aprender funções específicas associadas a software/algoritmos de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Aprender como um software/algoritmo de inteligência artificial funciona deixa-me ansioso.	○	○	○	○	○	○	○
Aprender a interagir com software/algoritmos de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Assistir a uma aula sobre o desenvolvimento de software/algoritmos de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Ler um manual de instruções de software/algoritmos de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○
Não conseguir acompanhar os avanços tecnológicos associados a software/algoritmos de inteligência artificial deixa-me ansioso.	○	○	○	○	○	○	○

Substituição de trabalho

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Tenho medo de ficar dependente de software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Tenho medo de ficar mais preguiçoso ao usar software/algoritmos de inteligência artificial no trabalho.	○	○	○	○	○	○	○
Tenho medo que software/algoritmos de inteligência artificial substituam humanos.	○	○	○	○	○	○	○
Tenho medo que a utilização de software/algoritmos de inteligência artificial capazes de executar tarefas normalmente feitas por humanos, retire trabalhadores humanos de postos de trabalho.	○	○	○	○	○	○	○
Tenho medo de ao começar a usar software/algoritmos de inteligência artificial no trabalho, ficar dependente dos mesmos e de perder algumas das minhas capacidades de raciocínio.	○	○	○	○	○	○	○
Tenho medo que software/algoritmos de inteligência artificial substituam alguém no trabalho.	○	○	○	○	○	○	○

Socio-técnica

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Tenho medo que software/algoritmos de inteligência artificial seja usado para fins menos corretos.	○	○	○	○	○	○	○
Tenho medo de vários problemas potencialmente associados a software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Tenho medo que um software/algoritmo de inteligência artificial fuja de controlo humano.	○	○	○	○	○	○	○
Tenho medo que um software/algoritmo de inteligência artificial se torne autónomo.	○	○	○	○	○	○	○

Configuração

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Considero software/algoritmos de inteligência artificial capazes de executar tarefas feitas por humanos assustadores.	○	○	○	○	○	○	○
Considero software/algoritmos de inteligência artificial capazes de executar tarefas feitas por humanos intimidadores.	○	○	○	○	○	○	○
Não sei porquê, mas software/algoritmos de inteligência artificial capazes de executar tarefas feitas por humanos assustam-me.	○	○	○	○	○	○	○

Exigências

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Com a utilização de software/algoritmos de inteligência artificial no trabalho, teria de trabalhar muito rápido.	○	○	○	○	○	○	○
Com a utilização de software/algoritmos de inteligência artificial no trabalho, teria de trabalhar muito intensamente.	○	○	○	○	○	○	○
Com a utilização de software/algoritmos de inteligência artificial no trabalho, teria de trabalhar com mais empenho.	○	○	○	○	○	○	○
Com a utilização de software/algoritmos de inteligência artificial no trabalho, teria tempo para realizar todas as minhas tarefas.	○	○	○	○	○	○	○
Com a utilização de software/algoritmos de inteligência artificial no trabalho, teria conflitos na equipa de trabalho.	○	○	○	○	○	○	○

Suporte

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Haverá um clima calmo e prazeroso ao trabalhar com software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Dar-me-ia bem com os meus colegas utilizando software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
A utilização de software/algoritmos de inteligência artificial apoiar-me-ia no trabalho.	○	○	○	○	○	○	○
Software/algoritmos de inteligência artificial entenderiam, se eu tenho um mau dia.	○	○	○	○	○	○	○
Dar-me-ia bem com os meus superiores numa equipa que utiliza software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Eu gostaria de trabalhar com software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○

Felicidade

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
A experiência de trabalhar com software/algoritmos de inteligência artificial será muito importante para a minha alegria na minha vida.	○	○	○	○	○	○	○
A experiência de trabalhar com software/algoritmos de inteligência artificial será muito significativa.	○	○	○	○	○	○	○
A experiência de trabalhar com software/algoritmos de inteligência artificial será pessoalmente enriquecedora.	○	○	○	○	○	○	○

Satisfação

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Se trabalhar com software/algoritmos de inteligência artificial serei reconhecido por executar bem as minhas tarefas.	○	○	○	○	○	○	○
Numa equipa de trabalho com software/algoritmos de inteligência artificial sentir-me-ei próximo das pessoas no trabalho.	○	○	○	○	○	○	○
Gosto de trabalhar na empresa, quando trabalhar com software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Quando trabalhar com software/algoritmos de inteligência artificial sentir-me-ei seguro em relação ao meu trabalho.	○	○	○	○	○	○	○
Quando me dão a oportunidade de trabalhar com software/algoritmos de inteligência artificial, eu acredito que a empresa se preocupa comigo.	○	○	○	○	○	○	○

Identificação

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Terei orgulho em dizer que pertenço a uma empresa que utiliza software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Terei um sentimento de pertença sobre esta empresa que usa software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
O meu orgulho por esta empresa será reforçado por trabalhar com software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Quando trabalhar com software/algoritmos de inteligência artificial, encararei o sucesso da empresa como o meu próprio sucesso.	○	○	○	○	○	○	○
Quando trabalhar com software/algoritmos de inteligência artificial, considerarei a empresa uma família para mim.	○	○	○	○	○	○	○
Se eu trabalhar numa empresa com software/algoritmos de inteligência artificial, refiro-me à empresa dizendo "nós" em vez de "eles".	○	○	○	○	○	○	○
Quando alguém elogia a empresa por usar software/algoritmos de inteligência artificial, considero como um elogio pessoal.	○	○	○	○	○	○	○

Comprometimento

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
O meu comprometimento com a empresa aumenta pela utilização de software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Trabalhando com software/algoritmos de inteligência artificial, estou muito comprometido em passar a mensagem da empresa aos consumidores.	○	○	○	○	○	○	○
Trabalhando com software/algoritmos de inteligência artificial, esta empresa terá um grande significado para mim.	○	○	○	○	○	○	○

Lealdade

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Serei feliz ao passar o resto da minha carreira a trabalhar com software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Não tenho a intenção de rejeitar trabalhar com software/algoritmos de inteligência artificial neste momento.	○	○	○	○	○	○	○
A minha intenção de continuar na empresa, deve-se ao facto de trabalhar com software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○

Performance

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
A minha performance numa equipa com software/algoritmos de inteligência artificial excederá as expectativas.	○	○	○	○	○	○	○
Trabalhando com software/algoritmos de inteligência artificial, as oportunidades de melhorar a minha performance serão muitas.	○	○	○	○	○	○	○

Auto-estima

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
No geral, eu ficaria satisfeito comigo próprio por usar software/algoritmos de inteligência artificial no local de trabalho.	○	○	○	○	○	○	○
Por vezes, eu penso que não tenho aptidão para usar software/algoritmos de inteligência artificial no local de trabalho.	○	○	○	○	○	○	○
Eu sinto que tenho boas capacidades para usar software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Sou tão capaz de usar software/algoritmos de inteligência artificial no meu local de trabalho, como tantas outras pessoas.	○	○	○	○	○	○	○

Não sinto orgulho se trabalhar com software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Sentir-me-ei inútil numa equipa de trabalho com software/algoritmos de inteligência artificial.	○	○	○	○	○	○	○
Numa equipa de trabalho com software/algoritmos de inteligência artificial sentir-me-ei uma pessoa com valor.	○	○	○	○	○	○	○
Numa equipa de trabalho com software/algoritmos de inteligência artificial eu desejaria poder ser mais respeitado.	○	○	○	○	○	○	○
Numa equipa de trabalho com software/algoritmos de inteligência artificial sentir-me-ei um fracasso.	○	○	○	○	○	○	○
Numa equipa de trabalho com software/algoritmos de inteligência artificial terei uma atitude positiva sobre mim próprio.	○	○	○	○	○	○	○

Antropomorfismo

	Artificiais (1)	2	3	4	5	6	Reais (7)
Eu considero que este tipo de software/algoritmos de inteligência artificial são:	○	○	○	○	○	○	○

Antropomorfismo

	Máquinas (1)	2	3	4	5	6	Humanos (7)
Eu considero que este tipo de software/algoritmos de inteligência artificial executam tarefas que são normalmente elaboradas por:	○	○	○	○	○	○	○

Antropomorfismo

	Falsos (1)	2	3	4	5	6	Naturais (7)
Eu considero que este tipo de software/algoritmos de inteligência artificial são:	○	○	○	○	○	○	○

Antropomorfismo

	Inconscientes (1)	2	3	4	5	6	Conscientes (7)
Eu considero que este tipo de software/algoritmos de inteligência artificial são:	○	○	○	○	○	○	○

Antropomorfismo

	Difíceis de usar (1)	2	3	4	5	6	Fáceis de usar (7)
Eu considero que este tipo de software/algoritmos de inteligência artificial são:	○	○	○	○	○	○	○

Antropomorfismo

	1 - Discordo completamente	2	3	4	5	6	7 - Concordo completamente
Este tipo de software/algoritmos de inteligência artificial expressam emoções.	○	○	○	○	○	○	○
Este tipo de software/algoritmo de inteligência artificial tem capacidade de pensar por si próprio.	○	○	○	○	○	○	○

Género:

- ○ Masculino
- ○ Feminino
- ○ Outro
- ○ Prefiro não revelar

Grupo etário

- ○ 18 aos 24 anos
- ○ 25 aos 34 anos
- ○ 35 aos 44 anos
- ○ 45 aos 54 anos
- ○ 55 aos 64 anos
- ○ Mais de 65 anos

País de residência

Nível de escolaridade mais alto obtido:

- ○ Mestrado ou superior
- ○ Licenciatura
- ○ Ensino Secundário
- ○ Outro

Situação de emprego:

- ○ Empregado
- ○ Trabalhador por conta própria
- ○ Desempregado
- ○ Estudante/Trabalhador
- ○ Estudante
- ○ Reformado

Rendimento anual do agregado familiar:

- ○ Menos de 25.000€
- ○ 25.000€ a 50.000€
- ○ 50.000€ a 100.000€
- ○ 100.000€ a 200.000€
- ○ Mais de 200.000€

Source: Qualtrics questionnaire layout

Appendix H. Sample description

I. Gender distribution

a) AI Robot scenario

Gender:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	95	46,8	46,8	46,8
	Female	107	52,7	52,7	99,5
	Prefer not to say	1	,5	,5	100,0
	Total	203	100,0	100,0	

Source: SPSS output

b) AI Software scenario

Gender:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	102	51,0	51,0	51,0
	Female	97	48,5	48,5	99,5
	Prefer not to say	1	,5	,5	100,0
	Total	200	100,0	100,0	

Source: SPSS output

II. Age group distribution

a) AI Robot scenario

Age group:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 to 24 years old	117	57,6	57,6	57,6
	25 to 34 years old	29	14,3	14,3	71,9
	35 to 44 years old	14	6,9	6,9	78,8
	45 to 54 years old	31	15,3	15,3	94,1
	55 to 64 years old	11	5,4	5,4	99,5
	More than 65 years old	1	,5	,5	100,0
	Total	203	100,0	100,0	

Source: SPSS output

b) AI Software scenario

Age group:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 to 24 years old	161	80,5	80,5	80,5
	25 to 34 years old	13	6,5	6,5	87,0
	35 to 44 years old	4	2,0	2,0	89,0
	45 to 54 years old	18	9,0	9,0	98,0
	55 to 64 years old	3	1,5	1,5	99,5
	More than 65 years old	1	,5	,5	100,0
	Total	200	100,0	100,0	

Source: SPSS output

III. Age group mean

a) AI Robot scenario

Statistics

Age group:

N	Valid	203
	Missing	0
Mean		1,98
Std. Deviation		1,353
Skewness		1,065
Std. Error of Skewness		,171
Kurtosis		-,285
Std. Error of Kurtosis		,340

Source: SPSS output

b) AI Software scenario

Statistics

AgeGroup

N	Valid	200
	Missing	0
Mean		1,4600
Std. Deviation		1,05545
Skewness		2,256
Std. Error of Skewness		,172
Kurtosis		3,949
Std. Error of Kurtosis		,342

Source: SPSS output

IV. Country of residence distribution

a) AI Robot scenario

Country of residence:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Portugal	203	100,0	100,0	100,0
	Total	203	100,0	100,0	

Source: SPSS output

b) AI Software scenario

Country of residence:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Portugal	200	100,0	100,0	100,0
	Total	200	100,0	100,0	

Source: SPSS output

V. Education level distribution

a) AI Robot scenario

Highest education level achieved:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Master's degree or above	55	27,1	27,1	27,1
	Bachelor's degree	119	58,6	58,6	85,7
	Highschool	26	12,8	12,8	98,5
	Other	3	1,5	1,5	100,0
	Total	203	100,0	100,0	

Source: SPSS output

b) AI Software scenario

Highest education level achieved:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Master's degree or above	68	34,0	34,0	34,0
	Bachelor's degree	119	59,5	59,5	93,5
	Highschool	13	6,5	6,5	100,0
	Total	200	100,0	100,0	

Source: SPSS output

VI. Employment status distribution

a) AI Robot scenario

Employment status:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employed	111	54,7	54,7	54,7
	Self-employed	5	2,5	2,5	57,1
	Unemployed	11	5,4	5,4	62,6
	Student/Employed	15	7,4	7,4	70,0
	Student	58	28,6	28,6	98,5
	Retired	3	1,5	1,5	100,0
	Total	203	100,0	100,0	

Source: SPSS output

b) AI Software scenario

Employment status:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employed	84	42,0	42,0	42,0
	Self-employed	2	1,0	1,0	43,0
	Unemployed	5	2,5	2,5	45,5
	Student/Employed	46	23,0	23,0	68,5
	Student	62	31,0	31,0	99,5
	Retired	1	,5	,5	100,0
	Total	200	100,0	100,0	

Source: SPSS output

VII. Employment status distribution

a) AI Robot scenario

Annual household income:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 25.000€	60	29,6	29,6	29,6
	25.000€ to 50.000€	88	43,3	43,3	72,9
	50.000€ to 100.000€	40	19,7	19,7	92,6
	100.000€ to 200.000€	12	5,9	5,9	98,5
	More than 200.000€	3	1,5	1,5	100,0
	Total	203	100,0	100,0	

Source: SPSS output

b) AI Software scenario

Annual household income:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 25.000€	78	39,0	39,0	39,0
	25.000€ to 50.000€	76	38,0	38,0	77,0
	50.000€ to 100.000€	32	16,0	16,0	93,0
	100.000€ to 200.000€	13	6,5	6,5	99,5
	More than 200.000€	1	,5	,5	100,0
	Total	200	100,0	100,0	

Source: SPSS output

Appendix I. Cronbach's alphas

I. AI Robot scenario

a) Social Interaction construct

Reliability Statistics

Cronbach's Alpha	N of Items
,700	11

Source: SPSS output

b) Anxiety construct

Reliability Statistics

Cronbach's Alpha	N of Items
,927	21

Source: SPSS output

c) Stress construct

Reliability Statistics

Cronbach's Alpha	N of Items
,625	16

Source: SPSS output

d) Happiness construct

Reliability Statistics

Cronbach's Alpha	N of Items
,763	3

Source: SPSS output

e) Employee Engagement construct

Reliability Statistics

Cronbach's Alpha	N of Items
,956	20

Source: SPSS output

f) Self-esteem construct

Reliability Statistics

Cronbach's Alpha	N of Items
,848	10

Source: SPSS output

II. AI Software scenario

a) Social Interaction construct

Reliability Statistics

Cronbach's Alpha	N of Items
,613	16

Source: SPSS output

b) Anxiety construct

Reliability Statistics

Cronbach's Alpha	N of Items
,914	21

Source: SPSS output

c) Stress construct

Reliability Statistics

Cronbach's Alpha	N of Items
,703	11

Source: SPSS output

d) Happiness construct

Reliability Statistics

Cronbach's Alpha	N of Items
,754	3

Source: SPSS output

e) Employee Engagement construct

Reliability Statistics

Cronbach's Alpha	N of Items
,950	20

Source: SPSS output

f) Self-esteem construct

Reliability Statistics

Cronbach's Alpha	N of Items
,828	10

Source: SPSS output

Appendix J. Descriptive statistics

I. AI Robot scenario

a) Social Interaction construct

SOCIAL INTERACTION – AI ROBOT SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
SIRUSE1: I know how to interact with this specific artificial intelligence (AI) robot	3.70	1.704	0.106	-0.684
SIRUSE2: I could interact with this AI robot if someone showed me how to do it first	**5.83**	**1.307**	**-1.276**	**1.621**
SIRUSE3: I could interact with this AI robot if I could call someone for help if I got stuck	5.43	1.449	-0.799	0.058
SIRUSE4: I could interact with this AI robot if I had seen someone else using it before trying it myself	**5.21**	**1.441**	**-0.839**	**0.538**
SIRUSE5: I could interact with this AI robot if I had just the built-in help facility for assistance	5.31	1.455	-0.905	0.483
SIAN1: I personally feel these type of AI robots are: artificial - lifelike (from 1 to 7)	**2.46**	**1.571**	**0.773**	**-0.177**
SIAN2: I personally feel these type of AI robots are: machinelike - humanlike (from 1 to 7)	2.72	1.651	0.489	-0.816
SIAN3: I personally feel these type of AI robots are: fake - natural (from 1 to 7)	**2.73**	**1.425**	**0.250**	**-0.754**
SIAN4: I personally feel these type of AI robots are: unconscious - conscious (from 1 to 7)	2.76	1.710	0.686	-0.342
SIAN5: I personally feel these type of AI robots are: moving rigidly - moving elegantly (from 1 to 7)	**2.64**	**1.501**	**0.455**	**-0.730**
SIAN6: These kind of AI robots experience emotions	2.08	1.538	1.311	0.849
SIAN7: These kind of AI robots have a mind of their own	**2.64**	**1.750**	**0.698**	**-0.690**
SIEEX1: It will take me too long to learn how to interact with these kind of AI robots	3.06	1.563	0.593	-0.301
SIEEX2: Interacting with AI robots will be unnecessarily difficult and complex in a restaurant	**3.28**	**1.597**	**0.571**	**-0.227**
SIEEX3: Interactions with AI robots will take too much of my time	3.11	1.371	0.420	-0.259
SIEEX4: AI robots will be intimidating to me	**3.03**	**1.867**	**0.649**	**-0.726**
SI: Social Interaction	**3.50**	**0.607**	**0.198**	**-0.364**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Robot Use-Self Efficacy - I know how to interact with this specific artificial intelligence (AI) robot.	203	3,70	1,704	,106	,171	-,684	,340
Robot Use-Self Efficacy - I could interact with this AI robot if someone showed me how to do it first.	203	5,83	1,307	-1,276	,171	1,621	,340
Robot Use-Self Efficacy - I could interact with this AI robot if I could call someone for help if I got stuck.	203	5,43	1,449	-,799	,171	,058	,340
Robot Use-Self Efficacy - I could interact with this AI robot if I had seen someone else using it before trying it myself.	203	5,21	1,441	-,839	,171	,538	,340
Robot Use-Self Efficacy - I could interact with this AI robot if I had just the built-in help facility for assistance.	203	5,31	1,455	-,905	,171	,483	,340
Effort Expectancy - It will take me too long to learn how to interact with these kind of AI robots.	203	3,06	1,563	,593	,171	-,301	,340
Effort Expectancy - Interacting with AI robots will be unnecessarily difficult and complex in a restaurant.	203	3,28	1,597	,571	,171	-,227	,340
Effort Expectancy - Interactions with AI robots will take too much of my time.	203	3,11	1,371	,420	,171	-,259	,340
Effort Expectancy - AI robots will be intimidating to me.	203	3,03	1,867	,649	,171	-,726	,340
Anthropomorphism - I personally feel these type of AI robots are:	203	2,46	1,571	,773	,171	-,177	,340
Anthropomorphism - I personally feel these type of AI robots are:	203	2,72	1,651	,489	,171	-,816	,340
Anthropomorphism - I personally feel these type of AI robots are:	203	2,73	1,425	,250	,171	-,754	,340
Anthropomorphism - I personally feel these type of AI robots are:	203	2,76	1,710	,686	,171	-,342	,340
Anthropomorphism - I personally feel these type of AI robots are:	203	2,64	1,501	,455	,171	-,730	,340
Anthropomorphism - These kind of AI robots experience emotions.	203	2,08	1,538	1,311	,171	,849	,340

