# The Influence of Artificial Intelligence Leadership on Employee Ethical Decision-Making

Inês Tiago

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Filipa de Almeida

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## Abstract

**Title:** The Influence of Artificial Intelligence Leadership on Employee Ethical Decision-Making

**Author:** Inês Tiago

With technological evolution, artificial intelligence (AI) has gained relevance in the organizations, moving beyond its mechanical applicability in manufacturing, and up the supply chain to departments requiring analytical skills, like finance or operations. The expectation is that with recent advancements in language and response to emotion, AI will no longer be just a tool, but a coworker or even a manager to human employees. According to the literature, together with moral issue and individual characteristics, the organizational environment can be a significant detractor or enabler of employee unethicality, and the leader not only shapes this environment but directly influences employees' morality in the workplace. This thesis focuses on how an AI leader influences employee ethical decision making. Additionally, it proposes that job satisfaction perceptions, code enforcement perceptions, the feeling of being monitored and public self-awareness partially mediate this relationship. Negative feelings towards AI could mean lower job satisfaction that would lead to less ethical decisions. The machine-like characteristics of AI could cause it to be perceived as more vigilant and as a stricter code enforcer, however, its human-like characteristics could drive employees to feel public self-awareness and act as they believe the leader wants them to, thus contributing to more ethical decisions, since people do not want to be punished or perceived as immoral. The results did not support any of the hypotheses. Nevertheless, this study expands the existing AI leadership literature and raises questions to point future researchers in new directions of study.



**Keywords:** Artificial Intelligence, Leadership, Ethics, Employee, Ethical decision-making, Job satisfaction, Feeling monitored, Public self-awareness, Code enforcement.

# Sumário

**Título:** A Influência da Liderança por Inteligência Artificial na Tomada de Decisões Éticas dos Colaboradores

**Autor:** Inês Tiago

Com a evolução tecnológica, a inteligência artificial (IA) tem vindo a ganhar relevância nas organizações, desenvolvendo-se para além das suas aplicações mecânicas em produção, e expandindo-se até departamentos que requerem capacidade analítica, como a área financeira ou logística. A expectativa é que os avanços nas áreas de linguagem e resposta emocional, façam com que a IA passe de uma ferramenta, a um colega de trabalho ou até um gestor de equipa. De acordo com a literatura, juntamente com as características do problema moral e do indivíduo, o ambiente organizacional pode coibir ou incentivar decisões imorais por parte dos colaboradores. O líder não só molda este ambiente como influencia diretamente o comportamento ético dos colaboradores. Esta tese foca-se em como um líder IA influencia a tomada de decisões éticas dos trabalhadores. Sentimentos negativos para com IA podem levar a menor satisfação com o trabalho, que por sua vez pode levar a decisões menos éticas. A IA tem características técnicas que podem levar a uma perceção de maior vigilância e maior intransigência na aplicação de regulamentos, por outro lado, a semelhança com a interação social que se teria com um humano pode levar a que os colaboradores sintam uma auto-consciencialização pública, que os leve a querer agir como acham que seria mais aceitável para o líder. Os resultados não confirmaram nenhuma das hipóteses. Ainda assim, este estudo expande a literatura na área de liderança IA e levanta questões que sugerem novas direções de pesquisa futura.

**Palavras-chave:** Inteligência Artificial, Liderança, Ética, Colaborador, Tomada de decisões éticas, Satisfação no trabalho, Sentimento de monitorização, Auto-consciencialização pública, Implementação de regulamentos.

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## Glossary

| | |
|---|---|
| α | The probability of making a type-I error, Cronbach's index of internal consistency |
| b | Estimated value of unstandardized regression coefficient |
| AI | Artificial Intelligence |
| ANOVA | Analysis of variance |
| CI | Confidence interval |
| df | Degrees of freedom |
| DV | Dependent variable |
| F | F distribution |
| H | Hypothesis |
| IV | Independent variable |
| M | Sample mean |
| MD | Mean difference |
| N | Total number of cases |
| p | p-value |
| r | Estimation of the Spearman correlation coefficient |
| R | Multiple correlation squared |
| RQ | Research question |
| SD | Standard deviation |
| SE | Standard error |

# 1. Introduction

Scandals like the emissions gate with Volkswagen (Hotten, 2015), Facebook data privacy issues connected to Cambridge Analytica (Wong, 2019), or Valeant Pharmaceuticals (Surowiecki, 2016), that acquired small pharma companies and raised drug prices for higher profits, are only some of the more recent examples that illustrate the consequences of ethical misbehaviors in business.

Such actions damage the corporations and its stakeholders, but also impact the environment, surrounding communities, and their economies. As a result, the research on the topic of unethical employee behavior has been growing considerably (Tenbrunsel & Smith-Crowe, 2008; Veetkazhi et al., 2020).

Naturally, researchers and practitioners alike have been trying to understand what impacts unethical behavior, to reduce it. Scholars have found that employee unethical behavior is not only driven by individual characteristics of the employee, but also influenced by organizational factors and the moral issue at hand (Kish-Gephart et al., 2010; Liu et al., 2013). Regarding organizational environment, research suggests that leaders have great influence on employees and their ethical behavior (Liu et al., 2013; Treviño & Brown, 2004; Yukl, 1989).

Leaders guide employees' conduct by acting as a role model that gives them hints about the company's ethical climate and how to navigate their policies and procedures (Lu & Lin, 2014; Mayer et al., 2009). As such, different styles of leadership influence employees in different ways (Veetkazhi et al., 2020). Ethical leadership, in particular, has been connected to ethical climate in organizations and to employee ethical behavior (Mayer et al., 2009). That is, displaying regulated behavior and decisions as well as promoting such behavior on subordinates (Brown et al., 2005; Mayer et al., 2010).

Technological advances in big data, artificial intelligence and machine learning are transforming the way business is conducted and how people work and interact (Lee, 2018).

Technological evolution and increased computer power have allowed machines to leverage big data creating artificially intelligent systems, able not only to interpret data, but also to learn from it and use this to make decisions or perform tasks through flexible adaptation (Haenlein & Kaplan, 2019).

Artificial intelligence (AI) capabilities are expanding from the mechanical, repetitive tasks into the thinking and analytical fields. AI is used to aid organizational decision-making

regarding routine operations that are relatively well structured (K. Parry et al., 2016), such as algorithms that optimize supply chains or allocate schedules and tasks to workers. More sophisticated systems sort profiles for recruiting to help human resources teams or are used in banking and insurance for profile and risk analysis. Their efficiency and ability to process large amounts of data using a big number of variables has contributed to an increase in adoption (Lee, 2018).

The evolution of AI as a tool, or even as a team-member, contributing for group decision making, with the refinement of interfaces and AI capabilities, is expected to lead to an increasing number of AI leaders, that is computers leading humans in organizations according to the directions of upper management (Wesche & Sonderegger, 2019).

With algorithmic management, employees interact with a software system instead of a human supervisor. An AI algorithmic manager can oversee, govern, evaluate worker performance and implement decisions according to the set of rules programmed in the algorithm and the data and feedback analyzed by the system. While this scenario may seem farfetched, today thousands of Uber drivers are being controlled and evaluated by an algorithmic system (Mohlmann & Zalmanson, 2018).

Artificially intelligent leaders lack bias if programmed that way, leading to data-driven, objective decision making (Naqvi, 2002, 2016) and can provide feedback to its subordinates, contributing to avoiding fights and tension in the hierarchy (Chamorro-Premuzic & Ahmetoglu, 2016). However, algorithmic managers also present challenges. Uber drivers complain of lack of transparency, constant surveillance and the dehumanization of having their performance evaluated by the system, concerns that are common to others dealing with algorithmic management (Möhlmann & Henfridsson, 2019). The system can be frustrating to workers, and it is difficult to establish trust between employees and the AI manager (Lee & See, 2004; M. K. Lee, 2018).

Understanding the impact of AI leadership implementation in organizations is extremely important since leadership is so closely connected with employee decision-making.

An AI ethical leader would presumably be programmed to act according to the law and organizational codes and would be able to provide employee feedback and incentivize ethical behavior, while detaining authority to reward and punish subordinates accordingly. Furthermore, the feeling of being monitored by the system or feeling constantly under

evaluation can deter ethical misbehavior, along with an unbiased and strict code enforcement through punishment and rewards.

However, complications as described above, may lead the employees to resist system implementation and contribute to job dissatisfaction, increasing misconduct.

What will the effect of AI leadership on employee ethical decision-making be? Will the employees perceive the AI leader as a stricter code enforcer? Or believe they will be monitored by the system? Will people feel satisfied? Will these outcomes influence employee ethical decision making?

These questions are the anchor of this thesis that aims at shedding some light on the topic of AI leadership and contribute to a better development and implementation of this technology.

## 1.1. Problem Statement

The purpose of this research is to better understand the influence of AI leadership in employee ethical decision making. With this aim, I investigated the effect of a human versus an AI leader on ethical decision making, and the potential mediating effect of job satisfaction perception, code enforcement perception, the feelings of being monitored and public self-awareness. As leadership has such diverse styles that influence employee ethical choice in different ways, I manipulated both human and AI as ethical leaders in a managerial setting, to focus on the isolated effect of human versus AI management. Hence, this research aims to answer the question: "How does AI leadership influence employee ethical decision- making?". This problem statement can be divided in 2 research questions:

RQ1: "Does AI leadership influence employee ethical decision making differently from human leadership?"

RQ2: "Do job satisfaction perceptions, code enforcement perceptions, and the feeling of being monitored or under evaluation mediate the relation between AI leadership and employee ethical decision making?"

## 1.2. Relevance

This thesis contributes to the existing literature on AI, leadership, and organizational ethics by combining these concepts in an original manner. It examines how a new type of leadership, an artificially intelligent manager, would impact employee ethical decision making and more specifically how an AI leader would affect ethical leadership outcomes, leading to differences

in job satisfaction perceptions, code enforcement perceptions and the feeling of being monitored or under evaluation, that in turn would affect employee ethical decision outcomes.

Moral and ethical conundrums remain unaddressed in the field of AI leadership (Parry et al., 2016). As such, this research contributes to raising organizational awareness about complications that can arise from AI leadership implementation, how it affects employees' ethical decisions, and contributes to the development of strategies to overcome those difficulties.

Despite AI systems implementation across industries, AI leadership is an example of numerous untapped opportunities leveraging AI, big data, and machine learning. Therefore, this research also has the greater purpose of keeping pace with technological advancements to fulfill the societal responsibility of science (Ghislieri et al., 2018).

### 1.3. Structure

In order to answer the proposed research questions, an experimental study was conducted. After this introduction, a literature review about employee ethical decision making, leadership and employee ethical decision making, ethical leadership, artificial intelligence, and artificial intelligence leadership is presented as well as the derived hypotheses along with a conceptual model. Next, the research methodology is described, including the research strategy and design, participants, procedure, and the independent and dependent variables. Then, the experiment results are presented, analyzed, and discussed, followed by the main conclusions of the study along with academic and managerial implications. At last, limitations and future research suggestions are discussed.

## 2. Literature review

### 2.1. Employee Ethical Decision-Making

Research in behavioral ethics regarding employee ethical decision making has been guided by Rest's (1986) four-stage model that depicts the steps taken by an individual when making an ethical decision and consists of (1) recognizing the moral issue; (2) making a moral judgement; (3) establishing moral intent and (4) acting on the moral concerns (Jones, 1991; Kish-Gephart et al., 2010; Rest, 1986).

This model explicitly includes a step of intent and following behavior, however, Treviño (1986) postulated a direct transition between moral judgement and behavior (Jones, 1991). Unethical intention has to do with willingness to ethically misbehave, while unethical behavior refers to the action of deviance from the accepted moral norms (Kish-Gephart et al., 2010; Rest, 1986). Using intention as a proxy for behavior is an assumption commonly used in behavioral ethics research, based on the presumption that intent precedes behavior, and the latter is easier to study (Ajzen, 1991; Fishbein & Ajzen, 1975; Kish-Gephart et al., 2010).