Anthropomorphism – These kind of AI robots have a mind of their own.	203	2,64	1,750	,698	,171	-,690	,340
RUSE	203	5,0966	1,14171	-,668	,171	,783	,340
EffortExpectancy	203	3,1195	1,17690	,559	,171	,258	,340
Antropomorphism	203	2,5771	1,14805	,520	,171	-,146	,340
SocialInteraction	203	3,5000	,60704	,198	,171	-,364	,340
Valid N (listwise)	203						

Source: SPSS output

b) Anxiety construct

ANXIETY – AI ROBOT SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
ANXLE1: Learning to understand all of the special functions associated with an AI robot makes me anxious	2.96	1.565	0.646	-0.196
ANXLE2: Learning to use AI robots makes me anxious	**2.81**	**1.568**	**0.757**	**-0.064**
ANXLE3: Learning to use specific functions of an AI robot makes me anxious	2.80	1.494	0.720	0.007
ANXLE4: Learning how an AI robot works makes me anxious	**2.72**	**1.546**	**0.820**	**0.115**
ANXLE5: Learning to interact with an AI robot makes me anxious	2.81	1.544	0.717	-0.162
ANXLE6: Taking a class about the development of AI robots makes me anxious	**2.47**	**1.605**	**1.099**	**0.553**
ANXLE7: Reading an AI robot manual makes me anxious	2.76	1.834	0.853	-0.385
ANXLE8: Being unable to keep up with the advances associated with AI robot makes me anxious	**3.68**	**1.893**	**0.120**	**-1.163**
ANXJR1: I am afraid that an AI robot may make us dependent	3.70	1.965	0.167	-1.121
ANXJR2: I am afraid that an AI robot may make us even lazier	**3.78**	**1.883**	**-0.046**	**-1.147**
ANXJR3: I am afraid that an AI robot may replace humans	4.87	1.999	-0.626	-0.854
ANXJR4: I am afraid that widespread use of humanoid robots will take jobs away from people	**5.45**	**1.715**	**-1.029**	**0.121**
ANXJR5: I am afraid that if I begin to work with AI robots I will become dependent upon them and lose some of my reasoning skills	4.24	1.951	-0.259	-1.050
ANXJR6: I am afraid that AI robots will replace someone's job	**5.33**	**1.754**	**-0.984**	**0.010**
ANXSB1: I am afraid that an AI robot may be misused	5.55	1.651	-1.037	0.131
ANXSB2: I am afraid of various problems potentially associated with AI robots	**5.02**	**1.706**	**-0.551**	**-0.614**
ANXSB3: I am afraid that an AI robot may get out of control and malfunction	4.71	1.987	-0.409	-1.092

ANXSB4: I am afraid that an AI robot may lead to robot autonomy	**4.30**	**2.142**	**-0.153**	**-1.379**
ANXAIC1: I find humanoid AI techniques/products (e.g. humanoid robots) scary	3.75	2.099	0.233	-1.308
ANXAIC2: I find humanoid AI techniques/products (e.g. humanoid robots) intimidating	**3.67**	**2.040**	**0.250**	**-1.238**
ANXAIC3: I don't know why, but humanoid AI techniques/products (e.g. humanoid robots) scare me	3.70	2.097	0.193	-1.338
ANX: Anxiety	**3.861**	**1.164**	**0.045**	**-0.462**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Learning to understand all of the special functions associated with an AI robot makes me anxious.	203	2,96	1,565	,646	,171	-,196	,340
Learning to use AI robots makes me anxious.	203	2,81	1,568	,757	,171	-,064	,340
Learning to use specific functions of an AI robot makes me anxious.	203	2,80	1,494	,720	,171	,007	,340
Learning how an AI robot works makes me anxious.	203	2,72	1,546	,820	,171	,115	,340
Learning to interact with an AI robot makes me anxious.	203	2,81	1,544	,717	,171	-,162	,340
Learning – Taking a class about the development of AI robots makes me anxious.	203	2,47	1,605	1,099	,171	,553	,340
Learning – Reading an AI robot manual makes me anxious.	203	2,76	1,834	,853	,171	-,385	,340
Learning – Being unable to keep up with the advances associated with AI robot makes me anxious.	203	3,68	1,893	,120	,171	-1,163	,340
Job replacement – I am afraid that an AI robot may make us dependent.	203	3,70	1,965	,167	,171	-1,121	,340
Job replacement – I am afraid that an AI robot may make us even lazier.	203	3,78	1,883	-,046	,171	-1,147	,340
Job replacement – I am afraid that an AI robot may replace humans.	203	4,87	1,999	-,626	,171	-,854	,340

Job replacement – I am afraid that widespread use of humanoid robots will take jobs away from people.	203	5,45	1,715	-1,029	,171	,121	,340
Job replacement – I am afraid that if I begin to work with AI robots I will become dependent upon them and lose some of my reasoning skills.	203	4,24	1,951	-,259	,171	-1,050	,340
Job replacement – I am afraid that AI robots will replace someone's job.	203	5,33	1,754	-,984	,171	,010	,340
Sociotechnical blindness – I am afraid that an AI robot may be misused.	203	5,55	1,651	-1,037	,171	,131	,340
Sociotechnical blindness – I am afraid of various problems potentially associated with AI robots.	203	5,02	1,706	-,551	,171	-,614	,340
Sociotechnical blindness – I am afraid that an AI robot may get out of control and malfunction.	203	4,71	1,987	-,409	,171	-1,092	,340
Sociotechnical blindness – I am afraid that an AI robot may lead to robot autonomy.	203	4,30	2,142	-,153	,171	-1,379	,340
AI configuration – I find humanoid AI techniques/products (e. g. humanoid robots) scary.	203	3,75	2,099	,233	,171	-1,308	,340
AI configuration – I find humanoid AI techniques/products (e. g. humanoid robots) intimidating.	203	3,67	2,040	,250	,171	-1,238	,340
AI configuration – I don't know why, but humanoid AI techniques/products (e. g. humanoid robots) scare me.	203	3,70	2,097	,193	,171	-1,338	,340
Learning	203	2,8750	1,31584	,747	,171	,201	,340
JobReplacement	203	4,5632	1,49788	-,456	,171	-,591	,340
SociotechnicalBlindness	203	4,8941	1,60228	-,492	,171	-,702	,340
AIConfiguration	203	3,7077	2,00959	,222	,171	-1,292	,340
Anxiety	203	3,8609	1,16364	,045	,171	-,462	,340
Valid N (listwise)	203						

Source: SPSS output

c) Stress construct

STRESS – AI ROBOT SCENARIO	Mean	Std. Deviation	Skewness	Kurtosis
STDE1: With artificial intelligence, I need to work very fast	3.51	1.440	0.186	-0.233
STDE2: With artificial intelligence, I need to work very intensively	**3.53**	**1.457**	**0.125**	**-0.558**
STDE3: With artificial intelligence, I need more effort in my job	3.59	1.566	0.124	-0.710
STDE4: With artificial intelligence, I have enough time to do my tasks	**4.58**	**1.431**	**-0.452**	**-0.236**
STDE5: With artificial intelligence, I have conflicts in the team	3.12	1.437	0.559	0.126
STSU1: There is a calm and pleasant atmosphere working with artificial intelligence	**4.04**	**1.487**	**-0.287**	**-0.308**
STSU2: I get on well with my artificial intelligence co-workers	3.99	1.601	-0.159	-0.265
STSU3: My artificial intelligence co-workers support me	**4.11**	**1.737**	**-0.157**	**-0.698**
STSU4: My artificial intelligence co-workers understand if I have a bad day	2.26	1.549	1.074	0.233
STSU5: I get on well with my supervisors in a team with AI robots	**3.63**	**1.640**	**-0.096**	**-0.783**
STSU6: I enjoy working with AI robots	3.84	1.807	0.017	-0.929
ST: Stress	**3.653**	**0.782**	**-0.004**	**1.449**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Demands – With artificial intelligence, I need to work very fast.	203	3,51	1,440	,186	,171	-,233	,340
Demands – With artificial intelligence, I need to work very intensively.	203	3,53	1,457	,125	,171	-,558	,340
Demands – With artificial intelligence, I need more effort in my job.	203	3,59	1,566	,124	,171	-,710	,340
Demands – With artificial intelligence, I have enough time to do my tasks.	203	4,58	1,431	-,452	,171	-,236	,340
Demands – With artificial intelligence, I have conflicts in the team.	203	3,12	1,437	,559	,171	,126	,340
Support – There is a calm and pleasant atmosphere working with artificial intelligence.	203	4,04	1,487	-,287	,171	-,308	,340

Support – I get on well with my artificial intelligence co-workers.	203	3,99	1,601	-,159	,171	-,265	,340
Support – My artificial intelligence co-workers support me.	203	4,11	1,737	-,157	,171	-,698	,340
Support – My artificial intelligence co-workers understand if I have a bad day.	203	2,26	1,549	1,074	,171	,233	,340
Support – I get on well with my supervisors in a team with AI robots.	203	3,63	1,640	-,096	,171	-,783	,340
Support – I enjoy working with AI robots.	203	3,84	1,807	,017	,171	-,929	,340
Demands	203	3,6631	,99223	,019	,171	,347	,340
Support	203	3,6437	1,16053	-,048	,171	-,144	,340
Stress	203	3,6525	,78207	-,004	,171	1,449	,340
Valid N (listwise)	203						

Source: SPSS output

d) Happiness construct

HAPPINESS – AI ROBOT SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
HA1: The experience of working with AI contributes very much to my happiness in life	2.56	1.425	0.715	-0.270
HA2: The experience of working with AI is very meaningful	**3.63**	**1.637**	**0.010**	**-0.837**
HA3: The experience of working with AI is very personally fulfilling	3.95	1.634	-0.188	-0.620
HA: Happiness	**3.379**	**1.292**	**0.009**	**-0.289**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Happiness – The experience of working with AI contributes very much to my happiness in life.	203	2,56	1,425	,715	,171	-,270	,340
Happiness – The experience of working with AI is very meaningful.	203	3,63	1,637	,010	,171	-,837	,340
Happiness – The experience of working with AI is very personally fulfilling.	203	3,95	1,634	-,188	,171	-,620	,340
Happiness	203	3,3793	1,29188	,009	,171	-,289	,340
Valid N (listwise)	203						

Source: SPSS output

e) Employee Engagement construct

EMPLOYEE ENGAGEMENT – AI ROBOT SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
EESA1: When I work with AI robots, I receive recognition for a job well done	3.39	1.605	0.150	-0.548
EESA2: In a team with AI robots, I feel close to people at work	**2.79**	**1.560**	**0.618**	**-0.382**
EESA3: While I work with AI robots, I feel good about working at the company	3.20	1.650	0.208	-0.846
EESA4: When I work with AI robots, I feel secure about my job	**3.18**	**1.655**	**0.249**	**-0.865**
EESA5: Giving me the possibility to work with AI robots, I believe management is concerned about me	3.23	1.585	0.141	-0.733
EEID1: I am proud to tell others that I am part of the organization that uses artificial intelligence	**4.55**	**1.532**	**-0.364**	**-0.215**
EEID2: I feel a sense of ownership toward this organization that uses AI	3.78	1.652	-0.014	-0.625
EEID3: My sense of pride toward the organizational brand is reinforced by working with AI robots	**3.77**	**1.695**	**0.042**	**-0.761**
EEID4: While I work with AI robots, I view the success of the company as my own success	3.88	1.783	-0.093	-1.012
EEID5: While I work with AI robots, the organization is like a family to me	**2.96**	**1.670**	**0.468**	**-0.693**
EEID6: If I work in a company with AI I would talk about this organization, usually saying “we” rather than “they”	3.49	1.814	0.170	-0.889
EEID7: When someone praises this company because of using AI, it feels like a personal compliment	**3.57**	**1.908**	**0.124**	**-1.154**

EECO1: My commitment to the company, increases because of the use of artificial intelligence	2.92	1.711	0.473	-0.736
EECO2: Working with AI robots, I am very committed to delivering the brand promise to our customers	**3.59**	**1.713**	**0.034**	**-0.824**
EECO3: Working with AI robots, this organization has a great deal of personal meaning for me	3.31	1.675	0.228	-0.798
EELO1: I will be happy to spend the rest of my career working with AI	**3.16**	**1.732**	**0.307**	**-0.862**
EELO2: I do not have an intention to stop using AI robots in my workplace at this moment	4.65	1.744	-0.373	-0.541
EELO3: My intention to stay is driven by the fact that I like to work with AI	**2.76**	**1.559**	**0.645**	**-0.166**
EEPE1: My performance in a team with AI robots exceeded expectations	3.77	1.577	-0.148	-0.427
EEPE2: Working with AI, the amount of opportunity for my performance improvement at my organization is high	**4.09**	**1.699**	**-0.282**	**-0.675**
EE: Employee Engagement	**3.502**	**1.242**	**0.055**	**-0.596**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Satisfaction – When I work with AI robots, I receive recognition for a job well done.	203	3,39	1,605	,150	,171	-,548	,340
Satisfaction – In a team with AI robots, I feel close to people at work.	203	2,79	1,560	,618	,171	-,382	,340
Satisfaction – While I work with AI robots, I feel good about working at the company.	203	3,20	1,650	,208	,171	-,846	,340
Satisfaction – When I work with AI robots, I feel secure about my job.	203	3,18	1,655	,249	,171	-,865	,340
Satisfaction – Giving me the possibility to work with AI robots, I believe management is concerned about me.	203	3,23	1,585	,141	,171	-,733	,340
Identification – I am proud to tell others that I am part of the organization that uses with artificial intelligence.	203	4,55	1,532	-,364	,171	-,215	,340
Identification – I feel a sense of ownership toward this organization that uses AI.	203	3,78	1,652	-,014	,171	-,625	,340
Identification – My sense of pride toward the organizational brand is reinforced by working with AI robots.	203	3,77	1,695	,042	,171	-,761	,340

Identification – While I work with AI robots, I view the success of the company as my own success.	203	3,88	1,783	-,093	,171	-1,012	,340
Identification – While I work with AI robots, the organization is like a family to me.	203	2,96	1,670	,468	,171	-,693	,340
Identification – If I work in a company with AI I would talk about this organization, usually saying "we" rather than "they.".	203	3,49	1,814	,170	,171	-,889	,340
Identification – When someone praises this company because of using AI, it feels like a personal compliment.	203	3,57	1,908	,124	,171	-1,154	,340
Commitment – My commitment to the company, increases because of the use of artificial intelligence	203	2,92	1,711	,473	,171	-,736	,340
Commitment – Working with AI robots, I am very committed to delivering the brand promise to our customers.	203	3,59	1,713	,034	,171	-,824	,340
Commitment – Working with AI robots, this organization has a great deal of personal meaning for me.	203	3,31	1,675	,228	,171	-,798	,340
Loyalty – I will be happy to spend the rest of my career working with AI.	203	3,16	1,732	,307	,171	-,862	,340
Loyalty – I do not have an intention to stop using AI robots in my workplace at this moment.	203	4,65	1,744	-,373	,171	-,541	,340
Loyalty – My intention to stay is driven by the fact that I like to work with AI.	203	2,76	1,559	,645	,171	-,166	,340
Performance – My performance in a team with AI robots exceeded expectations.	203	3,77	1,577	-,148	,171	-,427	,340
Performance – Working with AI, the amount of opportunity for my performance improvement at my organization is high.	203	4,09	1,699	-,282	,171	-,675	,340
Satisfaction	203	3,1576	1,33586	,206	,171	-,350	,340
Identification	203	3,7136	1,43721	,036	,171	-,670	,340
Commitment	203	3,2709	1,49530	,103	,171	-,709	,340
Loyalty	203	3,5255	1,32787	,165	,171	-,385	,340
Performance	203	3,9310	1,50993	-,303	,171	-,381	,340
EmployeeEngagement	203	3,5017	1,24196	,055	,171	-,596	,340
Valid N (listwise)	203						

Source: SPSS output

f) Self-esteem construct

SELF-ESTEEM – AI ROBOT SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
SE1: On the whole, I am satisfied with myself, interacting with AI robots in my workplace	3.89	1.738	-0.104	-0.672
SE2*: At times I think I am no good at all interacting with AI robots at my workplace	**3.24**	**1.648**	**0.326**	**-0.621**
SE3: I feel that I have a number of good skills to interact with AI robots	4.47	1.526	-0.377	-0.299
SE4: When I am able to interact with AI robots in my workplace as well as most other people	**4.46**	**1.712**	**-0.248**	**-0.654**
SE5*: While I work with AI robots, I feel I do not have much to be proud of	3.33	1.748	0.290	-0.732
SE6*: I certainly feel useless in a teamwork with AI robots	**3.04**	**1.687**	**0.336**	**-0.931**
SE7: In a team with AI robots, I feel that I am a person of worth	4.04	1.645	-0.132	-0.590
SE8*: In a team with AI robots, I wish I could have more respect for myself	**3.41**	**1.569**	**0.208**	**-0.529**
SE9*: In a team with AI robots, I am inclined to think that I am a failure	2.66	1.579	0.545	-0.683
SE10: In a team with AI robots, I take a positive attitude toward myself	**4.42**	**1.553**	**-0.219**	**-0.373**
SE: Self-esteem	**3.696**	**0.662**	**-0.248**	**2.171**

*items: SE2, SE5, SE6, SE8 and SE9 are reverted.