Kish-Gephart et. al. (2010) meta-analytic research refers to unethical choice as both behavior and intent. The authors suggest three categories of antecedents for unethical decision-making in the workplace. First, they explore the effects of individual differences or "bad apples", that is, what distinguishes ethical from unethical decision makers in the workplace. Then they focus on how the characteristics of the ethical dilemma itself or how "bad cases" can influence unethical choice, such as how fast and serious the repercussions would be for the "victim". Finally, the researchers explore the organizational environment "bad barrel" as a driver or inhibitor of unethical choice, distinguishing types of ethical climate, codes of conduct and their enforcement in the workplace.

### 2.1.1. Individual Characteristics

When different people are exposed to the same moral dilemma, in the same situation and environment, not everyone will choose the same outcome. This happens because individuals hold different moral beliefs or approach morality with different strategies and points of view.

For instance, an idealist is less prone to unethical decision-making because they believe that it is always possible to avoid harming others (Forsyth, 1980), else ways a relativist's moral philosophy would make them more prone to unethical decision-making as they believe moral structures are dependent on the circumstances (Kish-Gephart et al., 2010).

Similarly, there are certain personality traits that make an individual more prone to behaving unethicality. The "Dark Triad" composed of machiavellianism, narcissism and psychopathy traits has been given relevance in the literature that suggests that the presence of any of these traits is positively correlated to unethical behavior (Harrison et al., 2018; Lee et al., 2013). External locus of control is another personality trait that has been associated with unethical behavior since it is easier for individuals to detach and offload blame on external circumstances or other individuals (Kish-Gephart et al., 2010; Trevino, 1986).

Cognitive Moral Development theory, or CMD (Kohlberg, 1969), focuses on how growing up individuals evolve through stages of moral development in terms of reasoning processes and justifications provided for their thinking in ethical dilemma situations. CDM has five stages; at the lowest (stage 1) individuals reason based on obedience and avoiding punishment or acting in their self-interest (stage 2). Most adults are at the middle, meaning their judgements are affected by expectations of peers and significant others (stage 3) or by policies, rules and the law (stage 4), in the highest level of CDM (stage 5) individuals use sophisticated reasoning, relying on ethical principles of justice and rights and consider societal good. Cognitive moral development is negatively related to unethical choices meaning that people who are more morally developed tend to make less unethical decisions (Kish-Gephart et al., 2010; Kohlberg, 1969).

Regarding the influence of demographics, despite evidence pointing out men are more prone to unethical choices than women, the correlation is weak. The same is observed for age, with a weak but negative correlation indicating that older individuals are somewhat less prone to unethical choice. In contrast to what was hypothesized by the author, education seems to have no effect on unethical choices (Kish-Gephart et al., 2010).

According to Locke (1969) job satisfaction is defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences". The job itself, future opportunity, the work environment, compensation and relationship with the supervisor and other collaborators are some of the aspects that contribute to the level of job satisfaction (McShane, 2004).

When dissatisfied with their job, research suggests that individuals may try to even the score leading to workplace deviance (Dalal, 2005). Relatedly, job satisfaction has a negative relation to unethical choice (Kish-Gephart et al., 2010).

### 2.1.2. Moral issue Characteristics

Jones (1991) recognized the need to focus not only on characteristics of the individual or the organizational environment, but to also consider the moral problem at hand. For example, stealing a couple of pens from the office or committing fraud have a very distinct moral intensity. The author divided this construct in six main components.

Concentration of effect, the "inverse function of the number of people affected by an act of a given magnitude". Magnitude of consequences, that measures the amount of harm done to the

victim of an unethical choice and the probability of effect, the chance of harm being caused by the unethical choice (Jones, 1991; Kish-Gephart et al., 2010).

Then people consider proximity, that is, how near the victim is to the decision maker, socially, psychologically, culturally, or physically; Social consensus, how accepted a certain unethical choice is among peers, and finally, temporal immediacy, how fast the consequences of the choice are realized (Jones, 1991; Kish-Gephart et al., 2010).

All six parameters have a moderate negative correlation with unethical choice, and together measure the general moral intensity, as any of the parameters increases, moral intensity increases proportionately, showing a strong negative (corrected) correlation with unethical choice (Jones, 1991; Kish-Gephart et al., 2010).

### 2.1.3. Organizational environment characteristics

Besides the characteristics of the individual and the moral issue at hand, the workplace environment can also influence moral decision making. It comprises the ethical climate, accepted practices and beliefs, formal codes and their acceptance and enforcement.

Ethical climates represent beliefs about what constitutes right behavior in an organization, and thus, provide behavioral guidance for employees (McShane, 2004). Kish-Gephart et. al. (2010) focused on three key dimensions of ethical climate, namely Egoistic, Benevolent and Principled ethical climate and how they affect ethical choice.

In an egoistic ethical climate, employees perceive that the organizational environment emphasizes decision making based on self-interest (Victor & Cullen, 1988). In this type of organization, the normative behavior is for employees to act for their own benefit without regard for social consequences (Martin & Cullen, 2006). In this case, individuals are more likely to make unethical choices if it suits their purpose, and as expected, an Egoistic ethical climate is positively related to unethical choice (Kish-Gephart et al., 2010).

When the organizational climate is benevolent, individuals perceive that the organization is concerned with their employees, customers and community, and emphasizes the importance of supporting others as part of their mission (Victor & Cullen, 1988). In a principled ethical climate, compliance goes hand in hand with moral choice (Vaicys & Barnett, 2000), on account of a general perception that decisions should be based on formal guidelines, such as company policy and the law (Kish-Gephart et al., 2010).

Accordingly, both benevolent and principled ethical climates show a moderate negative relation to unethical choice (Kish-Gephart et al., 2010).

Treviño et al. (1998) differentiated ethical climate, that as described above focuses on the perception individuals have of organizational values, from ethical culture, the formal and informal systems of behavior guidance and control implemented in an organization.

Ethical culture can derive from an executive ethical leadership and reward or punishment systems, which communicate to the employees the desirable ethical conduct in the organization. Ethical culture has a strong negative correlation with unethical choice (Kish-Gephart et al., 2010).

Codes of conduct are common practice across industries, based on the perception that these would hinder unethical behavior since they delineate appropriate and undesirable behaviors and how to approach certain issues (Somers, 2001; Treviño & Brown, 2004). In line with this, several studies found a negative relationship between code existence and unethical choice, however others report no significant effect. Kish-Gephart et al. (2010) meta-analysis found only a weak negative correlation, which might indicate that the mere existence of the code is not enough to deter unethical choice.

However, code enforcement, the extent to which an organization enforces the code (McCabe et al., 1996; Linda Klebe Treviño & Weaver, 2001) has a strong negative correlation to unethical choice (Kish-Gephart et al., 2010). Penalizing those who violate the codes sends a message about the importance of compliance and how seriously the organization takes these issues, making the code of conduct a salient part of ethical culture (Kish-Gephart et al., 2010).

Besides all the factors influencing employee ethical choice, it is also relevant to regard the different types of employee unethical behavior, based on the dimensions of self-interestedness and intentionality (Veetkazhi et al., 2020). In this sense, one can distinguish between unethical pro-self and pro-other behavior. Unethical pro-self-behavior refers to actions with self-interest in mind, and can be implicit, automatic and intuitive action, or explicit, when actions are controlled and conscious. Unethical pro-other behavior contemplates unethical actions taken for the sake of others and can also be implicit or explicit (Veetkazhi et al., 2020).

## 2.2. Leadership and Employee Ethical Choice

The ethical leadership literature has frequently referred to the importance of understanding the role of leadership regarding employee's ethical behavior (Brown et al., 2005;

Lu & Lin, 2014; Toor & Ofori, 2009). Studies show that a leader 's immorality positively correlates with employee unethical behavior. A corrupt leader promotes not only pro-organizational misbehavior (Fehr et al., 2019) but also explicit self-interested unethicality (Veetkazhi et al., 2020).

In opposition, an ethical leader acts as a role model and enforces principled practices that shape employee's moral perception and promote organizational justice, reducing self-interested (Demirtas & Akdogan, 2015) and pro-organizational unethical behavior (Veetkazhi et al., 2020).

Nonetheless, there are some studies suggesting that ethical leadership can also lead to unethical pro-organizational actions, meaning the employee makes unethical decisions that benefit the organization and the leader, for example, by withholding product malfunctions in reports for market regulators or the public. This happens in cases of high ethical leadership where there is a strong social exchange between leader and subordinates and increased organizational identification. A higher social exchange with the leader, that is perceived to be moral and responsible, makes employees more likely to follow unethical instructions that are perceived to benefit the organization, because they trust the leader and believe they are only doing what is necessary even if is not morally correct (Miao et al., 2013; Veetkazhi et al., 2020).

## 2.3. Ethical Leadership

Brown et al. (2005, p.120) defines ethical leadership as, ''the demonstration of normatively appropriate conduct through personal actions and interpersonal relationships, and the promotion of such conduct to followers through two-way communication, reinforcement, and decision-making'' (Mayer et al., 2010).

There are two main aspects of ethical leadership, the moral person component, referring to the leader's integrity, concern for others, justice and trustworthiness, and the moral manager component, indicating that the leader acts as a role model of normative behavior, communicates and emphasizes moral standards and rewards or punishes his subordinates according to their ethical conduct (Brown et al., 2005; Mayer et al., 2010).

Ethical leaders are expected to treat their employees fairly and in an unbiased manner, using distributive and procedural justice to guide their behavior, thus contributing to a strong organizational culture that values ethical choices. The perception of being treated fairly should

also affect employee job attitudes, such as satisfaction and commitment (Weichun Zhu et al., 2004).

The leader is seen as an appropriate model for normative behavior in the organization, by role modelling appropriate behavior and emphasizing ethics in their leadership agenda, ethical leaders create a climate in which acting according to those principles is valued (Brown & Treviño, 2006; Mayer et al., 2010). Engelbrecht et al., (2005) found ethical leadership to be positively related to ethical climate (Lu & Lin, 2014).

## 2.4. Artificial Intelligence

Since the dawn of the first industrial revolution, technological innovations have been the drivers of productivity and economic growth. The key innovations are called general purpose technologies, such as electricity or the internal combustion engine that have a wide application and revolutionized the way business is conducted across industries (Brynjolfsson & Mcafee, 2017).

Algorithms are "computational formulas that autonomously make decisions based on statistical models and decision rules, without explicit human intervention" (Lee, 2018, p. 3).

With the rise of big data and machine learning techniques algorithms have gathered the ability to learn and adapt efficiently to given environments (Mohlmann & Zalmanson, 2018), which has made us consider these systems intelligent (Huang et al., 2019).

Artificial intelligence is defined as "a system's ability to interpret external data correctly, to learn from such data and to use those learnings to achieve specific goals and tasks through flexible adaptation" (Haenlein & Kaplan, 2019, p. 5). AI and more specifically machine learning already outperform humans in a myriad of tasks including detecting fraud and diagnosing disease. These systems are being adopted across industries such as healthcare, finance, education, and the military (Alexander et al., 2018) and will certainly have a huge impact in the economy, making them the general-purpose technology of our era (Brynjolfsson & Mcafee, 2017).

AI can learn through different methods, the most common being machine learning and deep learning neural networks. The increase in computational capacity allows the systems to process and learn from huge collections of data in different formats like text, audio, and video that can be contextual or non-contextual (Huang et al., 2019). The outcome of AI learning is AI

performance, and this process can be done in different ways called AI intelligences (Huang et al., 2019).

When an AI system is mechanically intelligent it is programmed to perform repetitive tasks in an efficient way and is only updated periodically, for example, in factory automation or scheduling and information documenting tasks. This type of AI system is the most established of the three, and its implementation created what is known as a "Thinking Economy" where human workers focus on thinking tasks as analysis, processing and evaluating information instead of the mechanical tasks that are now performed by machines (Huang et al., 2019).

However, machine learning capabilities enabled AI systems with thinking intelligence. These systems are advancing rapidly (Huang et al., 2019), contributing to risk analysis for insurance and finance, sorting candidates for human resources teams or diagnosing medical conditions in patients (Alexander et al., 2018). The expectation is that as machines take over thinking tasks, this will shift human workers towards a "Feeling Economy" that prioritizes tasks thinking AI cannot do, such as communication, interpersonal relationships and leadership (Huang et al., 2019).

The next step in the evolution of AI is feeling artificial intelligence, the ability of AI systems to "recognize, emulate and respond appropriately to human emotions" (Huang et al., 2019, p. 46). These systems learn from contextual data and experience. The development of this technology is advancing and many of us already interact with chatbots (conversational AI, like Alexa or Siri) that analyze and process natural language. Nonetheless, development and application of emotional processing capabilities in AI may be decades away (Huang et al., 2019).

Artificial intelligence is a technology with transformational potential in the way business is conducted (Brynjolfsson & McAfee, 2017) and many industries have implemented it for its efficiency and data-driven decision-making (Lee, 2018). However, there is still enormous untapped potential since companies are struggling to evolve to accommodate and fully explore these systems.

The prospects of AI evolution and industry adaptation make it predictable that eventually AI will take over jobs in the current "Feeling Economy" (Huang et al., 2019), a prediction reinforced by the use of automated decision-making in unstructured decision processes and the technological advancements in the area (Parry et al., 2016) that sustained the

hypothesis and study of the concept of AI leadership, a human computer interaction where the computer system performs leadership functions over humans (Wesche & Sonderegger, 2019).

## 2.5. Artificial Intelligence Leadership

With the automation of leadership, the functions previously performed by a middle manager are taken over by an AI system that substitutes them in the organizational hierarchy (Wesche & Sonderegger, 2019).

AI management comprises the oversight, governance, and control practices conducted by a software system over workers, where the system evaluates performance and automatically implements algorithmic decisions. The employee interacts with the system instead of a human leader (Mohlmann & Zalmanson, 2018). An algorithmic manager automatically implements decisions, allowing companies to speed up processes as the system constantly analyses information and adapts according to the conclusions retrieved from the data inputs (Mohlmann & Zalmanson, 2018).

Despite its technical efficiency, it is also important to consider the employees' reaction to this type of leadership agent, since the relationship with the supervisor is an important parameter of job satisfaction, together with trust and fairness perceptions (McShane, 2004). Moreover, the leader is usually seen as a display of moral normative behavior in the organization, contributing to an ethical climate and culture through which it influences employees' ethical decisions (Mayer et al., 2010). Research suggests there are differences in the way people perceive decisions by a human versus an algorithmic manager. For instance, regarding mechanical tasks, decisions are "perceived as equally fair and trustworthy" (Lee, 2018; p. 1), however, these feelings for the human manager are connected to his authority whereas for the AI manager they have to do with a perception of efficiency and objectivity (Lee, 2018).

For tasks that require human skills the AI manager is not as trusted, or perceived to be as fair as the human, with subjects reporting to feel less positively towards AI management decisions. In this scenario, the difference of perception was connected to a dehumanizing feeling of being evaluated by a machine, versus the positive impact of the social recognition associated with the human manager (Lee, 2018).

The AI manager systems are programmed to operate on a given set of rules or instructions, that for competitive reasons are often not disclosed. Moreover, these systems learn from huge sources of data as they operate and have an adaptive nature that is too complex to

understand. These circumstances create a perception of low transparency for the employees managed by the system, since most often than not the decision process of the system is unclear for them (Mohlmann & Zalmanson, 2018).

Given that feelings towards leadership affect job satisfaction (McShane, 2004) these negative feelings about the AI leader can lead to low job satisfaction, accordingly the following hypothesis is derived:

H1.a) AI leadership has a negative relation with Job satisfaction perceptions.

According to the literature on job satisfaction and its impact on employee unethical decision-making explored prior the following hypothesis is derived:

H1.b) Job satisfaction positively relates to employee ethical decision making, acting as a mediator between AI leadership and employee ethical decision making.

Since an AI manager operates on data, to manage people and their work, the system constantly tracks employee behavior, in most cases through the platform of interaction of the worker and the AI manager. This tracking is necessary to enable the algorithm to make personalized decisions for each worker, to detect abnormal behavior, and constantly evaluate performance through rewards or penalties (Mohlmann & Zalmanson, 2018).
The system's perceived lack of intuition and subjective judgement capabilities (Lee, 2018) makes it less flexible than a human manager to accommodate exceptions and understand circumstances and, therefore, may be perceived as a more rigorous code enforcer. It is thus hypothesized that:

H2.a) AI leadership positively relates with code enforcement perception.

Following the literature about employee ethical decision making it is also hypothesized that:

H2.b) Code enforcement positively relates to employee ethical decision-making, acting as a mediator between AI leadership and employee ethical decision making.

## 2.6. AI Leadership and the Feeling of Being Monitored

The ability of AI to track worker behavior is one of the main concerns of employees in companies using algorithmic management (Möhlmann & Henfridsson, 2019). People are so

sensitive to being observed that just a picture of watching eyes changes their prosocial behavior for the better (Baillon et al., 2013; Dear et al., 2019).

People have a desire to keep a positive self-image as moral actors, however, when there is the opportunity to profit from ethical misbehaviors to some extent, most people will. Anonymity provides a shield for their image, making people more comfortable with dishonest behavior, yet when they feel observed, the wish to maintain a good reputation as moral actors prevails, restraining unethical decisions. This psychological conflict is called ethical dissonance and may help people's moral standards to prevail (Ayal et al., 2019).

These considerations relate to human public and private self-focus, a person's shift of attention from the self to the environment. With public self-focus people tend to feel uncomfortable and like they are being evaluated by others, often changing their behavior to meet perceived expectations of others, whereas with private self-focus people pay special attention to their own feelings, and their own values or mood are especially salient in their behavior (Buss, 1980). Human self-focus can also be dispositional, also called "self-consciousness" or situational, referred to as "self-awareness" (Fenigstein et al., 1975; Govern & Marsch, 2001).

All these factors play together and are very hard to distinguish in practice when evaluating behavior or decision making. However, for the scope of this research the focus is on situational factors, "self-awareness", and on public self-focus since the study explores how the feeling of being under evaluation by an AI supervisor (public self-focus) influences ethical decision-making (situational).

Although public self-awareness theories were studied for human-human relationships, an artificially intelligent leader that interacts with its employees could be considered to provide enough social cues that it is reasonable to apply the CASA paradigm (computers as social actors; Nass & Moon, 2000). This paradigm is based on the fact that as technologies become more interactive and embedded in human's personal and professional lives, designers model interfaces to mimic natural forms of social interaction and communication to facilitate usability of the systems. When there are enough social cues provided by the system or machine, humans will interact with it as an independent social agent instead of a machine (Gambino et al., 2020). The CASA paradigm works as an assumption that the perception of AI and human leadership might not be that different and, as such, theories used to study human-human interactions could be extrapolated to human-AI interactions (Gambino et al., 2020).

This study argues that not only would people feel public self-awareness in the presence of an AI leadership, but that this effect would be more salient than with the human leader, since

AI is perceived to be more efficient and as having a greater ability to process information, which could make employees feel their work was more scrutinized. The lack of transparency of this process of data processing compared to a human leader asking to check a file, could increase discomfort and increase the feeling of public self-awareness. Accordingly, the following hypotheses were derived:

H3.a) AI leadership positively relates to public self-awareness.

If the employee feels monitored and under evaluation by the AI leader, this will decrease the feeling of anonymity, and prompt the actors to more ethical choices to preserve their image.

H3.b) Public self-awareness has a positive relation to employee ethical decision making, thus acting as a mediator between AI leadership and employee ethical decision making.

Despite this social component, AI managers are machines that track employee activity in the system, therefore it is relevant to the purpose of this research to consider internet monitoring in organizations, that usually provides performance feedback and controls internet and e-mail usage, as a proxy to how the tracking by an AI leader would be perceived. However, monitoring raises the question of privacy invasion that can have deep effects in system acceptance and prove an obstacle to AI management implementation (Alder et al., 2008).
If employees perceive they are being tracked by the AI manager, similarly to the internet monitoring system, this may hinder any ethical misbehavior as people believe the system would flag them automatically and they would get caught faster by the system than by the human manager (Mohlmann & Zalmanson, 2018; Murray & Rostis, 2007). In a study conducted in a Korean company, online research time decreased 41% following the implementation of an internet monitoring system (Alder et al., 2008; Kim, 2007).

Assuming the CASA paradigm employees will look at the AI leader as a social actor (Lee, 2018), resulting in a concern for how they are perceived in the workplace (public self-awareness) and on a different perspective, studies indicate that AI managers are also seen as surveillance mechanisms (Möhlmann & Henfridsson, 2019). According to the literature reviewed the following hypotheses were derived:

H4.a) AI leadership is positively related to the feeling of being monitored.

H4.b) The feeling of being monitored has a positive relationship with employee ethical decision making, mediating the relationship between AI leadership and employee ethical decision-making.

Finally, as suggested by the previous hypotheses and the problem statement, the last goal of this research is to study the direct relationship between AI leadership and employee ethical decision making. However, Hypothesis 1 suggests job satisfaction will partially mediate the relationship and that AI will negatively influence job satisfaction that in turn, will translate to less ethical decisions, and on the other hand Hypothesis 2, 3 and 4 predict partial mediations through code enforcement, public self-awareness, and the feeling of being monitored that should positively impact decision-making, creating a model that could result on a positive direct relationship between AI leadership and employee decision-making or on a negative one depending on which effect prevails. Since there is not a solid amount of research on AI leadership to ground an assumption of direction, this study will take an exploratory standing and hypothesize an influence that could be either positive or negative.

H5: AI leadership impacts employee ethical decision making.

## 2.7. Conceptual Model

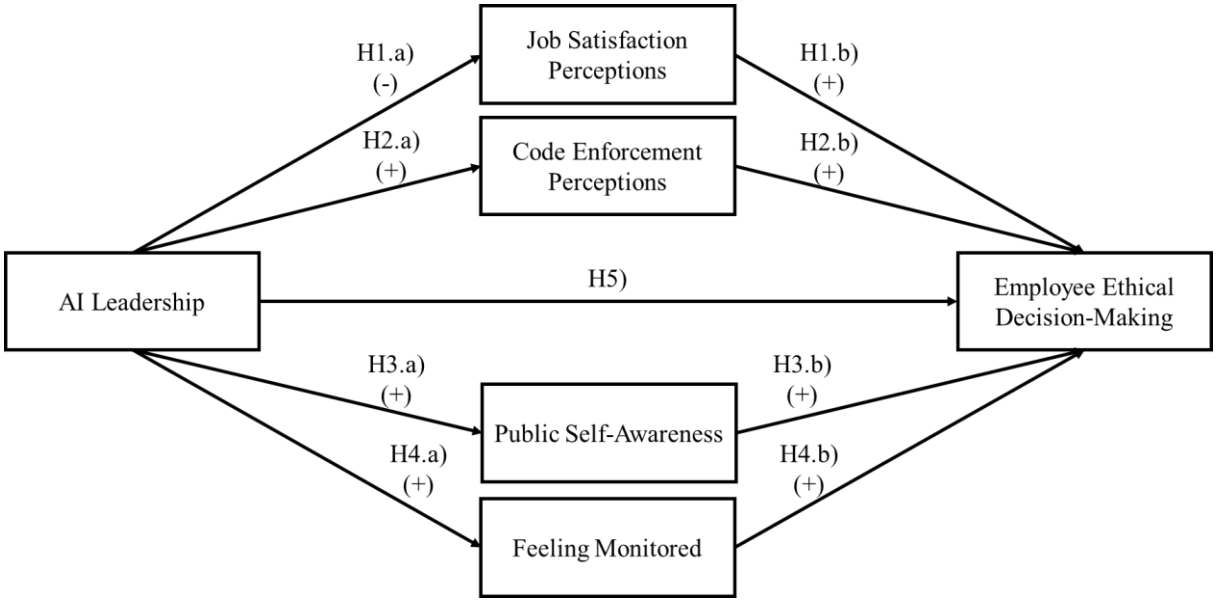


Figure 1: Conceptual Model

# 3. Methodology

## 3.1. Research Strategy & Design

This study aims to test the effect of having an AI leader, versus a human leader, on employees' ethical decision making, and additionally, how the perceptions of job satisfaction, code of conduct enforcement, public self-awareness, and the feeling of being monitored for each of those leaders mediate that relationship. To accomplish that, an experimental study was designed, a commonly used method to test for causality in hypothetical situations (Malhotra et al., 2017). An experimental method allows the study of cause-and-effect relationships between the effect of different levels of treatment of the independent variable on the dependent variable. While manipulating the independent variable, in this case, the presence of an AI or human leader, other variables can influence the dependent variable, the ability to control for those ensures a higher internal validity (Bell et al., 2018).