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Self-esteem – On the whole, I am satisfied with myself, interacting with AI robots in my workplace.	203	3,89	1,738	-,104	,171	-,672	,340
Self-esteem – At times I think I am no good at all interacting with AI robots at my workplace.	203	3,24	1,648	,326	,171	-,621	,340
Self-esteem – I feel that I have a number of good skills to interact with AI robots.	203	4,47	1,526	-,377	,171	-,299	,340
Self-esteem – I am able to interact with AI robots in my workplace as well as most other people.	203	4,46	1,712	-,248	,171	-,654	,340
Self-esteem – While I work with AI, I feel I do not have much to be proud of.	203	3,33	1,748	,290	,171	-,732	,340
Self-esteem – I certainly feel useless in a teamwork with AI robots.	203	3,04	1,687	,336	,171	-,931	,340
Self-esteem – In a team with AI robots, I feel that I'm a person of worth.	203	4,04	1,645	-,132	,171	-,590	,340
Self-esteem – In a team with AI robots, I wish I could have more respect for myself.	203	3,41	1,569	,208	,171	-,529	,340
Self-esteem – In a team with AI robots, I am inclined to think that I am a failure.	203	2,66	1,579	,545	,171	-,683	,340
Self-esteem – In a team with AI robots, I take a positive attitude toward myself.	203	4,42	1,553	-,219	,171	-,373	,340
Self_Esteem	203	3,6961	,66219	-,248	,171	2,171	,340
Valid N (listwise)	203						

Source: SPSS output

II. AI Software scenario

a) Social Interaction construct

SOCIAL INTERACTION – AI SOFTWARE SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
SIRUSE1: I know how to use this specific artificial intelligence (AI) software/algorithm	3.05	1.594	0.376	-0.642
SIRUSE2: I could use this AI software/algorithm if someone showed me how to do it first	**5.55**	**1.370**	**-1.255**	**1.639**
SIRUSE3: I could use this AI software/algorithm if I could call someone for help if I got stuck	5.43	1.405	-1.042	0.867
SIRUSE4: I could use this AI software/algorithm if I had seen someone else using it before trying it myself	**4.88**	**1.416**	**-0.397**	**-0.408**
SIRUSE5: I could use this AI software/algorithm if I had just the built-in help facility for assistance	5.03	1.461	-0.639	-0.250
SIAN1: I personally feel these type of AI software/algorithms are: Artificial (1) - Lifelike (7)	**3.04**	**1.718**	**0.436**	**-0.767**
SIAN2: I personally feel these type of AI software/algorithms perform tasks that are already made by: Machines (1) - Humans (7)	3.96	1.518	-0.158	-0.406
SIAN3: I personally feel these type of AI software/algorithms are: Fake (1) - Natural (7)	**3.53**	**1.483**	**0.034**	**-0.434**
SIAN4: I personally feel these type of AI software/algorithms are: Unconscious (1) - Conscious (7)	3.51	1.671	0.042	-0.815
SIAN5: I personally feel these type of AI software/algorithms are: Difficult to use (1) – User friendly (7)	**4.20**	**1.350**	**-0.045**	**-0.130**
SIAN6: These kind of AI software/algorithms experience emotions	2.28	1.560	1.065	0.146
SIAN7: These kind of AI software/algorithms have a mind of their own	**3.41**	**1.716**	**0.136**	**-1.006**
SIEEX1: It will take me too long to learn how to interact with these kind of AI software/algorithms	3.18	1.424	0.533	0.044
SIEEX2: Using AI software/algorithms will be unnecessarily difficult and complex in a restaurant	**2.36**	**1.341**	**1.097**	**1.019**
SIEEX3: Use of AI software/algorithms will take too much of my time	3.22	1.401	0.201	-0.753
SIEEX4: AI software/algorithms will be intimidating to me	**2.54**	**1.559**	**0.852**	**-0.042**
SI: Social Interaction	**3.698**	**0.577**	**0.538**	**2.109**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Robot Use-Self Efficacy – I know how to use this specific artificial intelligence (AI) software/algorithm.	200	3,05	1,594	,376	,172	-,642	,342
Robot Use-Self Efficacy – I could use this AI software/algorithm if someone showed me how to do it first.	200	5,55	1,370	-1,255	,172	1,639	,342
Robot Use-Self Efficacy – I could use this AI software/algorithm if I could call someone for help if I got stuck.	200	5,43	1,405	-1,042	,172	,867	,342
Robot Use-Self Efficacy – I could use this AI software/algorithm if I had seen someone else using it before trying it myself.	200	4,88	1,416	-,397	,172	-,408	,342
Robot Use-Self Efficacy – I could use this AI software/algorithm if I had just the built-in help facility for assistance.	200	5,03	1,461	-,639	,172	-,025	,342
Anthropomorphism – I personally feel these type of AI software/algorithms are: Artificial (1) – Lifelike (7)	200	3,04	1,718	,436	,172	-,767	,342
Anthropomorphism – I personally feel these type of AI software/algorithms perform tasks that are already made by: Machines (1) – Humans (7)	200	3,96	1,518	-,158	,172	-,406	,342
Anthropomorphism – I personally feel these type of AI software/algorithms are: Fake (1) – Natural (7)	200	3,53	1,483	,034	,172	-,434	,342
Anthropomorphism – I personally feel these type of AI software/algorithms are: Unconscious (1) – Conscious (7)	200	3,51	1,671	,042	,172	-,815	,342
Anthropomorphism – I personally feel these type of AI software/algorithms are: Difficult to use (1) – User friendly (7)	200	4,20	1,350	-,045	,172	-,130	,342
Anthropomorphism – These kind of AI software/algorithms experience emotions.	200	2,28	1,560	1,065	,172	,146	,342

Anthropomorphism – These kind of AI software/algorithms have a mind of their own.	200	3,41	1,716	,136	,172	-1,006	,342
Effort Expectancy – It will take me too long to learn how to use these kind of AI software/algorithms.	200	3,18	1,424	,533	,172	,044	,342
Effort Expectancy – Using AI software/algorithms will be unnecessarily difficult and complex in a company.	200	2,36	1,341	1,097	,172	1,019	,342
Effort Expectancy – Use of AI software/algorithms will take too much of my time.	200	3,22	1,401	,201	,172	-,753	,342
Effort Expectancy – AI software/algorithms will be intimidating to me.	200	2,54	1,559	,852	,172	-,042	,342
RUSE	200	4,7850	1,13225	-,693	,172	,682	,342
Anthropomorphism	200	3,4200	,88547	,099	,172	-,058	,342
EffortExpectancy	200	2,8263	1,05210	,701	,172	,656	,342
SocialInteraction	200	3,6981	,57651	,538	,172	2,109	,342
Valid N (listwise)	200						

Source: SPSS output

b) Anxiety construct

C) ANXIETY – AI SOFTWARE SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
ANXLE1: Learning to understand all of the special functions associated with an AI software/algorithm makes me anxious	2.62	1.489	0.849	0.064
ANXLE2: Learning to use AI software/algorithms makes me anxious	**2.56**	**1.536**	**0.937**	**0.176**
ANXLE3: Learning to use specific functions of an AI software/algorithm makes me anxious	2.64	1.487	0.841	-0.029
ANXLE4: Learning how an AI software/algorithm works makes me anxious	**2.52**	**1.507**	**0.980**	**0.332**
ANXLE5: Learning to interact with an AI software/algorithm makes me anxious	2.51	1.494	0.917	0.139
ANXLE6: Taking a class about the development of AI software/algorithms makes me anxious	**2.17**	**1.481**	**1.421**	**1.430**
ANXLE7: Reading an AI software/algorithm manual makes me anxious	2.69	1.723	0.817	-0.335
ANXLE8: Being unable to keep up with the advances associated with AI software/algorithms makes me anxious	**3.61**	**1.809**	**0.273**	**-0.917**
ANXJR1: I am afraid that an AI software/algorithm may make us dependent	3.04	1.553	0.543	-0.379

ANXJR2: I am afraid that an AI software/algorithm **may make us even lazier**	**3.22**	**1.655**	**0.268**	**-0.936**
ANXJR3: I am afraid that an AI software/algorithm may replace humans	3.69	1.847	0.062	-0.993
ANXJR4: I am afraid that widespread use of AI software/algorithms capable to perform tasks usually made by humans, will take jobs away from people	**4.21**	**1.927**	**-0.116**	**-1.170**
ANXJR5: I am afraid that if I begin to work using AI software/algorithms I will become dependent upon them and lose some of my reasoning skills	3.64	1.760	0.162	-0.970
ANXJR6: I am afraid that AI software/algorithms will replace someone's job	**4.09**	**1.906**	**-0.045**	**-1.191**
ANXSB1: I am afraid that an AI software/algorithm may be misused	4.79	1.801	-0.401	-0.965
ANXSB2: I am afraid of various problems potentially associated with AI software/algorithms	**4.31**	**1.694**	**0.043**	**-0.905**
ANXSB3: I am afraid that an AI software/algorithm may get out of control and malfunction	3.85	1.742	0.246	-0.836
ANXSB4: I am afraid that an AI software/algorithm may lead to robot autonomy	**3.47**	**1.753**	**0.511**	**-0.684**
ANXAIC1: I find humanoid AI techniques/products (e.g. AI software/algorithms capable to perform tasks usually made by humans) scary	2.86	1.666	0.699	-0.392
ANXAIC2: I find humanoid AI techniques/products (e.g. AI software/algorithms capable to perform tasks usually made by humans) intimidating	**3.07**	**1.706**	**0.528**	**-0.676**
ANXAIC3: I don't know why, but humanoid AI techniques/products (e.g. AI software/algorithms capable to perform tasks usually made by humans) scare me	2.68	1.721	0.888	-0.187
ANX: Anxiety	**3.249**	**1.022**	**0.585**	**0.413**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Learning to understand all of the special functions associated with an AI software/algorithm makes me anxious.	200	2,62	1,489	,849	,172	,064	,342
Learning to use AI software/algorithms makes me anxious.	200	2,56	1,536	,937	,172	,176	,342
Learning to use specific functions of an AI software/algorithm makes me anxious.	200	2,64	1,487	,841	,172	-,029	,342
Learning how an AI software/algorithm works makes me anxious.	200	2,52	1,507	,980	,172	,332	,342
Learning to interact with an AI software/algorithm makes me anxious.	200	2,51	1,494	,917	,172	,139	,342
Learning – Taking a class about the development of AI software/algorithms makes me anxious.	200	2,17	1,481	1,421	,172	1,430	,342
Learning – Reading an AI software/algorithm manual makes me anxious.	200	2,69	1,723	,817	,172	-,335	,342
Learning – Being unable to keep up with the advances associated with AI software/algorithms makes me anxious.	200	3,61	1,809	,273	,172	-,917	,342
Job replacement – I am afraid that an AI software/algorithm may make us dependent.	200	3,04	1,553	,543	,172	-,379	,342
Job replacement – I am afraid that an AI software/algorithm may make us even lazier.	200	3,22	1,655	,268	,172	-,936	,342
Job replacement – I am afraid that an AI software/algorithm may replace humans.	200	3,69	1,847	,062	,172	-,993	,342
Job replacement – I am afraid that widespread use of AI software/algorithms capable to perform tasks usually made by humans, will take jobs away from people.	200	4,21	1,927	-,116	,172	-1,170	,342

Job replacement – I am afraid that if I begin to work using AI software/algorithms I will become dependent upon them and lose some of my reasoning skills.	200	3,64	1,760	,162	,172	-,970	,342
Job replacement – I am afraid that AI software/algorithms will replace someone's job.	200	4,09	1,906	-,045	,172	-1,191	,342
Sociotechnical blindness – I am afraid that an AI software/algorithm may be misused.	200	4,79	1,801	-,401	,172	-,965	,342
Sociotechnical blindness – I am afraid of various problems potentially associated with AI software/algorithms.	200	4,31	1,694	,043	,172	-,905	,342
Sociotechnical blindness – I am afraid that an AI software/algorithm may get out of control and malfunction.	200	3,85	1,742	,246	,172	-,836	,342
Sociotechnical blindness – I am afraid that an AI software/algorithm may lead to robot autonomy.	200	3,47	1,753	,511	,172	-,684	,342
AI configuration – I find humanoid AI techniques/products (e. g. AI software/algorithms capable to perform tasks usually made by humans) scary.	200	2,86	1,666	,699	,172	-,392	,342
AI configuration – I find humanoid AI techniques/products (e. g. AI software/algorithms capable to perform tasks usually made by humans) intimidating.	200	3,07	1,706	,528	,172	-,676	,342
AI configuration – I don't know why, but humanoid AI techniques/products (e. g. AI software/algorithms capable to perform tasks usually made by humans) scare me.	200	2,68	1,721	,888	,172	-,187	,342
Learning	200	2,6650	1,29406	,942	,172	,616	,342
JobReplacement	200	3,6483	1,49200	,106	,172	-,835	,342
SociotechnicalBlindness	200	4,1038	1,44416	-,012	,172	-,516	,342
AIConfiguration	200	2,8700	1,59976	,679	,172	-,313	,342
Anxiety	200	3,2493	1,02203	,585	,172	,413	,342
Valid N (listwise)	200						

Source: SPSS output

d) Stress construct

STRESS – AI SOFTWARE SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
STDE1: Using AI software/algorithms, I need to work very fast	3.28	1.228	0.223	0.061
STDE2: Using AI software/algorithms, I need to work very intensively	**3.36**	**1.326**	**0.123**	**-0.363**
STDE3: Using AI software/algorithms, I need more effort in my job	3.41	1.386	0.056	-0.622
STDE4: Using AI software/algorithms, I have enough time to do my tasks	**4.71**	**1.309**	**-0.480**	**0.355**
STDE5: Using AI software/algorithms, I have conflicts in the team	2.65	1.287	0.749	0.372
STSU1: There is a calm and pleasant atmosphere working with AI software/algorithms	**4.28**	**1.228**	**-0.007**	**0.002**
STSU2: I get on well with my co-workers using AI software/algorithms	4.69	1.281	-0.357	0.219
STSU3: Use of AI software/algorithms support me	**5.41**	**1.191**	**-0.496**	**-0.030**
STSU4: AI software/algorithms understand if I have a bad day	2.50	1.623	0.818	-0.313
STSU5: I get on well with my supervisors in a team with AI software/algorithms	**4.69**	**1.274**	**-0.358**	**0.468**
STSU6: I enjoy working with **AI software/algorithms**	4.96	1.271	-0.369	-0.035
ST: Stress	**3.994**	**0.660**	**0.492**	**1.717**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Demands – Using AI software/algorithms, I need to work very fast.	200	3,28	1,228	,223	,172	,061	,342
Demands – Using AI software/algorithms, I need to work very intensively.	200	3,36	1,326	,123	,172	-,363	,342
Demands – Using AI software/algorithms, I need more effort in my job.	200	3,41	1,386	,056	,172	-,622	,342
Demands – Using AI software/algorithms, I have enough time to do my tasks.	200	4,71	1,309	-,480	,172	,355	,342
Demands – Using AI software/algorithms, I have conflicts in the team.	200	2,65	1,287	,749	,172	,372	,342
Support – There is a calm and pleasant atmosphere working with AI software/algorithms.	200	4,28	1,228	-,007	,172	,002	,342
Support – I get on well with my co-workers using AI software/algorithms.	200	4,69	1,281	-,357	,172	,219	,342
Support – Use of AI software/algorithms supports me.	200	5,41	1,191	-,496	,172	-,030	,342
Support – AI software/algorithms understand if I have a bad day.	200	2,50	1,623	,818	,172	-,313	,342
Support – I get on well with my supervisors in a team with AI software/algorithms.	200	4,69	1,274	-,358	,172	,468	,342
Support – I enjoy working with AI software/algorithms.	200	4,96	1,271	-,369	,172	-,035	,342
Demands	200	3,4810	,90206	,293	,172	1,269	,342
Support	200	4,4208	,86626	-,058	,172	,615	,342
Stress	200	3,9936	,65969	,492	,172	1,717	,342
Valid N (listwise)	200						