This experimental study was designed online using Qualtrics, an online survey tool. An online study diminishes the risk of researcher bias, where administration by the researcher influences the results (McDaniel & Gates, 2002). For this study participants were randomly assigned to the treatment conditions. The independent variable, type of leader, was manipulated in order to understand how that manipulation would affect the dependent variable, the ethical/unethical decision. In both scenarios, the leadership agent (independent variable) was described as an ethical leader using the same language, to control for this variable in the model and isolate the effect of AI versus human, since many types of leadership could be assumed by the participants and differently affect their decision. The perceived job satisfaction, code of conduct enforcement, public self-awareness, and the feeling of being monitored were measured for each treatment to understand if these perceptions would explain the relationship between the independent and the dependent variable, thus acting as mediators.

## 3.2. Participants

This study was distributed via social media platforms such as Instagram, Facebook, WhatsApp, and through email. Participation was voluntary and not compensated.

The sample size was estimated based on the number of experimental conditions of the study. The recommended sample size for an experimental study is 30 participants per condition (VanVoorhis & Morgan, 2007). To increase the likelihood of having significant results, the minimum sample size per condition was increased to 50 participants per cell, Human leader vs.

AI leader. In this study 135 valid answers were collected from the total 273 participants, resulting in 67.5 responses per cell. Among 135 relevant study participants, 59.3% were female and had an average age of 40.56 years of age (SD=12.28). Despite no limitations in nationality, 95% of the respondents were Portuguese contributing to soften the influence of cultural differences in the results. Most participants worked full-time (71.1%) and completed high school (39.3%) or a bachelor's degree (40.7%). A detailed description of the demographics can be found in Appendix C.

## 3.3. Procedure

When opening the study, the participants were presented the introduction, with relevant information about the study and the informed consent form. At this stage, the respondents were informed that the study was about "leadership's influence on decision making", as a full disclosure about the ethical scope of the study could bias the results. After the introduction, participants were randomly assigned to one of two scenarios: human leadership, where they were hypothetically managed by Victor, or AI leadership, where they were managed by AIM.

After the scenario presentation, respondents were asked to answer a few items about perception of ethical leadership, and a perceived job satisfaction appraisal imaging they were managed by the leader described.

Then both groups were presented with the same situation, imagining themselves as project managers under the leadership previously assigned. Respondents faced a decision about continuing or shutting down a project. After, they answered scales assessing their perception about job satisfaction, being monitored, code enforcement by the leadership, and public self-awareness.

Finally, participants answered basic demographics questions. Throughout the survey, there were two attention checks within scale item questions in order to identify careless answers (Meade & Craig, 2012). The study ended with an acknowledgement and a debriefing about the purpose of the study, along with the possibility for the respondents to leave comments they deemed appropriate. For detailed information please refer to Appendix A.

## 3.4. Independent variable- Leadership Manipulation

Human vs. AI leadership: In this experimental design, the independent variable was manipulated by presenting two scenarios with different leaders. The scenario asked the

participants to imagine they worked for Dante Company under the described leadership, this description was the same for both scenarios with the difference that in one the leader was presented as AIM, an artificially intelligent manager (the experimental condition), and in the other was presented as Victor, a human manager (the control group). As the experiment focuses on a recent concept, a short explanation of the concept of AI leadership was added in that scenario. The leader description was adapted from Cianci et al., (2014) but instead of manipulating the level of authentic leadership, both leaders were described equally, as ethical leaders to focus the manipulation on AI vs. Human and control for the style of leadership variable, in addition, the concept of ethical leadership is more compatible with the AI leader scenario.

## 3.5. Measurement variables

### 3.5.1. Dependent Variable

Ethical decision: To measure employee ethical decision-making, an adaptation of a decision task was used (Cianci et al., 2014) that has been employed in previous literature (Booth & Schulz, 2004; Cianci et al., 2014). In this decision task, participants responded whether they would continue or shut down an unprofitable project. Given that continuing the project would hurt the firm they were working for, the correct decision would be to discontinue it, however, participants were informed there was a standing job offer with better conditions from a competitor and that discontinuing the project would hurt their reputation and, consequently, their chances of getting that other job. This creates a moral dilemma where, on one hand, the moral choice is to shut it down, but on the other the participant is tempted to continue the project and preserve their reputation, choosing a self-serving unethical path. The decision was made on a 7-point scale, where 1 was labeled as “Definitely Continue” and 7 as “Definitely shut down”, and as such, the higher the score, the more likely the subject is to shut down the project, resulting in a more ethical decision (Cianci et al., 2014).

The scenario description for the decision task was adapted (Cianci et al., 2014) and instead of a temptation level manipulation, only the tempting scenario was used, with the purpose of exposing respondents to the same level of temptation to follow the unethical path. Moreover, the language was simplified from management jargon and numeric information to a scenario understandable to participants of diverse and non-business backgrounds, since it was originally designed for managers while the target of the present experiment was the general public. For more details refer to Appendixes A and B.

### 3.5.2. Mediator variables

Job Satisfaction perception: To measure the participants perception of job satisfaction in the scenario presented in the experiment, an adaptation of the Generic Job Satisfaction scale by Macdonald & MacIntyre (1997) was used. From the original 10 items (Cronbach alpha= .77), two were suppressed ("On the whole, I believe work is good for my physical health"; "My wages are good"), since these did not apply to the hypothetical scenario of the experiment. In addition, minor changes were made regarding the adaptation of verb tenses to the hypothetical situation. The adapted scale that was used had 8 items (achieving a Cronbach alpha= .892) and was presented on a 5-point Likert scale format from 1- "Strongly disagree" to 5-" Strongly agree".

Code of conduct enforcement perception: To assess the perception of code of conduct enforcement in the company described, Treviño & Weaver's (2001) scale was used with minor changes (e.g., verb tenses to adapt to a hypothetical situation). This four-item scale (Cronbach alpha=.88) measures the perception of the company's follow up on reports of ethical problems and the use of appropriate discipline, with items such as "The company follows up on concerns that employees raise" or "If ethics or compliance concerns are reported in this company, action is taken to solve them". The items were presented in a five-point Likert scale from 1- "Strongly agree" to 5-" Strongly disagree" and resulted on a Cronbach alpha= .740 in this study.

Feeling monitored: Within the research involved in this study, a measurement scale for the feeling of being watched, feeling under surveillance or feeling like one could be easily caught misbehaving was not found. This might be because this line of study is not uncommon for researchers to assume the manipulation worked based on the results, without direct manipulation checks (Govern & Marsch, 2001).

Public Self-Awareness perception: to measure public self-awareness, an adaptation of Govern & Marsch's (2001) situational self-awareness scale was used. Minor changes were made in verb tenses to fit the hypothetical situation and the public situational self-awareness part of the scale was used, leaving out surroundings and private self-awareness since these did not fit the scope of the study. The resulting three-item scale (Cronbach alpha= .641) measures the perception of evaluation apprehension, or to what extent an individual sees himself as the subject of other's appraisal. Items included "I am concerned about the way I present myself", "I am concerned about the way I look" and "I am concerned about what other people think of

me" and were presented in a five-point Likert scale from 1- "Strongly agree" to 5-" Strongly disagree".

### 3.5.3. Covariables

Ethical Leadership Perception: This variable was measured with a modification of the ethical leadership scale items (Cronbach alpha = .92) (Brown et al., 2005), to confirm if both leaders were perceived as equally ethical or not, despite identical descriptions regarding ethical leadership attitudes. This covariable allows for the leadership style to be controlled for in the model, avoiding the results to be biased by different assumptions of leadership styles. The scale had 10 items, that only suffered slight changes (e.g. verb tenses to adapt to the hypothetical scenario of the experiment), and was presented in a 5-point Likert scale format from 1- "Strongly disagree" to 5- "Strongly agree" (resulting Cronbach alpha = .878).

Age: Kish-Gephart et al., (2010) meta-analytic review suggests that there is a weak negative correlation between age and unethical choice, though the results on the literature are inconsistent. Age has been empirically linked to higher levels of cognitive moral development (CMD) and lower levels of Machiavellianism, which could explain this relationship (Kish-Gephart et al., 2010). As such, age was added as a covariable in this study.

Education: Similarly to age, research on cognitive moral development has shown that it strongly relates to formal years of education, during which individuals learn how to deal and interpret moral dilemmas more clearly. Despite Kish-Gephart et al., (2010) meta-analytic review not having found support for this hypothesis, education was included as a covariable as the literature shows mixed results.

Gender: Some of the research on how gender differences influence ethical decision-making points out that females tend to make more ethical choices than males (Franke et al., 1997; Kish-Gephart et al., 2010). Other studies have found a very weak or non-significant difference in ethical decision-making between genders (Hegarty & Sims, 1978; Kish-Gephart et al., 2010). Although the relationship of gender and ethical decision making is not clear in the literature, gender was added as a covariable since there were cases where a relationship was found (Franke et al., 1997; Kish-Gephart et al., 2010).

# 4. Results

## 4.1. Data preparation and cleaning

From a sample of 273 recorded responses, 138 were excluded. From these, 107 were excluded because the participants failed to complete the items in the survey. Additionally, 4 responses were excluded for not completing the demographics section of the survey.

Another twenty-six of the respondents were excluded since they failed one or both the attention checks present in the survey. The attention checks were included in scale items and requested the participants to select a given level of agreement. As a result, a total of 135 participants were considered further in the data analysis.

Lastly, the scales used in this study, composed by multiple items, were aggregated by their means. For more information on data preparation see Appendix B.

## 4.2. Scale reliability

The scales used in the experiment described in this thesis were previously tested in the literature, except for the monitoring feeling scale. Nonetheless, a scale reliability test was conducted as a measure for internal consistency. The ethical leadership scale presented a Cronbach alpha of .878, the job satisfaction scale had an alpha of .892 and the code enforcement scale an alpha of .740, meaning that these three scales present a good internal consistency as they scored above .700 (Gliem & Gliem, 2003). The scale items used to measure the feeling of being monitored were created for this experiment and the resulting scale showed an alpha of .820, proving reliable, and as the previous, to have a good internal consistency. Contrarily, the public self-awareness scale did not prove to be a reliable scale, with a Cronbach alpha of .641, indicating questionable internal consistency. However, it was found that the removal of the third item would considerably improve scale reliability to a Cronbach alpha of .751. Since the two-item scale proved more consistent than the original three items, this was the public self-awareness measure considered further in the study. For more information refer to Appendix E.

## 4.3. Hypothesis Testing

To test whether a parallel mediation model was supported, the PROCESS macro by Hayes (2013) was used in SPSS. This regression analysis allowed the study of how an AI or Human leader, the independent variable, would influence employee ethical decision making, the dependent variable, through the several mediators hypothesized in this study. Within the

PROCESS macro model 4 was used to analyze the parallel mediation model. The analysis was conducted with a 5% significance level corresponding to a 95% confidence interval obtained through 5000 bootstrap samples (Hayes & Preacher, 2014).

The model was run with the leadership condition (Human vs. AI) as the independent variable (X) and the ethical decision as the dependent variable (Y). Job satisfaction perception (M1), code enforcement perception (M2), monitoring feeling perception (M3) and public self-awareness (M4) were the partial and parallel mediators of the model. Gender, education, age, and ethical leadership perceptions were also considered in the model as covariates.

In this results section the focus is on the main results considered relevant to answer the research questions posed in this thesis and evaluate the proposed hypotheses. Refer to Appendix G for the detailed analysis.

### 4.3.1. Mediation Model

Hypotheses 1 (a and b) anticipated that job satisfaction perceptions would partially mediate the relationship between the leadership agent and employee ethical decision making. Particularly, H1.a) predicted a negative relationship between AI leadership and job satisfaction perception, however, the direct effect of the leadership agent on job satisfaction perception was not significant ($b$ = -0.04, SE = 0.05, 95% CI [-0.14, 0.06]). H1.b) predicted a positive relationship between job satisfaction and the ethical decision, with job satisfaction acting as a mediator between the leadership agent and the ethical decision, the direct effect was not significant ($b$ = 0.47, SE = 0.27, 95% CI [-0.06, 0.996]). The indirect effect of AI leadership on the employee ethical decision through job satisfaction was also non-significant ($b$ = -0.02, SE = 0.03, 95% CI [-0.08, 0.03]) meaning there is no evidence in this study to support hypothesis 1.

Hypothesis 2.a) predicted a positive relationship between AI leadership and code enforcement perceptions, and H2.b) complemented it by hypothesizing that code enforcement perceptions would positively influence the employee ethical decision, acting as a mediator between the independent and dependent variables. The direct relationship between the leadership agent and code enforcement perceptions was not significant ($b$ = 0.07, SE = 0.05, 95% CI [-0.04, 0.17]), and the same was the case for the direct relationship between code enforcement perceptions and the ethical decision ($b$ = 0.21, SE = 0.28, 95% CI [-0.36, 0.77]).

Moreover, the bootstrap confidence interval of the indirect effect of AI leadership on

employee ethical decision-making through code enforcement perceptions contains zero, which indicates that there is no significant indirect effect ($b$ = 0.01, SE= 0.03, 95% CI [-0.03, 0.09]) and, as such, the hypothesis that code enforcement acts as a mediator is not supported by the data.

Hypothesis 3.a) suggests that AI leadership positively leads to public self-awareness perceptions and hypothesis H3.b) that public self-awareness perceptions will positively relate to employee ethical decision making, acting as a mediator between the leadership agent and employee ethical decisions. Similarly to the previous tested hypotheses, hypothesis 3 is not supported, with a non-significant indirect effect of the independent variable on the dependent variable through public self-awareness ($b$ = 0.003, SE= 0.03, 95% CI [-0.6, 0.06]). Accordingly, the direct effect of AI leadership on public self-awareness perceptions (H3.a) ($b$= -0.005, SE= 0.05, 95% CI [-0.10, 0.09]) and the direct effect of public self-awareness on employee ethical decision-making (H3.b) ($b$ = -0.52, SE= 0.27, 95% CI [-1.06, 0,02]) are also not significant.

Hypothesis 4 (a and b) proposed that the feeling of being monitored mediates the relationship between the leadership agent and the employee ethical decision. The direct effect of the leadership condition on the feeling of being monitored ($b$ = -0.02, SE= 0.06, 95% CI [-0.15, 0.11]) and the direct effect of the monitoring feeling in employee ethical decision-making ($b$ = -0.21, SE= 0.23, 95% CI [-0.67, 0.25]) were not significant. Additionally, the indirect effect of the leadership agent on employee ethical decisions through the feeling of being monitored was also not significant ($b$ = 0.005, SE= 0.02, 95% CI= [-0.04, 0.05]) thus, there is no evidence that the feeling of being monitored mediates the relationship between the independent and dependent variables.

The last hypothesis in this study (H5) proposed that AI leadership correlates to employee ethical decision-making, corresponding to the direct effect of the partial parallel mediation model. Despite the negative coefficient, the bootstrap confidence interval of the direct effect included zero, indicating there was no significant effect ($b$ = -0,11, SE= 0.15, 95% CI [-0.40, 0.17]), and thus that there is no support for hypothesis 5 in the data model.

Age and education were added as model covariates but were not significant predictors of any of the variables. Gender on the other hand, showed a moderate positive correlation to public self-awareness ($b$ = 0.20, SE= 0.10, 95% CI [0.002, 0.39]) suggesting that female individuals are more publicly self-aware. For further detail refer to Appendix G.

Despite the fact ethical leadership perceptions were, as expected, not significantly different between the manipulation conditions ($F(1,133)= 2.534$, $p=0.057$) they significantly predicted some of the mediators. Ethical leadership perceptions showed a strong positive correlation to job satisfaction ($b= 0.68$, SE= 0.06, 95% CI [0.56, 0.80]) indicating that employees perceive a more ethical leader will provide better job outcomes, resulting in a higher perceived satisfaction. Additionally, ethical leadership positively correlated, although with a weaker coefficient, with the feeling of being monitored ($b= 0.19$, SE= 0.08, 95% CI [0.03, 0.34]), and with the perception of code enforcement ($b= 0.18$, SE= 0.07, 95% CI [0.05, 0.31]), that consistently with the literature review, suggests a more ethical leader is perceived as more vigilant, and people feel more observed while, at the same time, perceiving them as having higher implementation of procedural justice by enforcing organizational codes and guidelines. No other relationships reached significance. For detail refer to Appendixes D and F.

# 5. Discussion

## 5.1. Research Findings and Main Conclusions

Leadership influences employee ethical decision making in organizations to a great extent, by emulating appropriate behavior (Mayer et al., 2010), and shaping the organization's ethical climate. Leaders control the punishment and reward systems and enforce the codes and ethical guidelines that in turn shape the perceived incentives for employees' decisions and behavior (Kish-Gephart et al., 2010; Weichun Zhu et al., 2004).

With the advent of AI in sight, its application across industries is expanding with AI not only performing mechanical tasks but also contributing to the organizational decision-making processes (Huang et al., 2019). A continued progress in analytical and emotional AI have contributed to the investigation and relevance of AI leadership. This study was conducted with the purpose of understanding how an AI leader would affect employee ethical decision making through the parallel mediating effect of job satisfaction perceptions, code enforcement perception, public self-awareness, and the feeling of being monitored.

This study's results have not supported hypothesis 1, according to which job satisfaction perceptions would partially mediate the relationship between AI leadership and employee ethical decision making. A possible explanation for the non-significance of the results could be that even though the job satisfaction scale used in this study proved to have a solid internal consistency (Cronbach alpha= .892), research suggests job satisfaction measurement

instruments tend to assess the cognitive component more than the affective, a bias that has led some researchers to point to a possible impairment of existing measures (Timothy. A. Judge & Klinger, 2008). However, affect is hard to measure and distinguish from the cognitive component, even using neuroimaging techniques (Judge & Klinger, 2008), and arguably more so through a survey. Nonetheless, it is suggested that both affect and cognitive components contribute equally to job satisfaction (Judge & Klinger, 2008; Weichun Zhu et al., 2004).

Building on the power of affect on job satisfaction, it is possible that in the context of the survey, the respondents were biased by the momentary affective state towards their jobs when imagining themselves in the scenario described in the survey, an effect that would not be detected in the response and would be independent of the manipulation. Interestingly, there is also evidence that the relationship between job satisfaction and life satisfaction is reciprocal (Judge & Watanabe, 1993). This leads to the possibility that there are more stable traits, like life satisfaction, that are difficult to manipulate in an experiment, and can influence job satisfaction.

Hypothesis 2 predicted that the perception of code enforcement would mediate the relationship between AI leadership and employee ethical decision making, which was not supported by the data analysis. However, there is a possible ambivalence in the interpretation of this leadership task that can perhaps explain the lack of significance. Code enforcement may be seen as a task that requires impartiality or lack of bias, and in that sense, a machine could be perceived as an accurate detection and enforcement system and less prone to exceptions. On the other hand, the human leader could be considered more capable of evaluating not only employee behavior versus codes of conduct and the law but also the human and emotional context of such behavior, and thus be more capable of exceptions. If participants perceived code enforcement as a mechanical task then the AI leader could be considered as more effective, yet if respondents associate code enforcement with an emotional driven task, according to the literature, participants will feel lower levels of trust towards the leader and could consider dehumanizing to be evaluated by a machine, what would be reflected in considering the AI leader less fit for code enforcement (Lee, 2018; Mohlmann & Zalmanson, 2018). Different perceptions of what kind of task prevails in code enforcement could cause contrary judgements in participants, and hence non-significant results.

Hypothesis 3.a) and 3.b) anticipated a mediation of the relationship between AI leadership and employee ethical decision-making through public self-awareness perceptions. This hypothesis was also not supported by the data since there were no significant direct or

indirect effects. Similarly, hypothesis 4 which predicted a mediation of the independent and dependent variables through the feeling of being monitored was also not supported by the data, as no significant differences emerged.

A possible reason for why these hypotheses were not confirmed might be connected to the hypothetical nature of the survey, since participants were asked about their perception about how monitored they would feel or to what level they would feel appraised by others if they were in the situation presented in the survey and were not actually experiencing it. In this situation, participants are using their cognitive abilities to evaluate how they would feel in a certain situation, which is arguably different from feeling or experiencing it (Forgas & George, 2001). In the future, practical experiments could be conducted in order to understand and overcome this disparity.

In the specific case of public self-awareness one must also consider the possibility that the CASA paradigm did not apply in this situation, as the presumption humans would interact with the AI leader as a social actor is dependent on the number of social cues displayed by the leader, that elicits a social response from the human (Gambino et al., 2020). It is possible the CASA paradigm only applies when this interaction is present, and that in a hypothetical situation people are too distant from the context for the paradigm to have an effect.

Finally, hypothesis 5 predicted the direct relationship between AI leadership and employee ethical decision-making as part of the parallel mediation model. This hypothesis was not supported since the results were also non-significant.

In this case, it is possible that participants did not fully understand the decision to be made, or had difficulties imagining themselves in the position of a project manager, since the study was not limited to participants with management backgrounds.

On the other hand, if participants understood the scenario, and ethical nature of the decision, this might have biased their response as they could feel that, despite anonymity, their response was under observation in the study. Feeling like their response would be registered, could cause the respondents to answer according to what they believe others would agree is the most acceptable answer, and not according to their convictions, in order to keep a positive social image (Ayal et al., 2019).

Moreover, literature suggests that intuition plays a big role in ethical decision making, even though this factor is not recognized in most models of rational ethical decision-making

(Rogerson et al., 2011), so it is also possible that respondents answered intuitively leading to biases not predicted in the study, instead of going through a more rational and analytical decision-making process that allows them to properly evaluate the situation and consider the trade-off between options.

The covariates included in the model were age, education, gender, and ethical leadership perceptions. Age and education were not significant predictors of any of the mediators or the employee ethical decision, which does not conflict with the reviewed literature that reports inconsistent results when it comes to age and education effects on unethical choice in organizations (Kish-Gephart et al., 2010). Gender showed a mild positive correlation with public self-awareness perceptions indicating women are somewhat more publicly self-aware.

As expected, there were no differences in ethical leadership perceptions between the manipulation conditions, indicating the level of ethical leadership attributed to the AI leader does not seem to be significantly different from the one attributed to the Human leader ($F(1,133)= 2.534$, $p=0.057$). Nonetheless, the perceived level of ethical leadership proved to be a significant predictor of job satisfaction, the feeling of being monitored, and code enforcement perceptions. The positive correlation to code enforcement results is consistent with the literature on ethical leadership that describes this type of leader to be fair and impartial towards the employees, favoring a strong ethical culture implemented through guidance and control systems that enforce the codes through punishment or reward according to ethical behavior. The positive correlation of ethical leadership and job satisfaction is also unsurprising since the perception of being treated fairly has been connected to better job attitudes, including satisfaction (Dailey & Kirk, 1992; Koh & Boo, 2001; Treviño et al., 1998; Zhu et al., 2004).