Source: SPSS output

e) Happiness construct

F) HAPPINESS – AI SOFTWARE SCENARIO	Mean	Std. Deviation	Skewness	Kurtosis
HA1: The experience of working with AI software/algorithms contributes very much to my happiness in life	3.40	1.353	-0.018	-0.542
HA2: The experience of working with AI software/algorithms is very meaningful	**4.34**	**1.391**	**-0.367**	**-0.278**
HA3: The experience of working with AI software/algorithms is very personally fulfilling	4.64	1.410	-0.359	-0.165
HA: Happiness	**4.130**	**1.134**	**-0.224**	**0.178**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Happiness – The experience of working with AI software/algorithms contributes very much to my happiness in life.	200	3,40	1,353	-,018	,172	-,542	,342
Happiness – The experience of working with AI software/algorithms is very meaningful.	200	4,34	1,391	-,367	,172	-,278	,342
Happiness – The experience of working with AI software/algorithms is very personally fulfilling.	200	4,64	1,410	-,359	,172	-,165	,342
Happiness	200	4,1300	1,13361	-,224	,172	-,178	,342
Valid N (listwise)	200						

Source: SPSS output

g) Employee Engagement construct

EMPLOYEE ENGAGEMENT – AI SOFTWARE SCENARIO	Mean	Std. Deviation	Skewness	Kurtosis
EESA1: When I work with AI software/algorithms, I receive recognition for a job well done	4.20	1.421	-0.263	-0.441
EESA2: In a team with AI software/algorithms, I feel close to people at work	**3.59**	**1.316**	**-0.050**	**-0.348**
EESA3: While I work with AI software/algorithms, I feel good about working at the company	4.24	1.341	-0.362	0.071

EESA4: When I work with AI software/algorithms, I feel secure about my job	**4.18**	**1.365**	**-0.237**	**-0.475**
EESA5: Giving me the possibility to work with AI software/algorithms, I believe management is concerned about me	3.92	1.473	-0.100	-0.419
EEID1: I am proud to tell others that I am part of the organization that uses AI software/algorithms	**4.86**	**1.328**	**-0.485**	**-0.064**
EEID2: I feel a sense of ownership toward this organization that uses AI software/algorithms	4.25	1.406	-0.387	-0.389
EEID3: My sense of pride toward the organizational brand is reinforced by working with AI software/algorithms at work	**4.34**	**1.454**	**-0.322**	**-0.362**
EEID4: While I work with AI software/algorithms, I view the success of the company as my own success	4.43	1.423	-0.496	-0.148
EEID5: While I work with AI software/algorithms, the organization is like a family to me	**3.53**	**1.490**	**-0.169**	**-0.756**
EEID6: If I work in a company using AI software/algorithms I would talk about this organization, usually saying “we” rather than “they”	3.92	1.598	-0.235	-0.505
EEID7: When someone praises this company because of using AI software/algorithms, it feels like a personal compliment	**3.92**	**1.668**	**-0.083**	**-0.897**
EECO1: My commitment to the company, increases because of the use of artificial intelligence	3.61	1.610	-0.089	-0.971
EECO2: Working with AI software/algorithms, I am very committed to delivering the brand promise to our customers	**4.14**	**1.428**	**-0.458**	**-0.024**
EECO3: Working with AI software/algorithms, this organization has a great deal of personal meaning for me	3.92	1.502	-0.213	-0.561
EELO1: I will be happy to spend the rest of my career working with AI software/algorithms	**3.90**	**1.515**	**-0.346**	**-0.575**
EELO2: I do not have an intention to stop using AI software/algorithms in my workplace at this moment	5.23	1.559	-0.694	-0.067
EELO3: My intention to stay is driven by the fact that I like to work with AI software/algorithms	**3.31**	**1.478**	**-0.480**	**-0.742**
EEPE1: My performance in a team with AI software/algorithms exceeded expectations	4.30	1.173	-0.291	0.350
EEPE2: Working with AI software/algorithms, the amount of opportunity for my performance improvement at my organization is high	**4.82**	**1.203**	**-0.320**	**0.270**
EE: Employee Engagement	**4.129**	**1.032**	**-0.219**	**-0.308**

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Satisfaction – When I work with AI software/algorithms, I receive recognition for a job well done.	200	4,20	1,421	-,263	,172	-,441	,342
Satisfaction – In a team with AI software/algorithms, I feel close to people at work.	200	3,59	1,316	-,050	,172	-,348	,342
Satisfaction – While I work with AI software/algorithms, I feel good about working at the company.	200	4,24	1,341	-,362	,172	,071	,342
Satisfaction – When I work with AI software/algorithms, I feel secure about my job.	200	4,18	1,365	-,237	,172	-,475	,342
Satisfaction – Giving me the possibility to work with AI software/algorithms, I believe management is concerned about me.	200	3,92	1,473	-,100	,172	-,419	,342
Identification – I am proud to tell others that I am part of the organization that uses AI software/algorithms.	200	4,86	1,328	-,485	,172	-,064	,342
Identification – I feel a sense of ownership toward this organization that uses AI software/algorithms.	200	4,25	1,406	-,387	,172	-,389	,342
Identification – My sense of pride toward the organizational brand is reinforced by using AI software/algorithms at work.	200	4,34	1,454	-,322	,172	-,362	,342
Identification – While I work with AI software/algorithms, I view the success of the company as my own success.	200	4,43	1,423	-,496	,172	-,148	,342
Identification – While I work with AI software/algorithms, the organization is like a family to me.	200	3,53	1,490	-,169	,172	-,756	,342
Identification – If I work in a company using AI software/algorithms I would talk about this organization, usually saying “we” rather than “they.”.	200	3,92	1,598	-,235	,172	-,505	,342

Identification – When someone praises this company because of using AI software/algorithms, it feels like a personal compliment.	200	3,92	1,668	-,083	,172	-,897	,342
Commitment – My commitment to the company, increases because of the use of artificial intelligence	200	3,61	1,610	-,089	,172	-,971	,342
Commitment – Working with AI software/algorithms, I am very committed to delivering the brand promise to our customers.	200	4,14	1,428	-,458	,172	-,024	,342
Commitment – Working with AI software/algorithms, this organization has a great deal of personal meaning for me.	200	3,92	1,502	-,213	,172	-,561	,342
Loyalty – I will be happy to spend the rest of my career working with AI software/algorithms.	200	3,90	1,515	-,346	,172	-,575	,342
Loyalty – I do not have an intention to stop using AI software/algorithms in my workplace at this moment.	200	5,23	1,559	-,694	,172	-,067	,342
Loyalty – My intention to stay is driven by the fact that I like to work with AI software/algorithms.	200	3,31	1,478	-,048	,172	-,742	,342
Performance – My performance in a team with AI software/algorithms exceeded expectations.	200	4,30	1,173	-,291	,172	,350	,342
Performance – Working with AI software/algorithms, the amount of opportunity for my performance improvement at my organization is high.	200	4,82	1,203	-,320	,172	,270	,342
Satisfaction	200	4,0230	1,17207	-,162	,172	-,280	,342
Identification	200	4,1786	1,20478	-,379	,172	-,296	,342
Commitment	200	3,8883	1,36039	-,233	,172	-,406	,342
Loyalty	200	4,1467	1,13502	-,196	,172	-,401	,342
Performance	200	4,5550	1,06779	-,282	,172	,504	,342
EmployeeEngagement	200	4,1290	1,03215	-,219	,172	-,308	,342
Valid N (listwise)	200						

Source: SPSS output

h) Self-esteem construct

SELF-ESTEEM – AI SOFTWARE SCENARIO				
	Mean	Std. Deviation	Skewness	Kurtosis
SE1: On the whole, I am satisfied with myself, interacting with AI software/algorithms in my workplace	4.72	1.312	-0.441	0.189
SE2*: At times I think I am no good at all interacting with AI software/algorithms at my workplace	**3.48**	**1.619**	**0.187**	**-0.875**
SE3: I feel that I have a number of good skills to interact with AI software/algorithms	4.69	1.349	-0.557	-0.154
SE4: When I am able to interact with AI software/algorithms **in my workplace as well as most other people**	**4.85**	**1.575**	**-0.467**	**-0.257**
SE5*: While I work using AI software/algorithms, I feel I do not have much to be proud of	2.86	1.449	0.607	-0.088
SE6*: I certainly feel useless in a teamwork with AI software/algorithms	**2.70**	**1.585**	**0.680**	**-0.478**
SE7: In a team with AI software/algorithms, I feel that I am a person of worth	4.48	1.264	-0.422	0.161
SE8*: In a team with AI software/algorithms, I wish I could have more respect for myself	**3.21**	**1.437**	**0.036**	**-0.856**
SE9*: In a team with AI software/algorithms, I am inclined to think that I am a failure	2.37	1.443	0.881	-0.159
SE10: In a team with AI software/algorithms, I take a positive attitude toward myself	**4.63**	**1.258**	**-0.286**	**-0.090**
SE: Self-esteem	**3.799**	**0.659**	**0.769**	**3.397**

*items: SE2, SE5, SE6, SE8 and SE9 are reverted.

Source: Own elaboration based on SPSS outputs

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Self-esteem - On the whole, I am satisfied with myself, using AI software/algorithms in my workplace.	200	4,72	1,312	-,441	,172	,189	,342
Self-esteem - At times I think I am no good at all using AI software/algorithms at my workplace.	200	3,48	1,619	,187	,172	-,875	,342
Self-esteem - I feel that I have a number of good skills to use AI software/algorithms.	200	4,69	1,349	-,557	,172	-,154	,342
Self-esteem - I am able to use AI software/algorithms in my workplace as well as most other people.	200	4,85	1,575	-,467	,172	-,257	,342
Self-esteem - While I work using AI software/algorithms, I feel I do not have much to be proud of.	200	2,86	1,449	,607	,172	-,088	,342
Self-esteem - I certainly feel useless in a teamwork using AI software/algorithms.	200	2,70	1,585	,680	,172	-,478	,342
Self-esteem - In a team using AI software/algorithms, I feel that I am a person of worth.	200	4,48	1,264	-,422	,172	,161	,342
Self-esteem - In a team using AI software/algorithms, I wish I could have more respect for myself.	200	3,21	1,437	,036	,172	-,856	,342
Self-esteem - In a team using AI software/algorithms, I am inclined to think that I am a failure.	200	2,37	1,443	,881	,172	-,159	,342
Self-esteem - In a team using AI software/algorithms, I take a positive attitude toward myself.	200	4,63	1,258	-,286	,172	-,090	,342
Self_Esteem	200	3,7985	,65994	,769	,172	3,397	,342
Valid N (listwise)	200						

Source: SPSS output

Appendix K. Multiple linear regression analysis – Social Interaction, Anxiety and Stress as independent variables

I. AI Robot scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,684[a]	,468	,460	,91239	1,736

a. Predictors: (Constant), Anxiety, SocialInteraction, Stress

b. Dependent Variable: EmployeeEngagement

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	145,919	3	48,640	58,430	,000[b]
	Residual	165,658	199	,832		
	Total	311,577	202			

a. Dependent Variable: EmployeeEngagement

b. Predictors: (Constant), Anxiety, SocialInteraction, Stress

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1,137	,513		2,215	,028		
	Stress	,824	,086	,519	9,628	,000	,920	1,087
	SocialInteraction	,196	,108	,096	1,809	,042	,957	1,045
	Anxiety	-,344	,056	-,323	-6,118	,000	,961	1,041

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	,8879	6,6457	3,5017	,84992	203
Residual	-2,56482	3,09977	,00000	,90559	203
Std. Predicted Value	-3,075	3,699	,000	1,000	203
Std. Residual	-2,811	3,397	,000	,993	203

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

e) Correlations

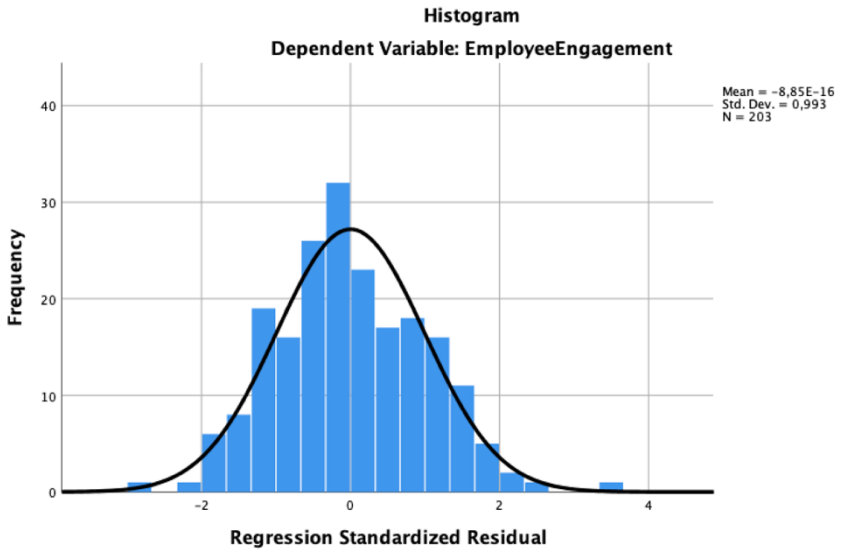
Correlations

		Unstandardized Residual	SocialInteraction	Anxiety	Stress
Unstandardized Residual	Pearson Correlation	1	,000	,000	,000
	Sig. (2-tailed)		1,000	1,000	1,000
	N	203	203	203	203
SocialInteraction	Pearson Correlation	,000	1	-,004	,205**
	Sig. (2-tailed)	1,000		,957	,003
	N	203	203	203	203
Anxiety	Pearson Correlation	,000	-,004	1	-,195**
	Sig. (2-tailed)	1,000	,957		,005
	N	203	203	203	203
Stress	Pearson Correlation	,000	,205**	-,195**	1
	Sig. (2-tailed)	1,000	,003	,005	
	N	203	203	203	203

**. Correlation is significant at the 0.01 level (2-tailed).

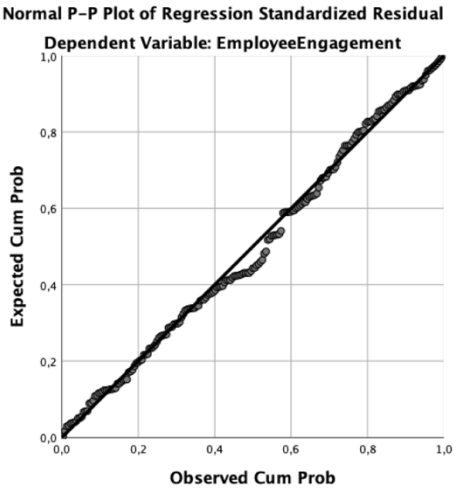
Source: SPSS output

f) Histogram



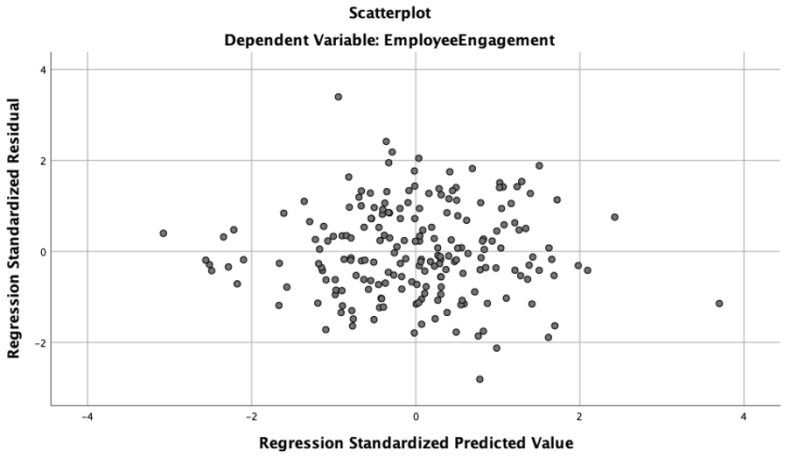
Source: SPSS output

g) Normal P – Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

II. AI Software scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin–Watson
1	,705[a]	,498	,490	,73714	1,828

a. Predictors: (Constant), Stress, Anxiety, SocialInteraction

b. Dependent Variable: EmployeeEngagement

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	105,500	3	35,167	64,718	,000[b]
	Residual	106,502	196	,543		
	Total	212,002	199			

a. Dependent Variable: EmployeeEngagement

b. Predictors: (Constant), Stress, Anxiety, SocialInteraction

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-,120	,398		-,301	,764		
	SocialInteraction	,253	,100	,141	2,523	,012	,818	1,222
	Anxiety	-,240	,053	-,238	-4,547	,000	,935	1,069
	Stress	1,025	,088	,655	11,611	,000	,804	1,243

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2,0972	7,0183	4,1290	,72811	200
Residual	-2,90882	1,77018	,00000	,73156	200
Std. Predicted Value	-2,791	3,968	,000	1,000	200
Std. Residual	-3,946	2,401	,000	,992	200