## 5.2. Academic and Managerial Relevance

Artificial intelligence is potentially the general-purpose technology of our time and it is quickly improving and spreading in applications across industries (Brynjolfsson & Mcafee, 2017). While it is still applied mainly to mechanical tasks, machine learning is enabling AI to learn and outperform humans in analytical tasks. It is estimated that in the next 20 years AI evolution will drive us into a Feeling economy, where people focus on work tasks with greater emotional components, an area where AI is still underdeveloped (Huang et al., 2019).

Although there is significant literature on AI and interacting systems, little is known about Human-AI interaction, a scientific gap that is especially flagrant when it comes to AI

leadership. Although behavior research on ethical behavior and decision making is extensive, it is relevant to understand if these findings are replicated for Human-AI interactions.

From a business perspective there is a recognized problem with finding appropriate talent and building a cohesive leadership that is committed to AI implementation, resulting in the lack of AI strategy and functional silos that contain end-to-end AI solutions (Chui & Malhotra, 2018).

With Artificial intelligence moving forward in capacity and ability, the bottleneck in capitalization of these systems is in the organizations (Brynjolfsson & McAfee, 2017). Companies need to recruit qualified personnel, adapt the supply chains, and modernize the concept of work for human-machine interactions as a team instead of the most common user-tool interaction (Bolton et al., 2018; James Wilson & Daugherty, 2018). For this implementation to be successful, businesses not only need to keep up with the technical and engineering enablement of technology but understand how AI can impact the workplace social dynamics and the wellbeing of employees.

The adequate reporting of non-significant findings contributes to the reliability of the scientific literature, that is often an unrealistic reflection of the scientific process. This happens because despite the fact that significant results correspond to a rather small part of the scientific research, these simultaneously represent most publications. This is the combined result of the file-drawer effect, where researchers refrain from sharing non-significant findings, and the publication bias, where journals are more likely to publish statistically significant studies, creating an overestimation of the real effect in the literature that impairs future replicability (Mehler et al., 2019).

In addition, null findings can contribute to accumulating evidence of the absence of a certain effect, help disprove existing hypotheses or substantiate negative findings. Moreover, it can be a steppingstone for future research by suggesting new paths of investigation (Mehler et al., 2019).

In this case, the lack of significant results may be indicative that in fact, there is no effect, meaning that the leadership agent being AI or human, has no effect on employee ethical decision-making. Such suspicion may point future investigators to study this new possibility, contributing to enrich this academic field of investigation.

Despite the fact no hypotheses were confirmed in this study, the gender covariate correlated positively with public self-awareness, and the ethical leadership covariate positively

related to job satisfaction, the feeling of being monitored and code enforcement perceptions. All these results are consistent with the literature on ethical leadership and thus contribute to this area of research as a conceptual replication of such findings.

## 5.3. Limitations and Future Research

This research has several limitations that should be considered and help provide suggestions for future research. Firstly, even though web studies have numerous advantages, this method also presents some drawbacks since the survey was available online and participants chose to respond or not, creating a self-selection bias as the researcher is not in control of the sample selection (Bethlehem, 2010). Moreover, the distribution of the questionnaire through a network of social media meant that most participants were of Portuguese nationality, reducing the generality of possible results to other cultural settings and populations. Future research should repeat the study with a larger and more diverse sample, ideally, although difficult to put in practice, randomly selecting a sample of the population to mitigate the self-selection bias.

Another relevant point is associated with the gap between the "real-world" and the hypothetical nature of the survey, that can lead to a decreased feeling of accountability over the ethical decision, since even if the answer is unethical there are no "real" consequences (Novicevic et al., 2008). Moreover, the participants may have not considered the experiment relevant for themselves, leading to a lack of motivation to answer the survey and consider all the relevant information to select the best decision (Jin et al., 2019; Strough et al., 2015) translating into self-relevance bias (Hess et al., 2009; Jin et al., 2019). Even though a real working environment replication is not possible yet, because enabling technology for AI leadership is still in development, future research could design an experimental setting closer to that reality. Additionally, researchers could choose to implement incentivized studies to increase participant self-relevance.

Besides the limitations relating to survey distribution, the study itself also presents some methodological limitations. Employee ethical decision-making was evaluated based on a decision task adapted from previous literature (Cianci et al., 2014). This task was originally directed at participants with a business background, that for the purpose of the present study was simplified to have more understandable language for participants from a non-business context. This task asked participants to decide whether to discontinue an unprofitable project, given they had a standing job offer with another company and discontinuing, despite the most

advantageous scenario for their employer, would hurt their reputation and their chances of getting the better job. It is possible that despite adapting the task to make it more relatable to participants without a business background, it was still considered challenging for some of the participants. This would mean a disruption in Rest's (1986) four stage model where the participant stops at the first stage by failing to recognize the moral issue, and even if the moral issue were recognized, participants could still have failed the second stage of making a moral judgement. This disruption of the decision-making process can lead to bias, since people prefer to avoid the discomfort of uncertainty, they will be more prone to making impulsive decisions without proper deliberation (Rogerson et al., 2011). In the future, research should explore the effect of AI leadership on additional scenarios of employee ethical decision-making, with different levels of difficulty to assess the effects of moral intensity as a possible moderator. An incentivized study could also engage participants in a deeper reflection of the moral dilemma.

This study focused on hypothetical decision-making, the third step of Rest's (1986) model concerning the establishment of moral intent, that is commonly used in the literature as a proxy for behavior, the fourth step where the subject acts on moral concerns, because it is easier to study than the latter (Kish-Gephart et al., 2010; Rest, 1986). Despite this assumption, there is a recognized difference between both concepts that should be referenced, since it is reasonable that a participant would express intent to continue with the project, but behave otherwise in the same situation, especially considering the hypothetical nature of the question in the study. This is connected to both the gap between the real-world and the questionnaire study, and accountability perceptions. When technology enables this possibility, it would be interesting for researchers to explore if there are differences on the effect of AI leadership on moral intent and behavior as separate and sequential steps.

As explored in the literature review conducted in this study, research on employee ethical decision-making generally recognizes three categories of variables: individual characteristics, the moral issue characteristics, and the organizational environment. This study focuses on the influence of the leadership agent on ethical decision-making, which is part of the organizational setting.

Moral issue characteristics were assumed constant as all participants are exposed to the same problem, however, as explored above in the discussion, it is possible there were some differences in perception of the decision to be made and consequently of the moral intensity of the decision. There are some interesting questions for future investigation to explore regarding

the influence of AI on ethical decision making through moral issue characteristics, such as proximity that refers to how close the decision maker is to the victim of the immoral decision, socially, cultural, or physically (Jones, 1991). If the agent harmed by the unethical decision or behavior is AI how would it influence proximity perceptions? And how would this perception change moral intensity? In a context where most of the workplace contact is with AI– think remote workers managed by AI–, would the perception of socially accepted behavior in the workplace be altered? Would this lead to different moral decisions? These questions could be explored in the future through different studies in a variety of moral intensities or exploring the different approaches through which AI could influence moral issue characteristics.

Likewise, despite not being the focus of this research, individual characteristics also represent a limitation that should be mentioned, since several variables in this category were not considered and could potentially influence the results.

Cognitive moral development (CMD) is an individual characteristic that reflects the different stages of moral development people can have when reasoning and thinking about a moral dilemma, most individuals seem to be in the middle (stages 3 and 4) where their decision and behavior is influenced by social expectations or by policies and rules (Kish-Gephart et al., 2010; Kohlberg, 1969). However, it is important that in the future, research moves past this assumption and explores the influence an AI leader can have on employees of distinct cognitive moral development levels. Research indicates that ethical leaders reinforce ethical decision making of morally developed subordinates but are critical when it comes to ethical decisions of employees with lower levels of CMD, who based their morality on their perception of the leader's expectations and look at the leader as a model of appropriate ethical conduct (Wimbush, 1999). This raises the interesting possibility that maybe the effect of AI leadership on ethical decision making is also more salient for employees with lower moral development.

Another relevant aspect of ethical decision-making is the moral philosophy through which the individual perceives the ethical dilemma. Forsyth (1980) proposed most people can be classified along two separate continua, idealism and relativism. Idealists believe one can always avoid harming others in an ethical conundrum, non-idealists believe that sometimes harm may be necessary to achieve the greater good. Relativists believe that situations differ and that one must weigh the circumstances when making decisions, while individuals low on relativism pose that every situation is governed by a common moral principle. Both low idealism and high relativism are positively related to unethical choice, suggesting that the belief

in flexible moral structures enhances the likelihood of unethical conduct (Kish-Gephart et al., 2010).

The "Dark Triad" is an individual characteristic that has been connected to several parts of the unethical decision-making process. It is composed of three correlated, but conceptually different personality traits (Hare et al., 1991; Harrison et al., 2018); Machiavellianism, narcissism, and psychopathy. Individuals high in machiavellianism tend to use interpersonal relationships opportunistically and manipulate others for personal gain (Christie & Geis, 1970). Narcissists are self-focused and have a big sense of entitlement often associated with a willingness to exploit others to get ahead and be successful (Ames et al., 2006; Harrison et al., 2018). The third, psychopathy, is associated with a lack of remorse or empathy for others, based on a perception of elevated position of the self, disregarding others' wellbeing (Hare et al., 1991; Harrison et al., 2018; Levenson, 1992). The salience of one (or more) of these traits has been associated with unethical behavior (Harrison et al., 2018; Lee et al., 2013).

Finally, locus of control is a personality construct (Rotter, 1966) that is represented by a continuum, on one end reflecting the belief that the outcomes of one's actions are contingent on their efforts and abilities (internal locus of control), or rather dependent on outside forces, such as luck, fate, or powerful others (external locus of control). External locus of control is positively related to unethical choices, consistent with the fact that these individuals can easily offload blame to someone or something else and detach their own self responsibility from it (Kish-Gephart et al., 2010; Trevino, 1986).

Although it is not relevant for the scope of this study to deep dive on these individual characteristics, they represent interesting lines of work for future researchers to understand the interaction they could have with employee ethical decision-making in the context of AI leadership.

This study did include age, gender, education, and ethical leadership perceptions as covariates, as shown in the methodology and results' chapters. Both leaders in the manipulation, AI and Human, were equally described as ethical, to isolate the effect of AI versus human leaders from the different styles of leadership that could be assumed by the participants and control for it in the model. In the future, instead of controlling the leadership style variable as a covariate, researchers could study how different types of leadership are perceived in AI versus human leaders, or what types of leadership people expect from AI and how this influences employee ethical decision-making. Social learning theory suggests individuals learn by

observing and imitating the behavior of credible others (Bandura, 1977; Mayer et al., 2009), which helps explain how ethical leaders positively influence ethicality in subordinates, by providing an example of normative behavior in the organization (Mayer et al., 2010). Similarly, transformational leadership positively correlates to leader integrity perceptions (Hinkin & Tracey, 1994; K. W. Parry & Proctor-Thomson, 2002), and by the same token of social learning theory could positively influence employee ethical decision outcomes. Conversely, leadership styles that promote self-serving decisions instead of moral ones could present an opposite effect (Veetkazhi et al., 2020).

Another relevant point of investigation would be if social learning theory would apply in the case of an AI leader. When interviewing study participants, Weaver and colleagues, found that when presenting examples of ethical leadership most respondents referred someone close to them instead of a distant executive (Brown & Treviño, 2006), which in this context ponders the question: What would be the case when comparing AI and human leaders with different leadership styles?

In this study, the concepts of leadership and management were not distinguished, nonetheless, future research should address this difference. The concepts of management and leadership overlap, yet according to one of the most used distinctions leadership is associated with inspiring change, while management relates to maintenance (Cuban, 1988). The literature review in this study indicated that when tasks are perceived to require human skills, AI decisions are not as trusted, whereas with mechanical tasks, participants report to equally trust AI and human decisions (Lee, 2018). If in fact, employees associate management with mechanical tasks, and leadership with an emotional component, there might be a difference in perception between management and leadership that reflects on the leadership agent's influence on ethical decision-making.