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

e) Correlations

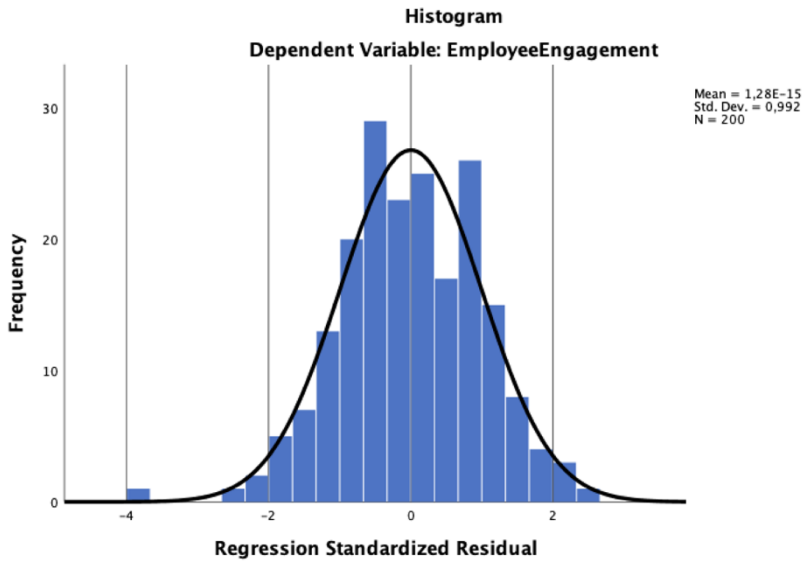
Correlations

		Unstandardized Residual	SocialInteraction	Anxiety	Stress
Unstandardized Residual	Pearson Correlation	1	,000	,000	,000
	Sig. (2-tailed)		1,000	1,000	1,000
	N	200	200	200	200
SocialInteraction	Pearson Correlation	,000	1	,193**	,414**
	Sig. (2-tailed)	1,000		,006	,000
	N	200	200	200	200
Anxiety	Pearson Correlation	,000	,193**	1	,232**
	Sig. (2-tailed)	1,000	,006		,001
	N	200	200	200	200
Stress	Pearson Correlation	,000	,414**	,232**	1
	Sig. (2-tailed)	1,000	,000	,001	
	N	200	200	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS output

f) Histogram

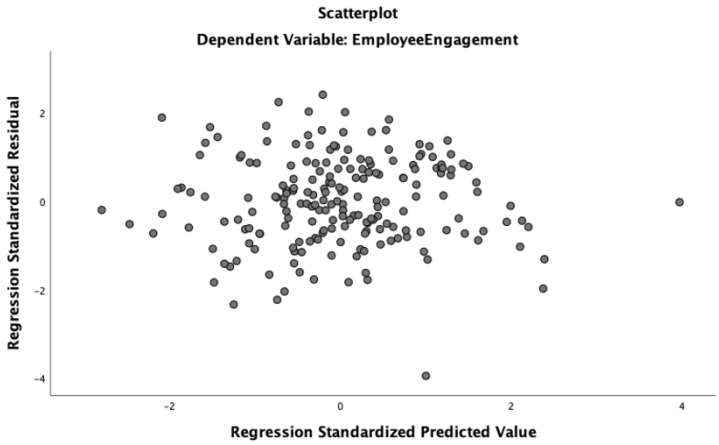


Source: SPSS output

g) Normal P - Plot

Source: SPSS output

h) Scatterplot



Source: SPSS output

Appendix L. Multiple linear regression analysis – Social Interaction's dimensions as independent variables

I. AI Robot scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin–Watson
1	,440[a]	,194	,182	1,12359	1,977

a. Predictors: (Constant), EffortExpectancy, Antropomorphism, RUSE

b. Dependent Variable: EmployeeEngagement

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60,351	3	20,117	15,935	,000[b]
	Residual	251,226	199	1,262		
	Total	311,577	202			

a. Dependent Variable: EmployeeEngagement

b. Predictors: (Constant), EffortExpectancy, Antropomorphism, RUSE

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2,710	,555		4,885	,000		
	RUSE	,203	,075	,187	2,724	,007	,860	1,162
	Antropomorphism	,230	,069	,213	3,329	,001	,990	1,010
	EffortExpectancy	-,269	,073	-,255	-3,693	,000	,853	1,173

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,2628	5,0823	3,5017	,54659	203
Residual	-2,40907	2,90817	,00000	1,11521	203
Std. Predicted Value	-4,096	2,892	,000	1,000	203
Std. Residual	-2,144	2,588	,000	,993	203

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

e) Correlations

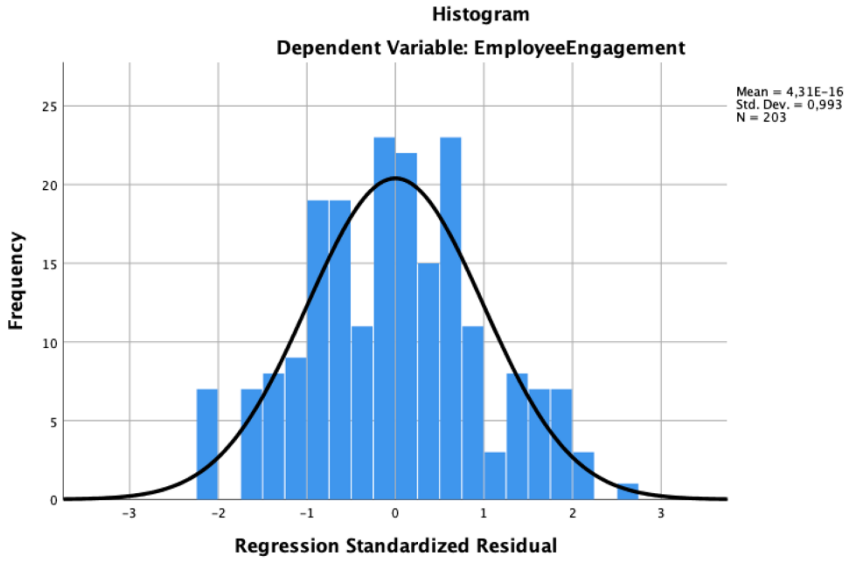
Correlations

		Unstandardized Residual	RUSE	Antropomorphism	EffortExpectancy
Unstandardized Residual	Pearson Correlation	1	,000	,000	,000
	Sig. (2-tailed)		1,000	1,000	1,000
	N	203	203	203	203
RUSE	Pearson Correlation	,000	1	,028	-,374**
	Sig. (2-tailed)	1,000		,689	,000
	N	203	203	203	203
Antropomorphism	Pearson Correlation	,000	,028	1	-,099
	Sig. (2-tailed)	1,000	,689		,159
	N	203	203	203	203
EffortExpectancy	Pearson Correlation	,000	-,374**	-,099	1
	Sig. (2-tailed)	1,000	,000	,159	
	N	203	203	203	203

**. Correlation is significant at the 0.01 level (2-tailed).

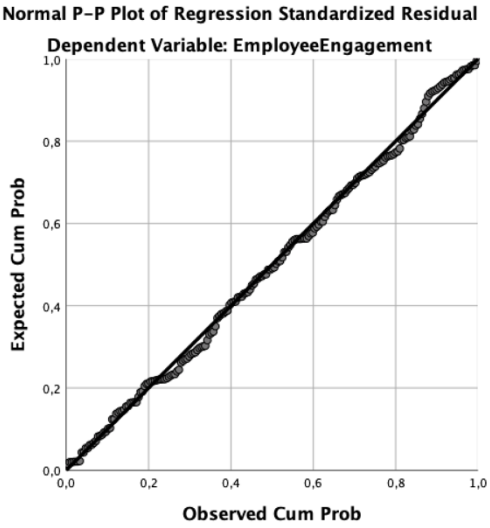
Source: SPSS output

f) Histogram



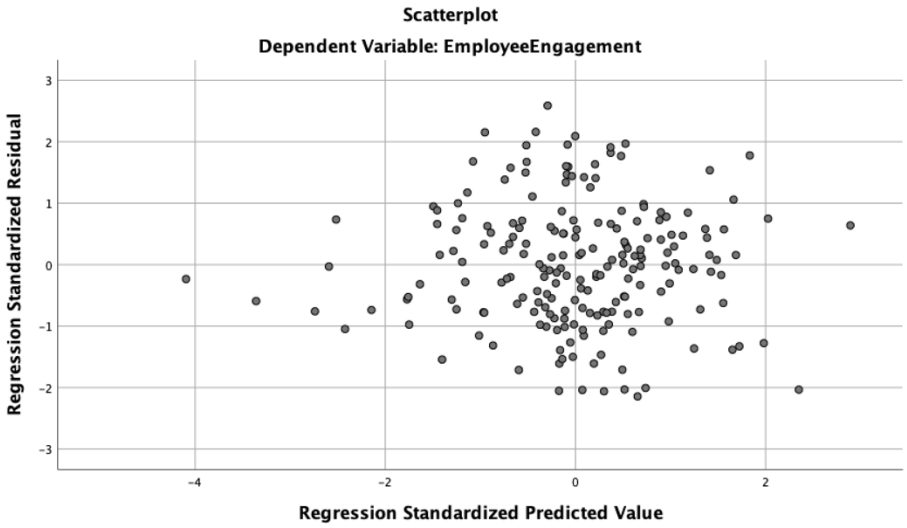
Source: SPSS output

g) Normal P – Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

II. AI Software scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,429[a]	,184	,172	,93946	1,768

a. Predictors: (Constant), EffortExpectancy, Anthropomorphism, RUSE

b. Dependent Variable: EmployeeEngagement

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39,014	3	13,005	14,735	,000[b]
	Residual	172,988	196	,883		
	Total	212,002	199			

a. Dependent Variable: EmployeeEngagement

b. Predictors: (Constant), EffortExpectancy, Anthropomorphism, RUSE

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1,734	,446		3,887	,000		
	RUSE	,299	,062	,328	4,828	,000	,900	1,111
	Anthropomorphism	,283	,076	,243	3,725	,000	,979	1,021
	EffortExpectancy	-,002	,066	-,002	-,027	,978	,907	1,103

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2,9927	5,4161	4,1290	,44278	200
Residual	-2,35674	1,93271	,00000	,93235	200
Std. Predicted Value	-2,566	2,907	,000	1,000	200
Std. Residual	-2,509	2,057	,000	,992	200

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

e) Correlations

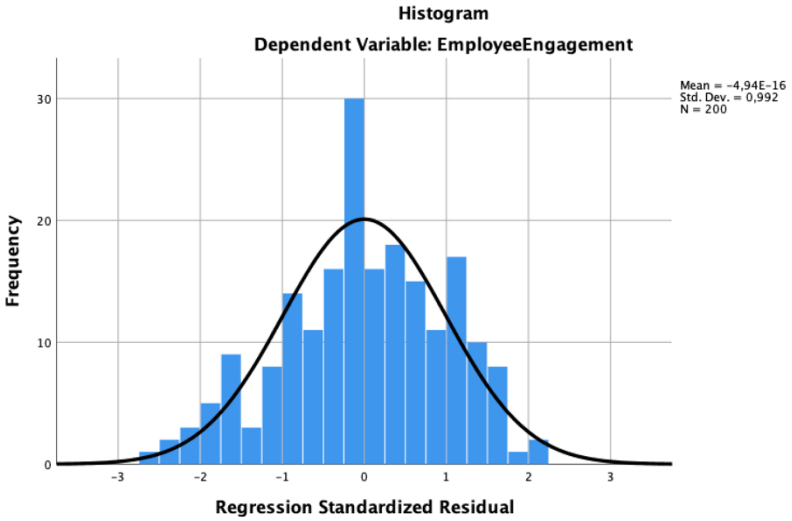
Correlations

		Unstandardized Residual	RUSE	Anthropomorphism	EffortExpectancy
Unstandardized Residual	Pearson Correlation	1	,000	,000	,000
	Sig. (2-tailed)		1,000	1,000	1,000
	N	200	200	200	200
RUSE	Pearson Correlation	,000	1	,106	-,291**
	Sig. (2-tailed)	1,000		,135	,000
	N	200	200	200	200
Anthropomorphism	Pearson Correlation	,000	,106	1	,063
	Sig. (2-tailed)	1,000	,135		,373
	N	200	200	200	200
EffortExpectancy	Pearson Correlation	,000	-,291**	,063	1
	Sig. (2-tailed)	1,000	,000	,373	
	N	200	200	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

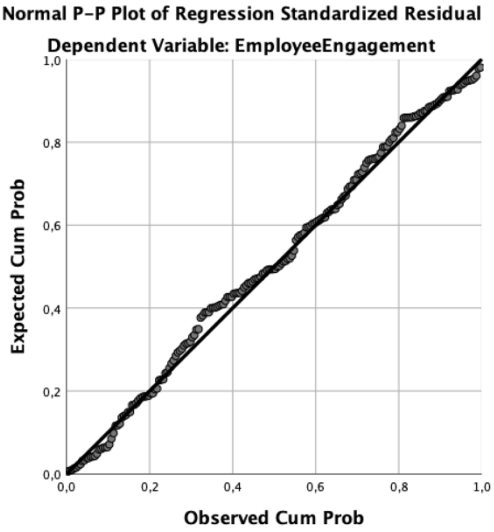
Source: SPSS output

f) Histogram



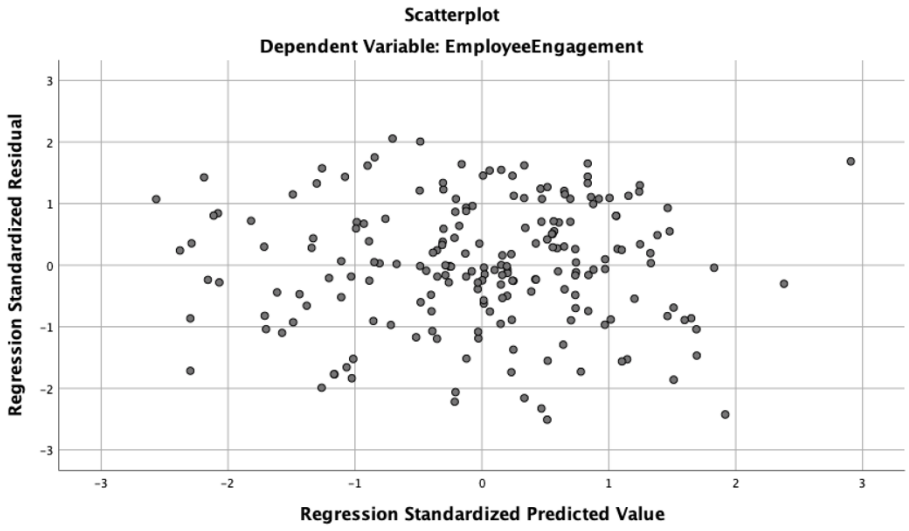
Source: SPSS output

g) Normal P - Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

Appendix M. Multiple linear regression analysis – Anxiety dimensions as independent variables

I. AI Robot scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,431[a]	,186	,170	1,13165	1,821

a. Predictors: (Constant), AIConfiguration, Learning, JobReplacement, SociotechnicalBlindness

b. Dependent Variable: EmployeeEngagement

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58,013	4	14,503	11,325	,000[b]
	Residual	253,564	198	1,281		
	Total	311,577	202			

a. Dependent Variable: EmployeeEngagement

b. Predictors: (Constant), AIConfiguration, Learning, JobReplacement, SociotechnicalBlindness

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	4,161	,252		16,536	,000		
	Learning	-,040	,061	-,050	-,659	,511	,829	1,207
	JobReplacement	,121	,056	,174	2,160	,032	,737	1,356
	SociotechnicalBlindness	,021	,062	,029	,338	,736	,641	1,561
	AIConfiguration	-,157	,056	-,244	-2,825	,005	,644	1,552

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2,1699	4,7877	3,5017	,53590	203
Residual	-2,83538	3,01941	,00000	1,12039	203
Std. Predicted Value	-2,485	2,400	,000	1,000	203
Std. Residual	-2,506	2,668	,000	,990	203

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

e) Correlations

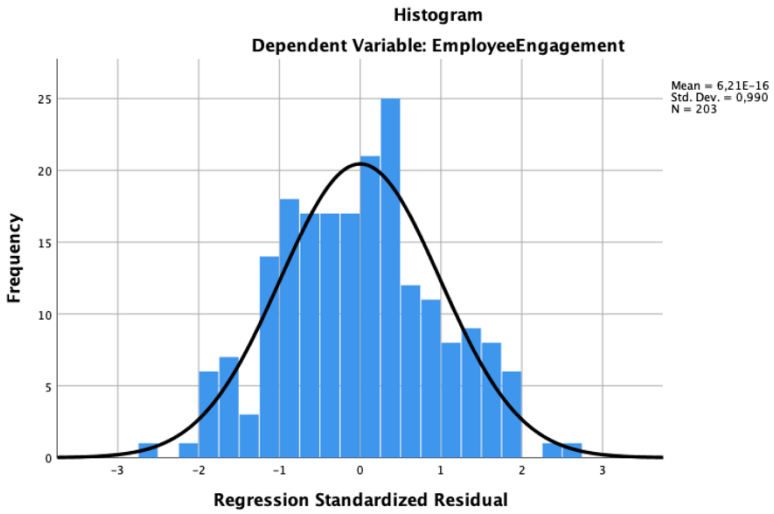
Correlations

		Unstandardized Residual	Learning	JobReplacement	SociotechnicalBlindness	AIConfiguration
Unstandardized Residual	Pearson Correlation	1	,000	,000	,000	,000
	Sig. (2-tailed)		1,000	1,000	1,000	1,000
	N	203	203	203	203	203
Learning	Pearson Correlation	,000	1	,321**	,354**	,436**
	Sig. (2-tailed)	1,000		,000	,000	,000
	N	203	203	203	203	203
JobReplacement	Pearson Correlation	,000	,321**	1	,604**	,478**
	Sig. (2-tailed)	1,000	,000		,000	,000
	N	203	203	203	203	203
SociotechnicalBlindness	Pearson Correlation	,000	,354**	,604**	1	,554**
	Sig. (2-tailed)	1,000	,000	,000		,000
	N	203	203	203	203	203
AIConfiguration	Pearson Correlation	,000	,436**	,478**	,554**	1
	Sig. (2-tailed)	1,000	,000	,000	,000	
	N	203	203	203	203	203