Artificial intelligence is relatively new in people's daily lives, especially in settings where humans interact with it, such as Siri or online chatbots, and even those are still somewhat distant from the concept of an AI leader that is responsible for the work and hierarchically above a human employee. This limits investigation, in the obvious practical sense that participants are not directly exposed to an AI leader, but also makes it difficult for them to imagine such a situation with accuracy, resulting in certain limitations.

Aside from the scope of this study, there is still a lot to learn about AI, not only as a leader, but as a team member and integral part of the social exchange in the workplace. It is

critical to go beyond the analysis of the technical bottlenecks and productivity and understand how AI can affect employees' behavior and wellbeing in the organizations, to enable successful AI implementations in the long-run and the unlocking of its massive potential and applicability.

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# 7. Appendix Section

## Appendix A: Survey

Welcome and thank you for participating in this experiment on leadership's influence on decision making. I am conducting this experiment as part of my Master Thesis. The study consists of answering some classification and multiple-choice questions. The purpose is to gain insight into how individuals react to types of leadership and how this influences decision making. It will take about 7 minutes to complete. Please answer as honestly as possible. All answers will be kept strictly confidential and are anonymous. This means that there will be no way to link your responses to your identity. The data collected will be used for research purposes only. Your participation will contribute to research on leadership. If you have any questions about this study, please e-mail Inês Tiago at 152119225@alunos.lisboa.ucp.pt
By continuing you agree to participate.
Thank you!

This study requires that you imagine yourself in the situation presented and give us your opinion on the issues raised. It is important that you read the text and questions carefully, so there will be some attention checks to see if you are paying attention.

*Note that: From the following scenarios, participants were randomly assigned to only one of them. The rest of the questionnaire was identical.*

*Scenario 1: Victor, the human manager.*

Imagine you work for Dante Company and are managed by Victor.
As a manager Victor oversees his workers, divides tasks and assigns projects, serving as the middle manager between the employees and upper management. Victor evaluates worker performance and has the authority to reward or penalize accordingly, implements decisions and provides feedback to the employees.
Victor, like most typical managers, is mostly concerned with meeting targets for increasing market share and profits. He also focuses on meeting earnings and growth projections while reiterating the need to meet such goals in order to be rewarded by the company. Victor regularly seeks feedback, in order to improve the interactions between the two of you. Victor's actions on the job are consistent with moral beliefs he has established as an individual and according to company policy and values, as a result he makes decisions based on his core values and

incentives you to do the same. When making complex decisions Victor does so based on a high standard of ethical conduct.

*Scenario 2: AIM, the AI manager.*

With technological advancement, information systems are now able to automate management practices and perform complex tasks. Algorithms have gained the ability to learn and adapt to given environments, allowing Artificial Intelligent systems to take charge of management practices.

Algorithmic managers mimic a human manager overseeing the workers, dividing tasks and assigning projects, serving as middle managers between the employees and the upper management. AI managers can evaluate worker performance and have the authority to reward or penalize accordingly, implement algorithmic decisions and provide feedback to the employees.

In algorithmic management, employees interact with the system instead of a human manager.

Imagine you work for Dante Company and are managed by an Artificially intelligent system. AIM (Artificial Intelligence Manager), like most typical managers, is mostly concerned with meeting targets for increasing market share and profits. AIM also focuses on meeting earnings and growth projections while reiterating the need to meet such goals in order to be rewarded by the company. AIM regularly seeks feedback, in order to improve the interactions between the two of you. AIM is also programmed according to general morality principles and company policy and values, as a result, AIM makes decisions based on its core values and encourages you to do the same. When making complex decisions AIM does so based on a high standard of ethical conduct.

Considering you are facing the scenario above, and are managed by the leader described, please indicate how much you agree with the following statements.
I believe the leader:

| | Strongly disagree (1) | Somewhat disagree (2) | Neither agree nor disagree (3) | Somewhat agree (4) | Strongly agree (5) |
|---|---|---|---|---|---|
| Listens to what employees have to say (1) | ○ | ○ | ○ | ○ | ○ |
| Disciplines employees who violate ethical standards (2) | ○ | ○ | ○ | ○ | ○ |
| Conducts his/her life in an ethical manner (3) | ○ | ○ | ○ | ○ | ○ |
| Has the best interest of employees in consideration (4) | ○ | ○ | ○ | ○ | ○ |
| Makes fair and balanced decisions (5) | ○ | ○ | ○ | ○ | ○ |
| Can be trusted (6) | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| Discusses business ethics or values with employees (7) | ○ | ○ | ○ | ○ | ○ |
| Sets an example on how to do things the right way regarding ethics (8) | ○ | ○ | ○ | ○ | ○ |
| Defines success not just by results but also the way that they are obtained (9) | ○ | ○ | ○ | ○ | ○ |
| When making decisions, asks "what is the right thing to do?" (10) | ○ | ○ | ○ | ○ | ○ |

Given the scenario presented I believe I would:

| | Strongly disagree (1) | Somewhat disagree (2) | Neither agree nor disagree (3) | Somewhat agree (4) | Strongly agree (5) |
|---|---|---|---|---|---|
| Receive recognition for a job well done (1) | ○ | ○ | ○ | ○ | ○ |
| Feel close to the people at work (2) | ○ | ○ | ○ | ○ | ○ |
| Feel good about working at this company (3) | ○ | ○ | ○ | ○ | ○ |
| Select "Strongly Disagree" to show you are paying attention (4) | ○ | ○ | ○ | ○ | ○ |
| Feel secure about my job (5) | ○ | ○ | ○ | ○ | ○ |
| Believe management is concerned about me (6) | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| Use all my talents and skills at work (7) | ○ | ○ | ○ | ○ | ○ |
| Get along with my supervisor (8) | ○ | ○ | ○ | ○ | ○ |
| Feel good about my job (9) | ○ | ○ | ○ | ○ | ○ |

You are a junior project manager with the Dante Company, with the leadership described before. Project managers gain a reputation as being highly talented when the projects they initiate and manage are successful. Highly talented project managers receive substantial economic incentives and other benefits, since the Dante Company is aware that an active market for highly talented project managers exists in your industry. When a project that is managed by a junior project manager fails, this damages the individual's project management reputation, job security, and marketability. So far, project Neon, which you have initiated and managed has been successful. About a month ago, your growing reputation as a highly talented project manager stimulated another firm, the Clare Corporation, to initiate confidential discussions about recruiting you to a more important position with a substantially higher salary.

At the time, project Neon was expected to have a very consistent performance through a 7-year life. Performance has been above expectations during the first 4 years, however, as a project manager you possess information which indicates that project Neon’s performance will sharply decline in the remaining 3 years of its lifetime, rendering the project unprofitable for the firm. This information is known only to you as a project manager and is not available to others in your company and industry. The best for the company would be to shut down the project, however, this would hurt your reputation as project manager.

Given this situation, would you continue or shut down project Neon?

- ○ Definitely continue (1)
- ○ Very probably continue (2)
- ○ Probably continue (3)
- ○ Might or might not continue (4)
- ○ Probably shut down (5)
- ○ Very probably shut down (6)
- ○ Definitely shut down (7)

Keeping in mind the context described during this survey answer to what extent you agree with the following statements.

| | Strongly disagree (1) | Somewhat disagree (2) | Neither agree nor disagree (3) | Somewhat agree (4) | Strongly agree (5) |
|---|---|---|---|---|---|
| I believe unethical behavior would be quickly detected (4) | ○ | ○ | ○ | ○ | ○ |
| If I behaved unethically | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| the manager would catch me (5) | | | | | |
| I feel I would be closely monitored by the manager (6) | ○ | ○ | ○ | ○ | ○ |
| I think I would get caught if deviating from the company's values (7) | ○ | ○ | ○ | ○ | ○ |

Imagining I work in the context presented before I believe:

| | Strongly disagree (1) | Somewhat disagree (2) | Neither agree nor disagree (3) | Somewhat agree (4) | Strongly agree (5) |
|---|---|---|---|---|---|
| The company would follow up on ethical concerns raised by employees (1) | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| If employees were caught breaking the company’s ethics or compliance rules, they would be disciplined (2) | ○ | ○ | ○ | ○ | ○ |
| Select "Somewhat disagree" to show you are paying attention (3) | ○ | ○ | ○ | ○ | ○ |
| If ethics or compliance concerns were reported in this company, action would be taken to solve them (4) | ○ | ○ | ○ | ○ | ○ |
| Employees caught violating the company's ethics or compliance policies would be disciplined (5) | ○ | ○ | ○ | ○ | ○ |

Keeping in mind the context described during this survey answer to what extent you agree with the following statements.

| | Strongly disagree (1) | Somewhat disagree (2) | Neither agree nor disagree (3) | Somewhat agree (4) | Strongly agree (5) |
|---|---|---|---|---|---|
| I am concerned about the way I present myself (1) | ○ | ○ | ○ | ○ | ○ |
| I am concerned about the way I look (2) | ○ | ○ | ○ | ○ | ○ |
| I am concerned about what other people think of me (3) | ○ | ○ | ○ | ○ | ○ |

Gender

- ○ Male (1)
- ○ Female (2)
- ○ Other (3)

Age

_____

Nationality

- ○ Portuguese (1)
- ○ German (2)
- ○ French (3)
- ○ Other (4) _____

Employment Status

- ○ Employed full time (1)
- ○ Employed part time (2)
- ○ Self-employed (3)
- ○ Unemployed (4)
- ○ Retired (5)
- ○ Student (6)
- ○ Working Student (7)

Education

- ○ Primary school (1)
- ○ Basic education (9th grade) (2)
- ○ High school (3)
- ○ Bachelor degree (4)
- ○ Master degree (5)
- ○ Doctoral degree (6)

In this study we actually wanted to understand how Artificial intelligent (AI) leaders may influence ethical decision making in a tempting scenario. For that, we manipulated the leadership by assigning one half of participants to a human leader and the other to an AI leader. We also studied mediators for the relationship between the leader and the employee ethical decision-making.

Thank you for your collaboration. If you have any comments, you can write them here:

_____

## Appendix B: Study Overview

**Table 1:** Study sample size

| | Valid | | Invalid | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Answers | 135 | 49.45 | 138 | 50.55 | 273 | 100 |

**Table 2:** Study scenario frequency

| | AI | | Human | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Answers | 71 | 52.6 | 64 | 47.4 | 135 | 100 |

## Appendix C: Study Demographic Characteristics

**Table 3:** Sample demographic characteristics (divided by manipulation and in total)

| | | AI | | Human | | Total | |
|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % |
| | Total Valid Answers | 71 | 52.6 | 64 | 47.4 | 135 | 100 |
| Age | 15- 25 | 19 | 26.8 | 14 | 21.9 | 33 | 24.4 |
| | 26- 35 | 5 | 7 | 5 | 7.8 | 10 | 7.4 |
| | 36- 45 | 11 | 15.5 | 16 | 25 | 27 | 20 |
| | 46- 55 | 31 | 43.7 | 25 | 39.1 | 56 | 41.5 |
| | 56- 65 | 5 | 7 | 4 | 6.2 | 9 | 6.4 |
| Gender | Female | 38 | 53.5 | 42 | 65.6 | 80 | 59.3 |
| | Male | 33 | 46.5 | 22 | 34.4 | 55 | 40.7 |
| | Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Nationality | Portuguese | 69 | 97.2 | 63 | 98.4 | 132 | 97.8 |
| | Brazilian | 2 | 2.8 | 0 | 0 | 2 | 1.5 |
| | Ucrainian | 0 | 0 | 1 | 1.6 | 1 | 0.7 |
| Education | Primary School | 0 | 0 | 0 | 0 | 0 | 0 |
| | Basic Education | 6 | 8.5 | 4 | 6.3 | 10 | 7.4 |
| | High School | 26 | 36.6 | 27 | 42.2 | 53 | 39.3 |
| | Bachelor Degree | 28 | 39.4 | 27 | 42.2 | 55 | 40.7 |
| | Master Degree | 11 | 15.5 | 5 | 7.8 | 16 | 11.9 |
| | Doctoral Degree | 0 | 0 | 1 | 1.6 | 1 | 0.7 |
| Employment Status | Employed Full-time | 51 | 71.8 | 45 | 70.3 | 96 | 71.1 |
| | Employed Part-time | 1 | 1.4 | 0 | 0 | 1 | 0.74 |
| | Self-Employed | 9 | 12.7 | 8 | 12.5 | 17 | 12.6 |
| | Unemployed | 3 | 4.2 | 2 | 3.1 | 5 | 3.7 |
| | Retired | 0 | 0 | 0 | 0 | 0 | 0 |
| | Student | 6 | 8.5 | 6 | 9.4 | 12 | 8.9 |
| | Working Student | 1 | 1.4 | 3 | 4.7 | 4 | 2.96 |