**. Correlation is significant at the 0.01 level (2-tailed).

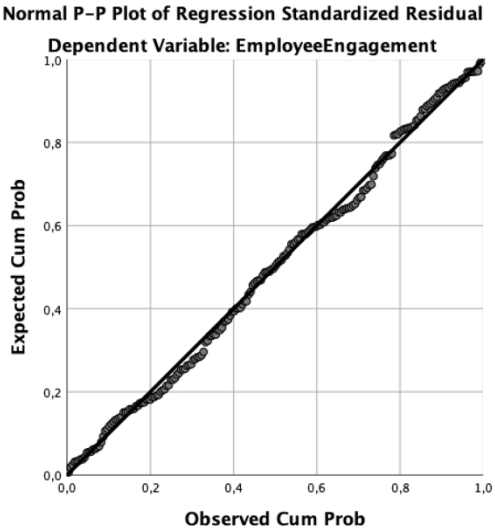
Source: SPSS output

f) Histogram



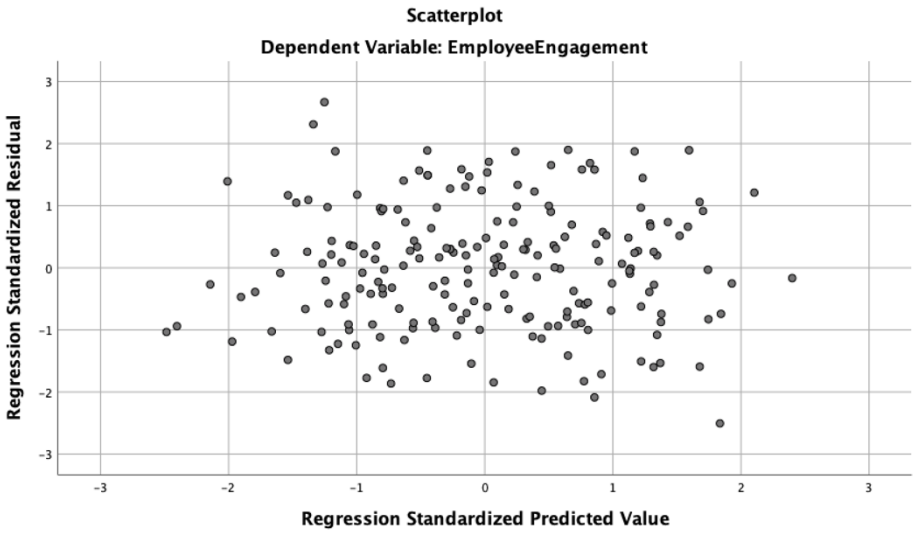
Source: SPSS output

g) Normal P - Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

II. AI Software scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,255[a]	,065	,046	1,00817	1,970

a. Predictors: (Constant), AIConfiguration, JobReplacement, Learning, SociotechnicalBlindness

b. Dependent Variable: EmployeeEngagement

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13,801	4	3,450	3,394	,010[b]
	Residual	198,201	195	1,016		
	Total	212,002	199			

a. Dependent Variable: EmployeeEngagement

b. Predictors: (Constant), AIConfiguration, JobReplacement, Learning, SociotechnicalBlindness

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5,224	,295		17,702	,000		
	Learning	-,140	,068	-,148	-2,044	,042	,786	1,272
	JobReplacement	-,065	,069	-,079	-,953	,342	,601	1,663
	SociotechnicalBlindness	-,139	,068	-,179	-2,053	,041	,539	1,856
	AIConfiguration	-,092	,051	-,150	-1,817	,071	,607	1,648

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3,2325	4,7461	4,1290	,26334	200
Residual	-2,33417	3,22931	,00000	,99799	200
Std. Predicted Value	-3,404	2,343	,000	1,000	200
Std. Residual	-2,315	3,203	,000	,990	200

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

e) Correlations

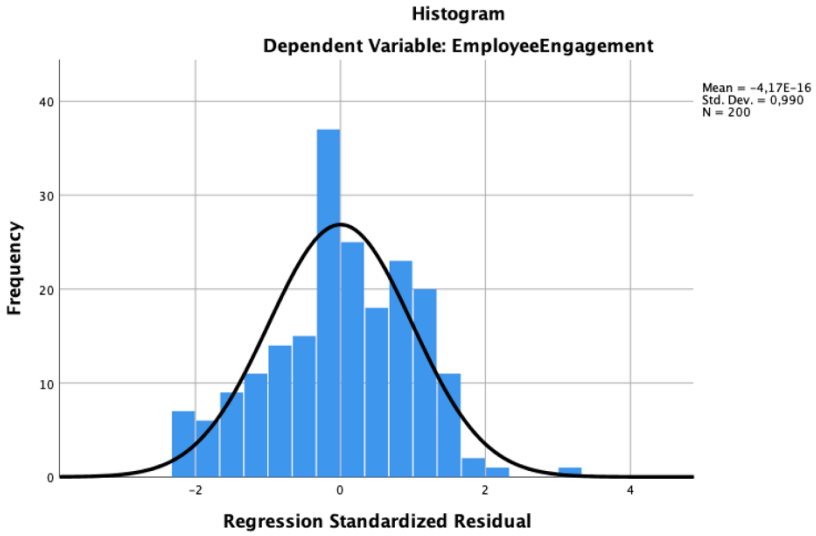
Correlations

		Unstandardized Residual	Learning	JobReplacement	SociotechnicalBlindness	AIConfiguration
Unstandardized Residual	Pearson Correlation	1	,000	,000	,000	,000
	Sig. (2-tailed)		1,000	1,000	1,000	1,000
	N	200	200	200	200	200
Learning	Pearson Correlation	,000	1	,233**	,205**	,402**
	Sig. (2-tailed)	1,000		,001	,004	,000
	N	200	200	200	200	200
JobReplacement	Pearson Correlation	,000	,233**	1	,485**	,364**
	Sig. (2-tailed)	1,000	,001		,000	,000
	N	200	200	200	200	200
SociotechnicalBlindness	Pearson Correlation	,000	,205**	,485**	1	,504**
	Sig. (2-tailed)	1,000	,004	,000		,000
	N	200	200	200	200	200
AIConfiguration	Pearson Correlation	,000	,402**	,364**	,504**	1
	Sig. (2-tailed)	1,000	,000	,000	,000	
	N	200	200	200	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

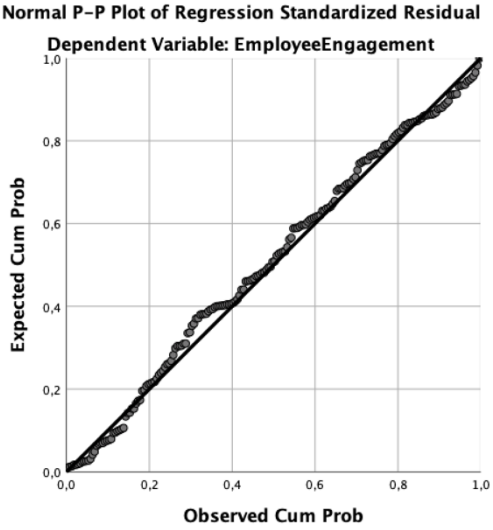
Source: SPSS output

f) Histogram



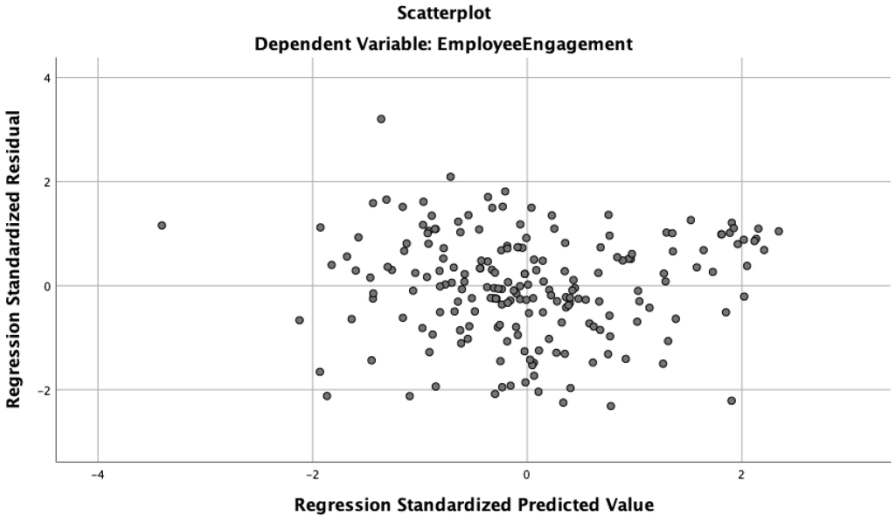
Source: SPSS output

g) Normal P - Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

Appendix N. Multiple linear regression analysis – Stress's dimensions as independent variables

I. AI Robot scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin–Watson
1	,699[a]	,488	,483	,89301	1,837

a. Predictors: (Constant), Support, Demands

b. Dependent Variable: EmployeeEngagement

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	152,084	2	76,042	95,355	,000[b]
	Residual	159,493	200	,797		
	Total	311,577	202			

a. Dependent Variable: EmployeeEngagement

b. Predictors: (Constant), Support, Demands

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	,531	,309		1,719	,087		
	Demands	,070	,063	,056	1,112	,267	1,000	1,000
	Support	,744	,054	,696	13,749	,000	1,000	1,000

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,3460	6,1790	3,5017	,86769	203
Residual	-2,54886	3,70950	,00000	,88858	203
Std. Predicted Value	-2,484	3,086	,000	1,000	203
Std. Residual	-2,854	4,154	,000	,995	203

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

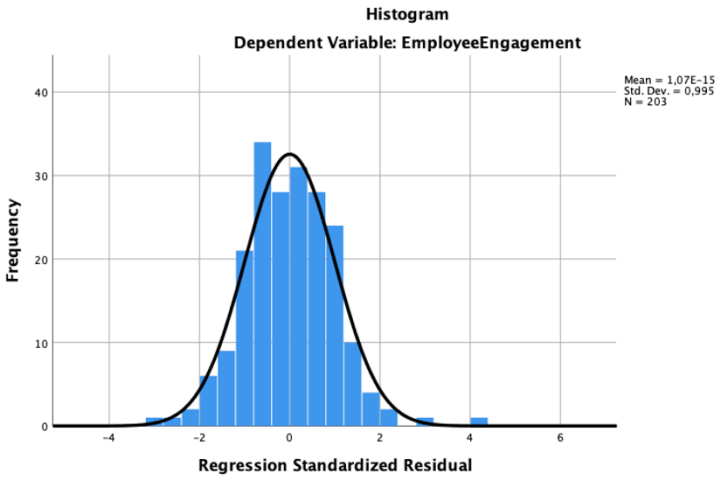
e) Correlations

Correlations

		Unstandardized Residual	Demands	Support
Unstandardized Residual	Pearson Correlation	1	,000	,000
	Sig. (2-tailed)		1,000	1,000
	N	203	203	203
Demands	Pearson Correlation	,000	1	,013
	Sig. (2-tailed)	1,000		,852
	N	203	203	203
Support	Pearson Correlation	,000	,013	1
	Sig. (2-tailed)	1,000	,852	
	N	203	203	203

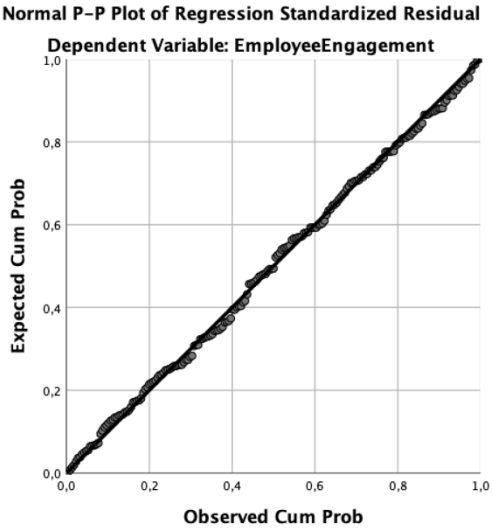
Source: SPSS output

f) Histogram



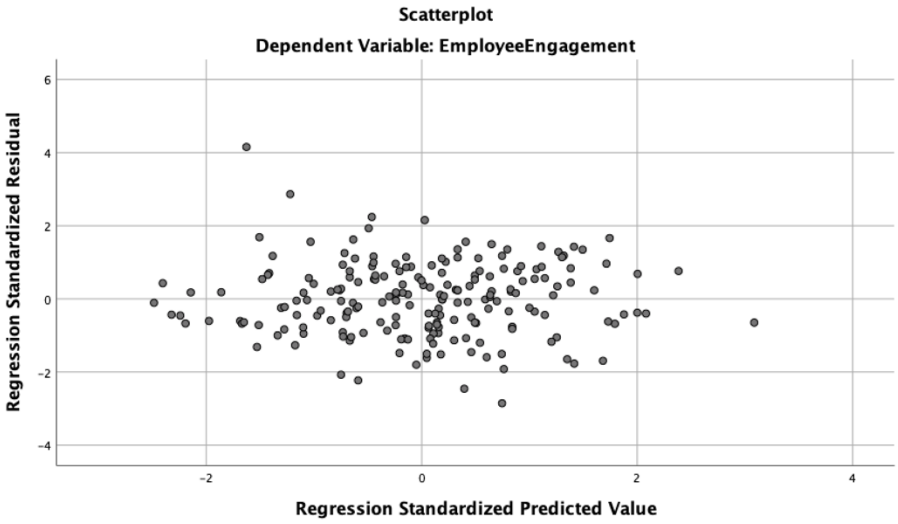
Source: SPSS output

g) Normal P - Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

II. AI Software scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,714[a]	,510	,505	,72642	1,780

a. Predictors: (Constant), Support, Demands

b. Dependent Variable: EmployeeEngagement

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	108,047	2	54,024	102,378	,000[b]
	Residual	103,954	197	,528		
	Total	212,002	199			

a. Dependent Variable: EmployeeEngagement

b. Predictors: (Constant), Support, Demands

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-,145	,317		-,456	,649		
	Demands	,219	,057	,192	3,818	,000	,987	1,013
	Support	,794	,060	,666	13,270	,000	,987	1,013

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,9238	6,9487	4,1290	,73685	200
Residual	-2,70810	1,74980	,00000	,72276	200
Std. Predicted Value	-2,993	3,827	,000	1,000	200
Std. Residual	-3,728	2,409	,000	,995	200

a. Dependent Variable: EmployeeEngagement

Source: SPSS output

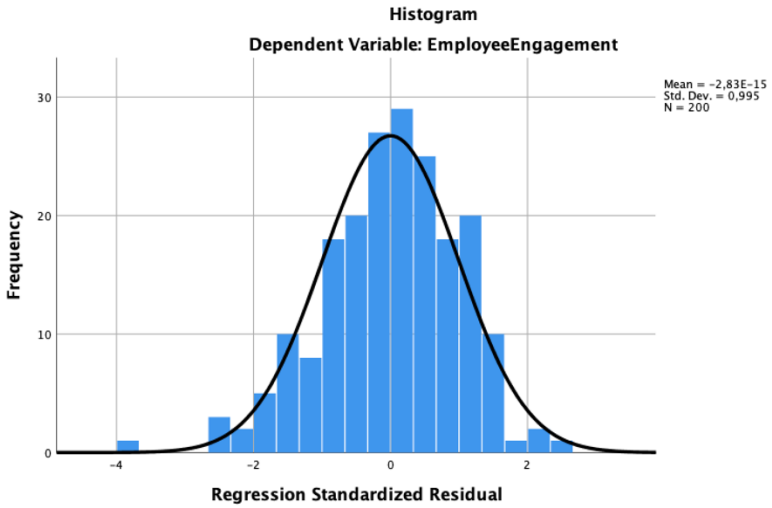
e) Correlations

Correlations

		Unstandardized Residual	Demands	Support
Unstandardized Residual	Pearson Correlation	1	,000	,000
	Sig. (2-tailed)		1,000	1,000
	N	200	200	200
Demands	Pearson Correlation	,000	1	,113
	Sig. (2-tailed)	1,000		,111
	N	200	200	200
Support	Pearson Correlation	,000	,113	1
	Sig. (2-tailed)	1,000	,111	
	N	200	200	200

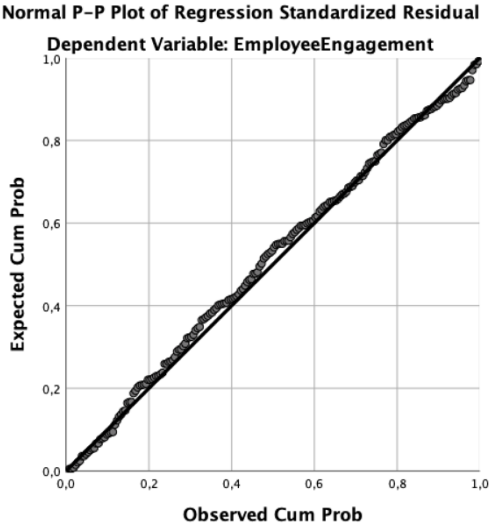
Source: SPSS output

f) Histogram



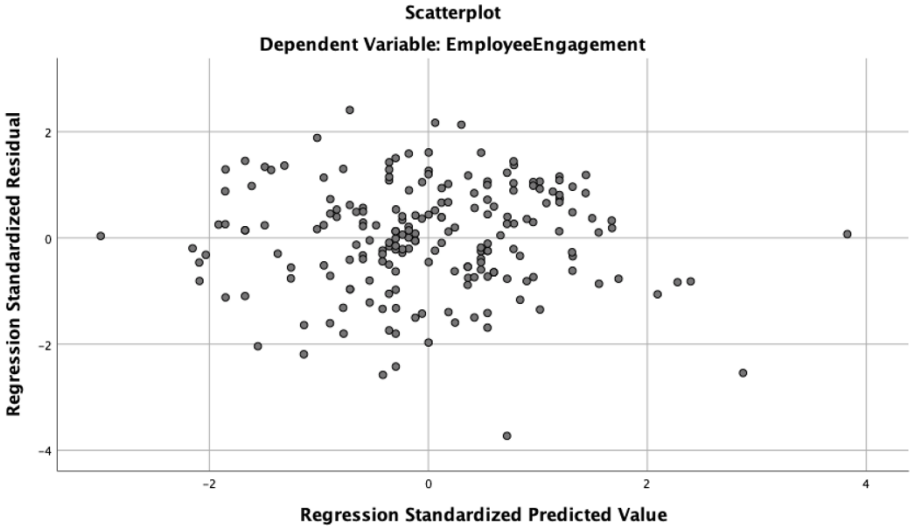
Source: SPSS output

g) Normal P - Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

Appendix O. Simple linear regression analysis - Employee Engagement as independent variable, Happiness as dependent variable

I. AI Robot scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin–Watson
1	,735[a]	,541	,539	,87749	1,635

a. Predictors: (Constant), EmployeeEngagement

b. Dependent Variable: Happiness

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	182,359	1	182,359	236,835	,000[b]
	Residual	154,767	201	,770		
	Total	337,126	202			

a. Dependent Variable: Happiness

b. Predictors: (Constant), EmployeeEngagement

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,700	,185		3,793	,000		
	EmployeeEngagement	,765	,050	,735	15,389	,000	1,000	1,000

a. Dependent Variable: Happiness

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,4654	5,6731	3,3793	,95014	203
Residual	-2,76051	2,50725	,00000	,87531	203
Std. Predicted Value	-2,014	2,414	,000	1,000	203
Std. Residual	-3,146	2,857	,000	,998	203

a. Dependent Variable: Happiness

Source: SPSS output

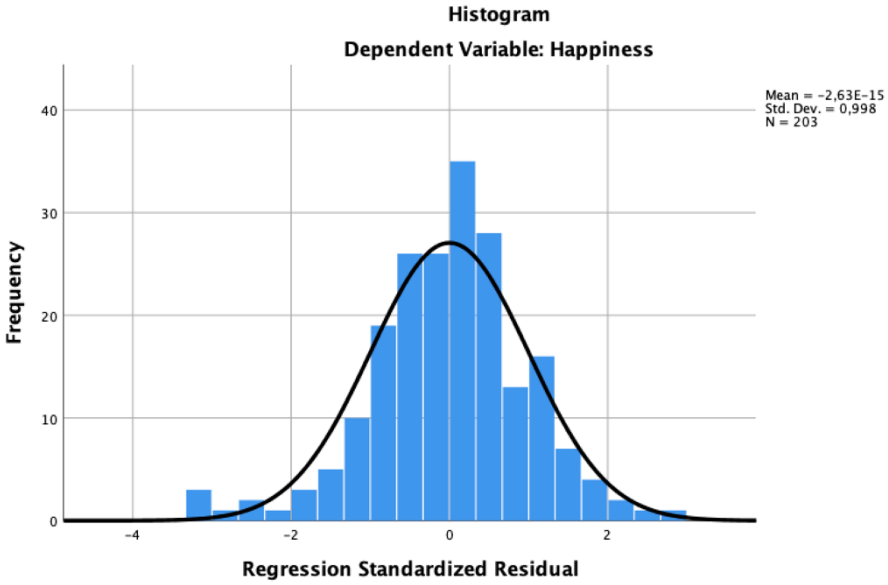
e) Correlations

Correlations

		Unstandardized Residual	EmployeeEngagement
Unstandardized Residual	Pearson Correlation	1	,000
	Sig. (2-tailed)		1,000
	N	203	203
EmployeeEngagement	Pearson Correlation	,000	1
	Sig. (2-tailed)	1,000	
	N	203	203

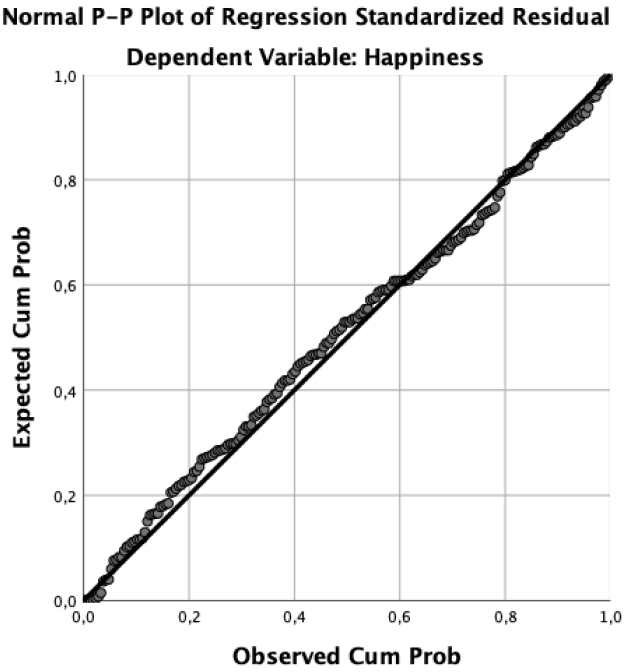
Source: SPSS output

f) Histogram



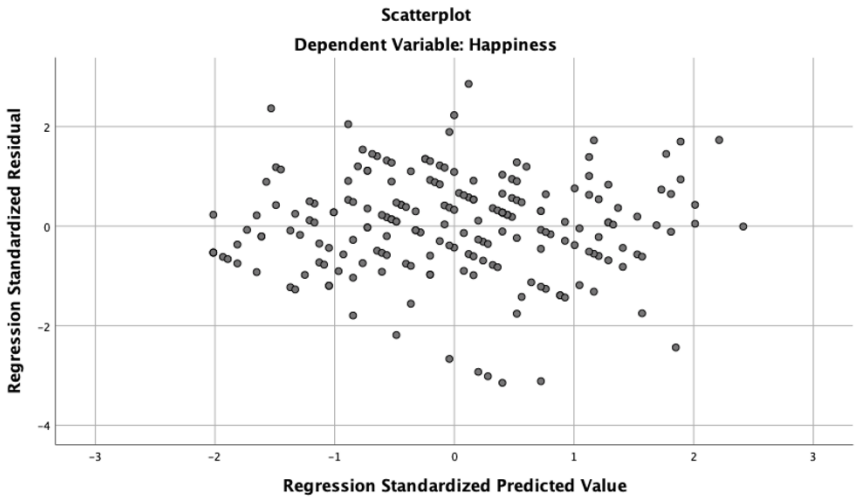
Source: SPSS output

g) Normal P - Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

II. AI Software scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,742[a]	,551	,548	,76192	2,024

a. Predictors: (Constant), EmployeeEngagement

b. Dependent Variable: Happiness

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	140,786	1	140,786	242,513	,000[b]
	Residual	114,945	198	,581		
	Total	255,731	199			

a. Dependent Variable: Happiness

b. Predictors: (Constant), EmployeeEngagement

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	,765	,223		3,436	,001		
	EmployeeEngagement	,815	,052	,742	15,573	,000	1,000	1,000

a. Dependent Variable: Happiness

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,9876	6,4696	4,1300	,84111	200
Residual	-2,12847	2,73065	,00000	,76001	200
Std. Predicted Value	-2,547	2,782	,000	1,000	200
Std. Residual	-2,794	3,584	,000	,997	200

a. Dependent Variable: Happiness

Source: SPSS output

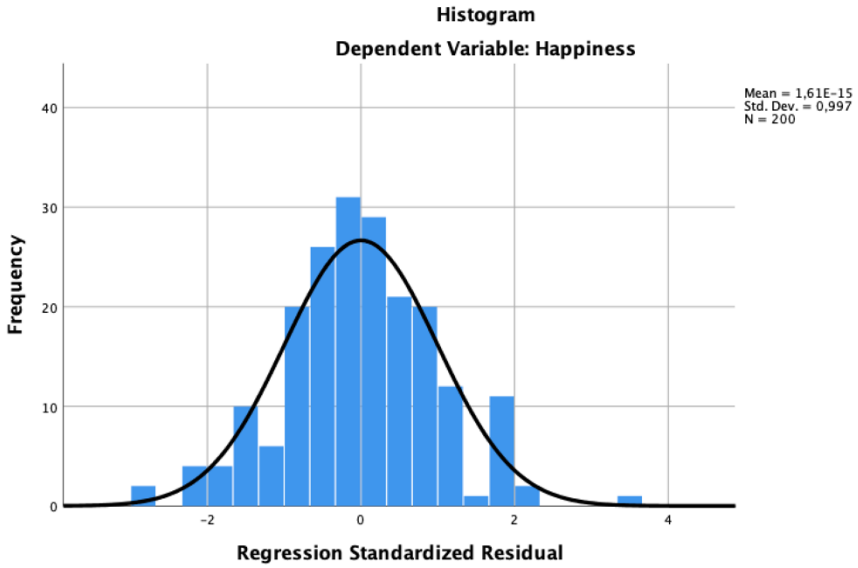
e) Correlations

Correlations

		Unstandardized Residual	EmployeeEngagement
Unstandardized Residual	Pearson Correlation	1	,000
	Sig. (2-tailed)		1,000
	N	200	200
EmployeeEngagement	Pearson Correlation	,000	1
	Sig. (2-tailed)	1,000	
	N	200	200

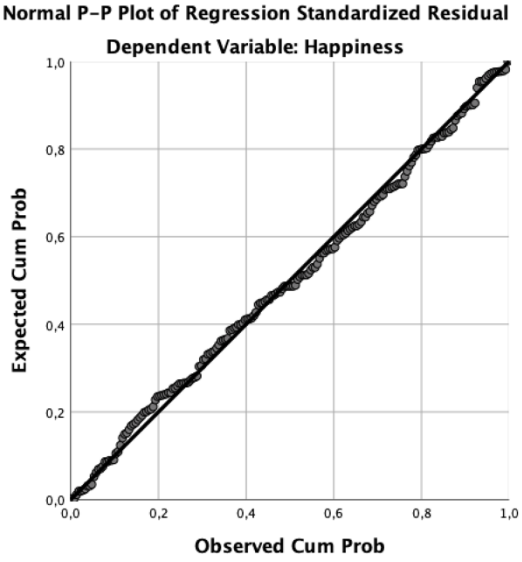
Source: SPSS output

f) Histogram



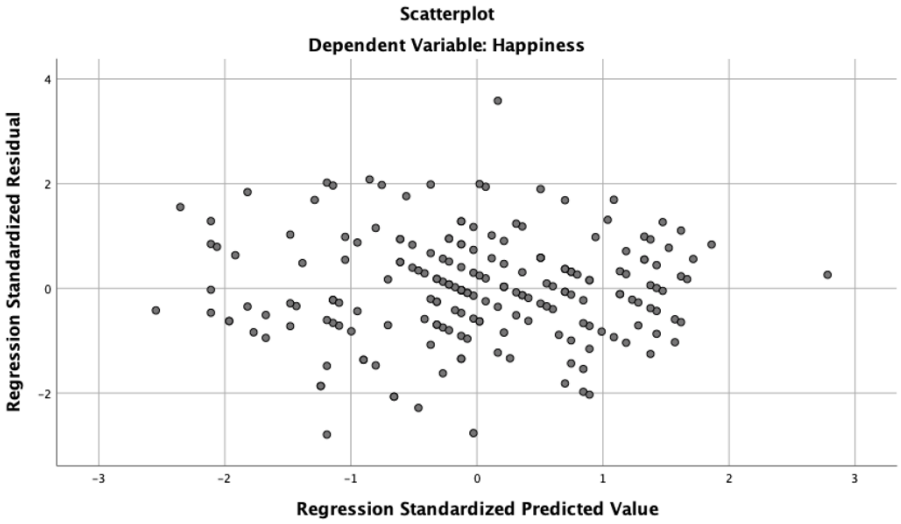
Source: SPSS output

g) Normal P - Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

Appendix P. Multiple linear regression analysis – Employee Engagement dimensions as independent variables, Happiness as dependent variable

I. AI Robot scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,756[a]	,571	,560	,85648	1,573

a. Predictors: (Constant), Performance, Satisfaction, Commitment, Loyalty, Identification

b. Dependent Variable: Happiness

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	192,615	5	38,523	52,515	,000[b]
	Residual	144,512	197	,734		
	Total	337,126	202			

a. Dependent Variable: Happiness

b. Predictors: (Constant), Performance, Satisfaction, Commitment, Loyalty, Identification

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	,715	,187		3,816	,000		
	Satisfaction	,424	,068	,438	6,195	,000	,434	2,302
	Identification	,251	,078	,279	3,199	,002	,285	3,503
	Commitment	,010	,071	,012	,143	,887	,323	3,099
	Loyalty	,101	,079	,104	1,267	,207	,326	3,067
	Performance	,001	,061	,001	,019	,985	,424	2,358

a. Dependent Variable: Happiness

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,5025	6,0014	3,3793	,97649	203
Residual	-2,84719	2,47841	,00000	,84582	203
Std. Predicted Value	-1,922	2,685	,000	1,000	203
Std. Residual	-3,324	2,894	,000	,988	203

a. Dependent Variable: Happiness

Source: SPSS output

e) Correlations

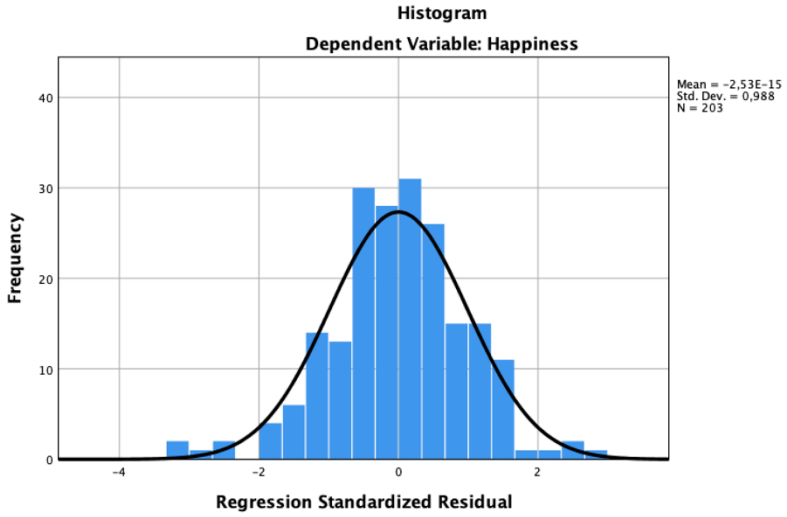
Correlations

		Unstandardized Residual	Satisfaction	Identification	Commitment	Loyalty	Performance
Unstandardized Residual	Pearson Correlation	1	,000	,000	,000	,000	,000
	Sig. (2-tailed)		1,000	1,000	1,000	1,000	1,000
	N	203	203	203	203	203	203
Satisfaction	Pearson Correlation	,000	1	,690**	,667**	,691**	,599**
	Sig. (2-tailed)	1,000		,000	,000	,000	,000
	N	203	203	203	203	203	203
Identification	Pearson Correlation	,000	,690**	1	,788**	,749**	,672**
	Sig. (2-tailed)	1,000	,000		,000	,000	,000
	N	203	203	203	203	203	203
Commitment	Pearson Correlation	,000	,667**	,788**	1	,701**	,673**
	Sig. (2-tailed)	1,000	,000	,000		,000	,000
	N	203	203	203	203	203	203
Loyalty	Pearson Correlation	,000	,691**	,749**	,701**	1	,711**
	Sig. (2-tailed)	1,000	,000	,000	,000		,000
	N	203	203	203	203	203	203
Performance	Pearson Correlation	,000	,599**	,672**	,673**	,711**	1
	Sig. (2-tailed)	1,000	,000	,000	,000	,000	
	N	203	203	203	203	203	203

**. Correlation is significant at the 0.01 level (2-tailed).

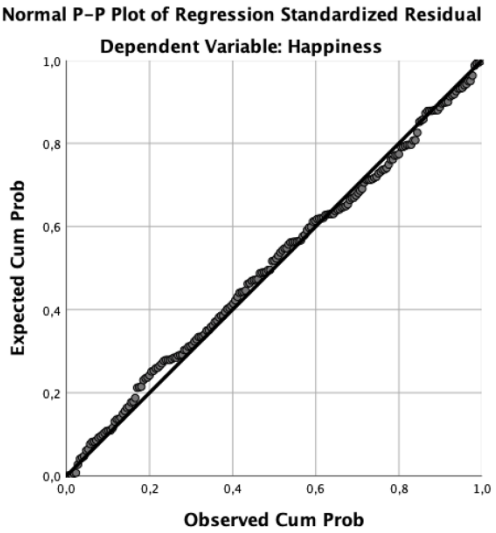
Source: SPSS output

f) Histogram



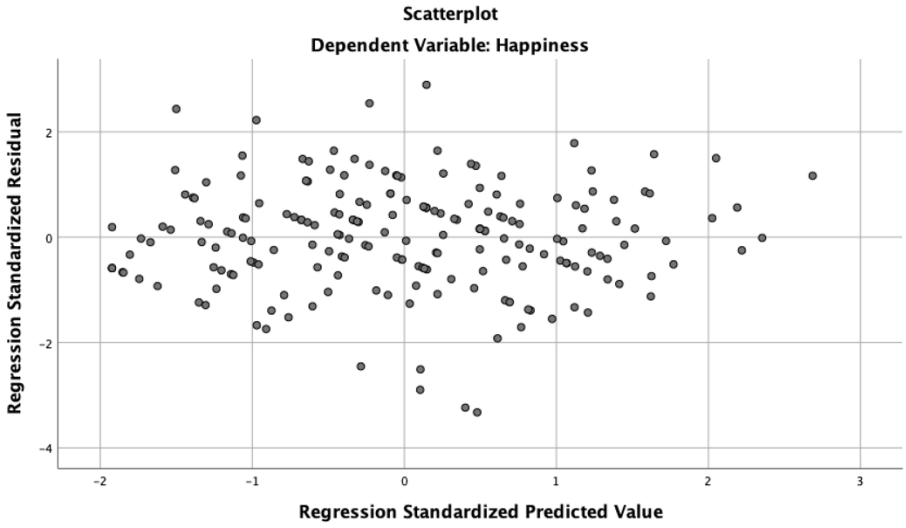
Source: SPSS output

g) Normal P- Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

II. AI Software scenario

a) Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin–Watson
1	,756[a]	,572	,561	,75141	2,084

a. Predictors: (Constant), Performance, Commitment, Satisfaction, Loyalty, Identification

b. Dependent Variable: Happiness

Source: SPSS output

b) ANOVA test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	146,196	5	29,239	51,786	,000[b]
	Residual	109,535	194	,565		
	Total	255,731	199			

a. Dependent Variable: Happiness

b. Predictors: (Constant), Performance, Commitment, Satisfaction, Loyalty, Identification