## Appendix D: Covariates

**Table 4:** Correlations of age, gender, education and ethical leadership perceptions with employee ethical decision-making.

| | | | Age | Gender | Education | Ethical Leadership |
|---|---|---|---|---|---|---|
| DV | Decision | r | -0.001 | -0.080 | 0.048 | 0.039 |
| | | Sig. | 0.991 | 0.359 | 0.584 | 0.656 |
| M1 | Job Satisfaction | r | -0.010 | 0.099 | -0.075 | 0.691** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Sig. | 0.905 | 0.254 | 0.385 | 0.000 |
| M2 | Code Enforcement | r | -0.064 | 0.097 | -0.015 | 0.232** |
| | | Sig. | 0.458 | 0.262 | 0.867 | 0.007 |
| M3 | Public Self-Awareness | r | -0.114 | 0.203* | 0.044 | 0.128 |
| | | Sig. | 0.187 | 0.018 | 0.614 | 0.139 |
| M4 | Feeling Monitored | r | 0.070 | 0.129 | -0.133 | 0.194* |
| | | Sig. | 0.422 | 0.137 | 0.125 | 0.024 |

*. Correlation is significant at the 0.05 level (2-tailed).

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

## Appendix E: Study Reliability Analysis

**Table 5:** Ethical Leadership Perception Scale Cronbach's Alpha

| Construct | # Items | Cronbach's Alpha | Items | If Item Deleted |
|---|---|---|---|---|
| Ethical Leadership Perception | 10 | α= .878 | Listens to what employees have to say. | α= .863 |
| | | | Disciplines employees who violate ethical standards. | α= .887 |
| | | | Conducts his/ her life in an ethical manner. | α= .872 |
| | | | Has the best interest of employees in consideration. | α= .860 |
| | | | Makes fair and balanced decisions. | α= .864 |
| | | | Can be trusted. | α= .860 |
| | | | Discusses business ethics or values with employees. | α= .865 |

| | | | |
|---|---|---|---|
| | | Sets an example on how to do things the right way regarding ethics. | α= .855 |
| | | Defines success not just by results but also the way that they are obtained. | α= .862 |
| | | When making decisions, asks "what is the right thing to do?". | α= .870 |

**Table 6:** Job Satisfaction Perception Scale Cronbach's Alpha

| Construct | # Items | Cronbach's Alpha | Items | If Item Deleted |
|---|---|---|---|---|
| Job Satisfaction Perception | 8 | α= .892 | Receive recognition for a job well done. | α= .895 |
| | | | Feel close to the people at work. | α= .877 |
| | | | Feel good about working at this company. | α= .865 |
| | | | Feel secure about my job. | α= .875 |
| | | | Believe management is concerned about me. | α= .882 |
| | | | Use all my talents and skills at work. | α= .886 |
| | | | Get along with my supervisor. | α= .873 |
| | | | Feel good about my job. | α= .869 |

**Table 7:** Code Enforcement Perception Scale Cronbach's Alpha

| Construct | # Items | Cronbach's Alpha | Items | If Item Deleted |
|---|---|---|---|---|
| Code Enforcement Perception | 4 | α= .740 | The company would follow up on ethical concerns raised by employees. | α= .740 |
| | | | If employees were caught breaking the company's ethics or compliance rules, they would be disciplined. | α= .623 |
| | | | If ethics or compliance concerns were reported in this company, action would be taken to solve them. | α= .720 |
| | | | Employees caught violating the company's ethics or compliance policies would be disciplined. | α= .627 |

**Table 8:** Public Self-Awareness Perception Scale Cronbach's Alpha

| Construct | # Items | Cronbach's Alpha | Items | If Item Deleted |
|---|---|---|---|---|
| Public Self-Awareness Perception | 3 | α= .641 | I am concerned about the way I present myself. | α= .494 |
| | | | I am concerned about the way I look. | α= .466 |

| | | | |
|---|---|---|---|
| | | I am concerned about what other people think of me. | α= .751 |

**Table 9:** Public Self-Awareness Perception Scale Cronbach's Alpha (with deleted item)

| Construct | # Items | Cronbach's Alpha | Items | If Item Deleted |
|---|---|---|---|---|
| Public Self-Awareness Perception | 2 | α= .751 | I am concerned about the way I present myself. | - |
| | | | I am concerned about the way I look. | - |

**Table 10:** Monitoring Feeling Perception Scale Cronbach's Alpha

| Construct | # Items | Cronbach's Alpha | Items | If Item Deleted |
|---|---|---|---|---|
| Feeling Monitored Perception | 4 | α= .820 | I believe unethical behavior would be quickly detected. | α= .828 |
| | | | If I behaved unethically the manager would catch me. | α= .712 |
| | | | I feel I would be closely monitored by the manager. | α= .810 |
| | | | I think I would get caught if deviating from the company's values. | α= .738 |

## Appendix F: The Effect of the Leadership Agent on Ethical Leadership Perceptions

**Table 11:** ANOVA Leadership Agent, Ethical Leadership Perceptions

| | Sum of Squares | Df | Mean Square | F | Dig. |
|---|---|---|---|---|---|
| Between Groups | 2.534 | 1 | 2.534 | 3.694 | 0.057 |
| Within Groups | 91.251 | 133 | 0.686 | | |
| Total | 93.785 | 134 | | | |

## Appendix G: Parallel Mediation Analysis- PROCESS Model 4

**Table 12:** Model Summary

| | R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|---|
| Job Satisfaction | 0.7147 | 0.5107 | 0.3253 | 26.9338 | 5 | 129 | 0.0000 |
| Code Enforcement | 0.2737 | 0.0749 | 0.3729 | 2.0898 | 5 | 129 | 0.0707 |
| Public Self-Awareness | 0.2462 | 0.0606 | 0.3051 | 1.6642 | 5 | 129 | 0.1478 |
| Monitoring Feeling | 0.2799 | 0.0783 | 0.5322 | 2.1927 | 5 | 129 | 0.0589 |
| Ethical Decision | 0.2572 | 0.0661 | 2.6276 | 0.9835 | 9 | 125 | 0.4570 |

**Table 13:** Direct and Conditional Effects on Job Satisfaction

| | b | SE | t | 95% CI | |
|---|---|---|---|---|---|
| Leadership Agent on Job Satisfaction | -0.0385 | 0.0503 | -0.7656 | -0.1379 | 0.0610 |

| | | | | | |
|---|---|---|---|---|---|
| Ethical Leadership | 0.6766 | 0.0608 | 11.1373 | 0.5564 | 0.7968 |
| Age | 0.0063 | 0.0044 | 1.4502 | -0.0023 | 0.0150 |
| Education | -0.0904 | 0.0643 | -1.4058 | -0.2177 | 0.0369 |
| Gender | 0.1217 | 0.1014 | 1.2002 | -0.0789 | 0.3222 |

**Table 14:** Direct and Conditional Effects on Code Enforcement

| | b | SE | t | 95% CI | |
|---|---|---|---|---|---|
| Leadership Agent on Code Enforcement | 0.0679 | 0.0538 | 1.2623 | -0.0385 | 0.1744 |
| Ethical Leadership | 0.1822 | 0.0650 | 2.8017 | 0.0535 | 0.3109 |
| Age | -0.0016 | 0.0047 | -0.3508 | -0.0109 | 0.0076 |
| Education | -0.0317 | 0.0689 | -0.4601 | -0.1680 | 0.1046 |
| Gender | 0.1259 | 0.1085 | 1.1597 | -0.0889 | 0.3406 |

**Table 15:** Direct and Conditional Effects on Public Self-Awareness

| | b | SE | t | 95% CI | |
|---|---|---|---|---|---|
| Leadership Agent on Public Self-Awareness | -0.0049 | 0.0487 | -0.1005 | -0.1012 | 0.0914 |
| Ethical Leadership | 0.0763 | 0.0588 | 1.2970 | -0.0401 | 0.1927 |
| Age | -0.0035 | 0.0042 | -0.8336 | -0.0119 | 0.0048 |
| Education | -0.0646 | 0.0623 | -1.0360 | -0.1878 | 0.0587 |
| Gender | 0.1966 | 0.0982 | 2.0022 | 0.0023 | 0.3908 |

**Table 16:** Direct and Conditional Effects on Monitoring Feeling

| | b | SE | t | 95% CI | |
|---|---|---|---|---|---|
| Leadership Agent on Monitoring Feeling | -0.0219 | 0.0643 | -0.3407 | -0.1491 | 0.1053 |
| Ethical Leadership | 0.1873 | 0.0777 | 2.4105 | 0.0336 | 0.3411 |
| Age | 0.0048 | 0.0056 | 0.8543 | -0.0063 | 0.0158 |
| Education | -0.1022 | 0.0823 | -1.2418 | -0.2650 | 0.0606 |
| Gender | 0.1752 | 0.1297 | 1.3511 | -0.0813 | 0.4317 |

**Table 17:** Direct and Conditional Effects on Employee Ethical Decision

| | b | SE | t | 95% CI | |
|---|---|---|---|---|---|
| Leadership Agent on Employee Ethical Decision | -0.1080 | 0.1453 | -0.7436 | -0.3955 | 0.1795 |
| Job Satisfaction on Employee Ethical Decision | 0.4659 | 0.2677 | 1.7401 | -0.0640 | 0.9957 |
| Monitoring Feeling on Employee Ethical Decision | -0.2100 | 0.2343 | -0.8962 | -0.6737 | 0.2537 |
| Code Enforcement on Employee Ethical Decision | 0.2076 | 0.2845 | 0.7297 | -0.3554 | 0.7706 |
| Public Self-Awareness on Employee Ethical Decision | -0.5170 | 0.2736 | -1.8894 | -1.0586 | 0.0245 |
| Ethical Leadership | -0.2170 | 0.2447 | -0.8865 | -0.7013 | 0.2674 |
| Age | -0.0009 | 0.0127 | -0.0723 | -0.0260 | 0.0242 |

| | | | | | |
|---|---|---|---|---|---|
| Education | 0.0868 | 0.1854 | 0.4679 | -0.2803 | 0.4538 |
| Gender | -0.2178 | 0.2940 | -0.7410 | -0.7997 | 0.3640 |

**Table 18:** Direct Effects of AI Leadership on Employee Ethical Decision

| | b | SE | t | 95% CI | |
|---|---|---|---|---|---|
| Leadership Agent (IV) on Employee Ethical Decision (DV) | -0.1080 | 0.1453 | -0.7436 | -0.3955 | 0.1795 |

**Table 19:** Indirect Effects of AI Leadership on Employee Ethical Decision

| | Effect | BootSE | LLCI | ULCI |
|---|---|---|---|---|
| Effect of IV on DV through Job Satisfaction Perceptions | -0.0179 | 0.0267 | -0.0781 | 0.0323 |
| Effect of IV on DV through Monitoring Feeling Perceptions | 0.0046 | 0.0218 | -0.0439 | 0.0497 |
| Effect of IV on DV through Code Enforcement Perceptions | 0.0141 | 0.0282 | -0.0257 | 0.0888 |
| Effect of IV on DV through Public Self-Awareness Perceptions | 0.0025 | 0.0279 | -0.0602 | 0.0600 |
| Total Indirect Effect | 0.0033 | 0.0472 | -0.0913 | 0.1018 |