Source: SPSS output

c) Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,534	,249		2,140	,034		
	Satisfaction	,273	,071	,282	3,862	,000	,414	2,415
	Identification	,094	,075	,100	1,248	,214	,346	2,894
	Commitment	,089	,061	,107	1,459	,146	,409	2,443
	Loyalty	,258	,074	,258	3,510	,001	,407	2,457
	Performance	,151	,067	,142	2,257	,025	,554	1,805

a. Dependent Variable: Happiness

Source: SPSS output

d) Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1,8054	6,5911	4,1300	,85712	200
Residual	-2,06307	2,73494	,00000	,74191	200
Std. Predicted Value	-2,712	2,871	,000	1,000	200
Std. Residual	-2,746	3,640	,000	,987	200

a. Dependent Variable: Happiness

Source: SPSS output

e) Correlations

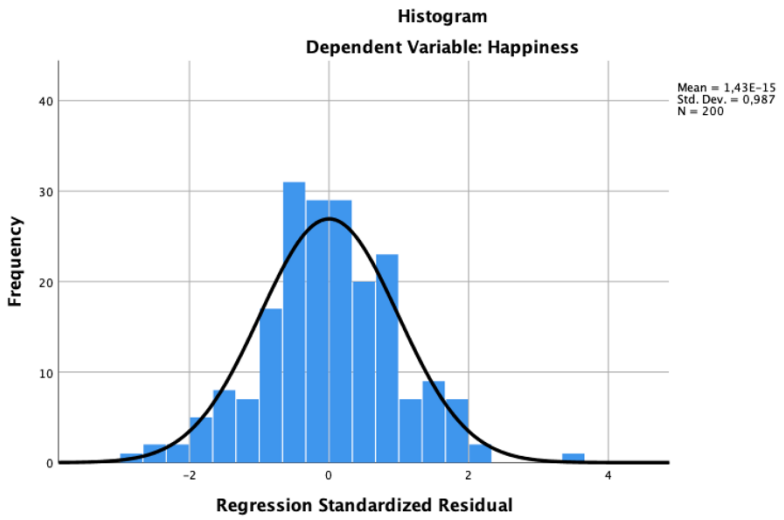
Correlations

		Unstandardized Residual	Satisfaction	Identification	Commitment	Loyalty	Performance
Unstandardized Residual	Pearson Correlation	1	,000	,000	,000	,000	,000
	Sig. (2-tailed)		1,000	1,000	1,000	1,000	1,000
	N	200	200	200	200	200	200
Satisfaction	Pearson Correlation	,000	1	,724**	,633**	,637**	,577**
	Sig. (2-tailed)	1,000		,000	,000	,000	,000
	N	200	200	200	200	200	200
Identification	Pearson Correlation	,000	,724**	1	,692**	,681**	,611**
	Sig. (2-tailed)	1,000	,000		,000	,000	,000
	N	200	200	200	200	200	200
Commitment	Pearson Correlation	,000	,633**	,692**	1	,699**	,551**
	Sig. (2-tailed)	1,000	,000	,000		,000	,000
	N	200	200	200	200	200	200
Loyalty	Pearson Correlation	,000	,637**	,681**	,699**	1	,578**
	Sig. (2-tailed)	1,000	,000	,000	,000		,000
	N	200	200	200	200	200	200
Performance	Pearson Correlation	,000	,577**	,611**	,551**	,578**	1
	Sig. (2-tailed)	1,000	,000	,000	,000	,000	
	N	200	200	200	200	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

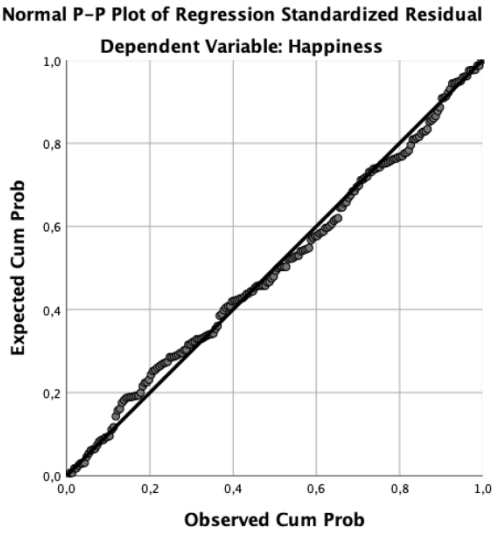
Source: SPSS output

f) Histogram



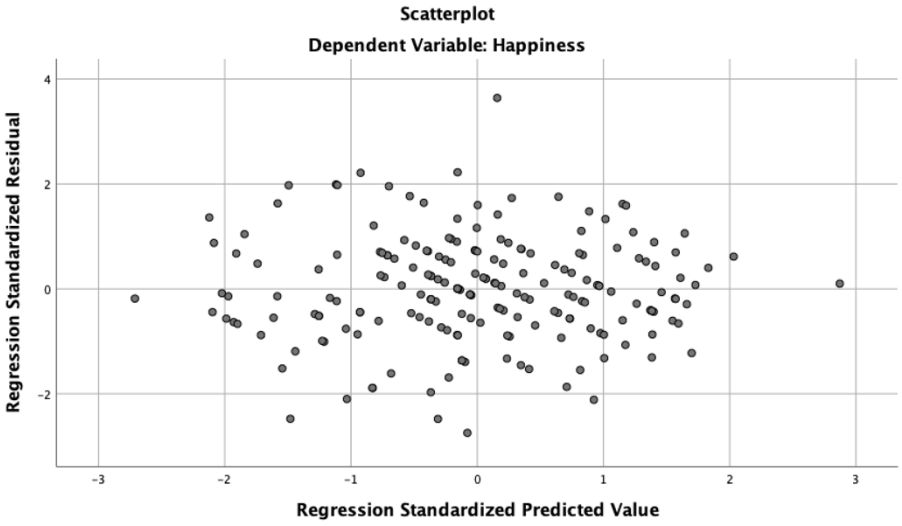
Source: SPSS output

g) Normal P - Plot



Source: SPSS output

h) Scatterplot



Source: SPSS output

Appendix Q. Moderation analysis – Self Esteem as moderator between Social Interaction and Employee Engagement

I. AI Robot scenario

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : EE
    X  : SocialIn
    W  : SelfEst

Sample
Size:  203

**************************************************************************
OUTCOME VARIABLE:
 EE

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,4934      ,2434     1,1846    21,3416     3,0000   199,0000      ,0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     3,5134      ,0782    44,9086      ,0000     3,3591     3,6677
SocialIn      ,1906      ,1311     1,4537      ,1476     -,0679      ,4491
SelfEst       ,8632      ,1195     7,2226      ,0000      ,6275     1,0989
Int_1        -,1169      ,1694     -,6901      ,4910     -,4509      ,2171

Product terms key:
 Int_1    :        SocialIn x        SelfEst

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      ,0018      ,4762     1,0000   199,0000      ,4910
----------
    Focal predict: SocialIn (X)
          Mod var: SelfEst  (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.
DATA LIST FREE/
   SocialIn   SelfEst    EE         .
BEGIN DATA.
     -,6070     -,6622     2,7791
      ,0000     -,6622     2,9418
      ,6070     -,6622     3,1044
     -,6070      ,0000     3,3977
      ,0000      ,0000     3,5134
      ,6070      ,0000     3,6291
     -,6070      ,6622     4,0163
      ,0000      ,6622     4,0850
      ,6070      ,6622     4,1537
END DATA.
GRAPH/SCATTERPLOT=
 SocialIn WITH     EE       BY       SelfEst  .

***************************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

NOTE: The following variables were mean centered prior to analysis:
          SelfEst  SocialIn
```

Source: SPSS output

II. AI Software scenario

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : EE
    X  : SocialI
    W  : SelfEs

Sample
Size:  200

**************************************************************************
OUTCOME VARIABLE:
 EE

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,5893      ,3473      ,7060    34,7591     3,0000   196,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant    -1,2660     1,4619     -,8660      ,3875    -4,1490     1,6170
SocialI       ,6276      ,3809     1,6475      ,1011     -,1237     1,3788
SelfEs       1,1486      ,3630     3,1644      ,0018      ,4328     1,8645
Int_1         -,0907      ,0895    -1,0132      ,3122     -,2672      ,0858

Product terms key:
 Int_1    :        SocialI  x        SelfEs

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      ,0034     1,0266     1,0000   196,0000      ,3122
----------
    Focal predict: SocialI  (X)
          Mod var: SelfEs   (W)
Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   SocialI    SelfEs     EE         .
BEGIN DATA.
     3,1250     3,2000     3,4639
     3,6875     3,2000     3,6537
     4,2500     3,2000     3,8434
     3,1250     3,8000     3,9830
     3,6875     3,8000     4,1422
     4,2500     3,8000     4,3014
     3,1250     4,2000     4,3291
     3,6875     4,2000     4,4679
     4,2500     4,2000     4,6066
END DATA.
GRAPH/SCATTERPLOT=
 SocialI  WITH     EE       BY       SelfEs   .

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

------ END MATRIX -----
```

Source: SPSS output

Appendix R. Moderation analysis – Self Esteem as moderator between Anxiety and Employee Engagement

I. AI Robot scenario

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5.3 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : EE
    X  : Anxiety
    W  : SelfEst

Sample
Size:  203

**************************************************************************
OUTCOME VARIABLE:
 EE

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,6360      ,4046      ,9323    45,0678     3,0000   199,0000      ,0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     3,5015      ,0678    51,6553      ,0000     3,3678     3,6352
Anxiety      -,4404      ,0584    -7,5407      ,0000     -,5555     -,3252
SelfEst       ,8896      ,1027     8,6619      ,0000      ,6871     1,0921
Int_1        -,0126      ,0809     -,1558      ,8763     -,1722      ,1469

Product terms key:
 Int_1    :        Anxiety  x        SelfEst

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      ,0001      ,0243     1,0000   199,0000      ,8763
----------
    Focal predict: Anxiety  (X)
          Mod var: SelfEst  (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   Anxiety    SelfEst    EE        .
BEGIN DATA.
    -1,1636     -,6622     3,4151
      ,0000     -,6622     2,9124
     1,1636     -,6622     2,4097
    -1,1636      ,0000     4,0139
      ,0000      ,0000     3,5015
     1,1636      ,0000     2,9890
    -1,1636      ,6622     4,6127
      ,0000      ,6622     4,0906
     1,1636      ,6622     3,5684
END DATA.
GRAPH/SCATTERPLOT=
 Anxiety  WITH     EE       BY       SelfEst  .

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

NOTE: The following variables were mean centered prior to analysis:
          SelfEst  Anxiety

------ END MATRIX -----
```

Source: SPSS output

II. AI Software scenario

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5.3 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : EE
    X  : Anxiety
    W  : SelfEs

Sample
Size:  200

**************************************************************************
OUTCOME VARIABLE:
 EE

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,6029      ,3635      ,6885    37,3037     3,0000   196,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1,3035      ,9093     1,4335      ,1533     -,4898     3,0968
Anxiety      -,2522      ,2499    -1,0090      ,3142     -,7450      ,2407
SelfEs        ,9162      ,2249     4,0730      ,0001      ,4726     1,3598
Int_1         ,0132      ,0589      ,2240      ,8230     -,1030      ,1293

Product terms key:
 Int_1    :        Anxiety  x        SelfEs

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      ,0002      ,0502     1,0000   196,0000      ,8230
----------
    Focal predict: Anxiety  (X)
          Mod var: SelfEs   (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   Anxiety    SelfEs     EE         .
BEGIN DATA.
     2,2057     3,2000     3,7722
     3,0952     3,2000     3,5854
     4,3733     3,2000     3,3171
     2,2057     3,8000     4,3393
     3,0952     3,8000     4,1596
     4,3733     3,8000     3,9014
     2,2057     4,2000     4,7174
     3,0952     4,2000     4,5424
     4,3733     4,2000     4,2909
END DATA.
GRAPH/SCATTERPLOT=
 Anxiety  WITH     EE       BY       SelfEs   .

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

------ END MATRIX -----
```

Source: SPSS output

Appendix S. Moderation analysis – Self Esteem as moderator between Stress and Employee Engagement

I. AI Robot scenario

```
Run MATRIX procedure:

*************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : EE
    X  : Stress
    W  : SelfEst

Sample
Size:  203

**************************************************************************
OUTCOME VARIABLE:
 EE

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,6800      ,4623      ,8418    57,0421     3,0000   199,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     3,5057      ,0666    52,6241      ,0000     3,3743     3,6370
Stress        ,7962      ,0867     9,1849      ,0000      ,6253      ,9672
SelfEst       ,6207      ,1032     6,0161      ,0000      ,4173      ,8242
Int_1        -,0254      ,1095     -,2320      ,8168     -,2413      ,1905

Product terms key:
 Int_1    :        Stress   x        SelfEst

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      ,0001      ,0538     1,0000   199,0000      ,8168
----------
    Focal predict: Stress   (X)
          Mod var: SelfEst  (W)
Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   Stress     SelfEst    EE         .
BEGIN DATA.
     -,7821     -,6622     2,4588
      ,0000     -,6622     3,0947
      ,7821     -,6622     3,7305
     -,7821      ,0000     2,8830
      ,0000      ,0000     3,5057
      ,7821      ,0000     4,1284
     -,7821      ,6622     3,3072
      ,0000      ,6622     3,9167
      ,7821      ,6622     4,5263
END DATA.
GRAPH/SCATTERPLOT=
 Stress   WITH     EE       BY       SelfEst  .

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

NOTE: The following variables were mean centered prior to analysis:
          SelfEst  Stress

------ END MATRIX -----
```

Source: SPSS output

II. AI Software scenario

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5.3 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : EE
    X  : Stress
    W  : SelfEs

Sample
Size:  200

**************************************************************************
OUTCOME VARIABLE:
 EE

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,7463      ,5569      ,4792    82,1289     3,0000   196,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant    -4,5532     1,1659    -3,9051      ,0001    -6,8526    -2,2538
Stress       1,6158      ,2805     5,7594      ,0000     1,0625     2,1691
SelfEs       1,4197      ,2941     4,8264      ,0000      ,8396     1,9998
Int_1        -,2060      ,0671    -3,0706      ,0024     -,3383     -,0737

Product terms key:
 Int_1    :        Stress   x        SelfEs

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      ,0213     9,4284     1,0000   196,0000      ,0024
----------
    Focal predict: Stress   (X)
          Mod var: SelfEs   (W)

Conditional effects of the focal predictor at values of the moderator(s):

     SelfEs     Effect         se          t          p       LLCI       ULCI
     3,2000      ,9566      ,0983     9,7339      ,0000      ,7628     1,1504
     3,8000      ,8330      ,0835     9,9764      ,0000      ,6684      ,9977
     4,2000      ,7506      ,0836     8,9837      ,0000      ,5859      ,9154

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   Stress     SelfEs     EE         .
BEGIN DATA.
     3,3636     3,2000     3,2075
     4,0000     3,2000     3,8162
     4,6364     3,2000     4,4250
     3,3636     3,8000     3,6436
     4,0000     3,8000     4,1737
     4,6364     3,8000     4,7038
     3,3636     4,2000     3,9343
     4,0000     4,2000     4,4120
     4,6364     4,2000     4,8896
END DATA.
GRAPH/SCATTERPLOT=
 Stress   WITH     EE       BY       SelfEs   .

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

W values in conditional tables are the 16th, 50th, and 84th percentiles.

------ END MATRIX -----
```

Source: SPSS output

Appendix T. Moderation analysis – Self Esteem as moderator between Employee Engagement and Happiness

I. AI Robot scenario

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5.3 ***************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 1
    Y  : Happin
    X  : EE
    W  : SelfEst

Sample
Size:  203

**************************************************************************
OUTCOME VARIABLE:
 Happin

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,7391      ,5463      ,7686    79,8808     3,0000   199,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant      ,4155      ,9291      ,4472      ,6552    -1,4167     2,2476
EE           1,0154      ,2776     3,6584      ,0003      ,4681     1,5628
SelfEst       ,0452      ,2590      ,1744      ,8617     -,4655      ,5558
Int_1        -,0569      ,0722     -,7878      ,4317     -,1993      ,0855

Product terms key:
 Int_1    :        EE       x        SelfEst

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      ,0014      ,6207     1,0000   199,0000      ,4317
----------
    Focal predict: EE       (X)
          Mod var: SelfEst  (W)
Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   EE         SelfEst    Happin     .
BEGIN DATA.
     2,2000     3,1640     2,3963
     3,5000     3,1640     3,4824
     4,9000     3,1640     4,6520
     2,2000     3,7000     2,3534
     3,5000     3,7000     3,3999
     4,9000     3,7000     4,5268
     2,2000     4,2000     2,3134
     3,5000     4,2000     3,3229
     4,9000     4,2000     4,4100
END DATA.
GRAPH/SCATTERPLOT=
 EE       WITH     Happin   BY       SelfEst  .

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

------ END MATRIX -----
```

Source: SPSS output

II. AI Software scenario

```
Run MATRIX procedure:

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**************************************************************************
Model  : 1
    Y  : Happine
    X  : EE
    W  : SelfEs

Sample
Size:  200

**************************************************************************
OUTCOME VARIABLE:
 Happine

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,7431      ,5523      ,5842    80,5852     3,0000   196,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant      ,1094      ,9347      ,1170      ,9070    -1,7340     1,9528
EE            ,9068      ,2110     4,2977      ,0000      ,4907     1,3229
SelfEs        ,2074      ,2660      ,7800      ,4363     -,3171      ,7319
Int_1        -,0318      ,0552     -,5760      ,5653     -,1408      ,0771

Product terms key:
 Int_1    :        EE       x        SelfEs

Test(s) of highest order unconditional interaction(s):
       R2-chng           F        df1        df2          p
X*W      ,0008      ,3318     1,0000   196,0000      ,5653
----------
    Focal predict: EE       (X)
          Mod var: SelfEs   (W)
Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
   EE         SelfEs     Happine    .
BEGIN DATA.
     3,0000     3,2000     3,1880
     4,1000     3,2000     4,0735
     5,2920     3,2000     5,0330
     3,0000     3,8000     3,2552
     4,1000     3,8000     4,1197
     5,2920     3,8000     5,0564
     3,0000     4,2000     3,3000
     4,1000     4,2000     4,1504
     5,2920     4,2000     5,0720
END DATA.
GRAPH/SCATTERPLOT=
 EE       WITH     Happine  BY       SelfEs   .

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

------ END MATRIX -----
```

Source: SPSS output