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Haute école de gestion
Genève

# The Impact of Artificial Intelligence based on Human Resources Information Systems on Ethical Management: A Case Study focusing in Switzerland

**Bachelor Project submitted for the degree of**
**Bachelor of Science HES in International Business Management**

by

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## Hes·so GENÈVE
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The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                              i

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The Impact of Artificial Intelligence based on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI

ii

# Executive Summary

The rise of technological innovations and the accessibility in data has led us to the development of Artificial Intelligence (AI). Predominant in our daily life and often present in our professional life, the arrival of AI has impacted our behaviours and relation towards technology and dataset.

The goal of this research is to investigate on the consequences that Artificial Intelligence's implementation on Human Resources Information System (HRIS) have on ethical management, by analysing the level of understanding on this subject, and finding or defining tools to guide the behaviour of managers towards the use of digital technologies.

The general digital ethics principles that should be respected by any users of Artificial Intelligence are Human agency and oversight, technical robustness and safety, privacy and data governance, transparency, diversity, non-discrimination, fairness, societal and environmental well-being and finally, accountability. The importance to understand their signification and the link with AI is necessary, as it allows companies to develop their own guidelines according to their objectives and culture.

Artificial Intelligence is a tool that adds value within the firm and aid to interpret the huge amount of data, with which HR department constantly work via the Human Resources Information System (HRIS). As HR department is often considered to be the centre of the firm because its activities are related to employees, the target for the survey were mainly HR managers. Their experiences, beliefs and research on the subject led us to different conclusions.

The knowledge and understanding on Artificial intelligence including the development and functioning of algorithm and the need for data, as well as digital ethics is crucial and helps to anticipate consequences on humans. Technological and Human perspective need to be included to integrate new principles and values in the company. Therefore, diversity could increase security, trust, and collaboration, and consequently ease the process of collecting data, providing them as input in the algorithm to obtain reliable, unbiased, and interpretable output for HR managers.

Moreover, to ensure an ethical behaviour from managers, different tools have been designed. They can be used to accompany HR managers' decisions. As humans are behind artificial intelligence, a constant supervision is needed to guarantee a good

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                iii

behaviour. Thus, a new job position might be necessary to verify that meaningful decision do not negatively impact the firm, or the employees concerned.

The Impact of Artificial Intelligence based on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.
Lirika LATIFI

iv

# Contents

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                  v

The Impact of Artificial Intelligence based on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI

vi

# List of Tables

# List of Figures

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                              vii

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The Impact of Artificial Intelligence based on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI

viii

# 1. Introduction

During the past halt-century, the rise of technological innovations, the internet, and the massive increase in processing and computing power, have led the world to a new digital era. Digital computer or computer-controlled robot have now, the capacity to accomplish things that human can do. This replication of human intellectual processes by machines and computers systems, such as "reason, discern meaning, generalize, and learn from previous experience", is known as artificial intelligence (AI) (World Trade Reports 2018) Today, we live in a world where artificial intelligence is predominantly present in every one's life. From the social media used daily to the different programs used at work, artificial intelligence affects multiple aspects of our life. Social media are a great example of the influences of artificial intelligence. For example, the video and pictures taken and posted on Instagram are data that the application will combine with the data derived from other activities, such as the subscription to the different account, the interactions with influencers, friends, and family, « likes » on photos, etc. Subsequently, this amount of data will be treated by an algorithm of Instagram, which will provide incredible insights into human behaviors and can bring commercial intelligence. (Bernard Marr & Co 2021) In other words, businesses can target more effectively their customers with the analyze of the data by using the algorithm and therefore, suggest their product, thanks to the sponsored ads provided by Instagram, google, twitter, amazon, YouTube, and all other social media related. As a result, an increase in sales is likely to happen. (Forbes, 2021). As many useful benefits of artificial intelligence are known, most CEO's and leaders are eager to implement it into their company's business processes. In fact, AI can help several departments and functions. For instance,

- In the contact centers, AI allows to collect data on customer and improve customer's experience
- In building maintenance, AI is used to increase the building's energy efficiency
- In the manufacturing department: to predict maintenance needs
- In the accounting and finance department: to reduce employee's time on repetitive tasks
- In the marketing department: to target customers or for the aftersales customers services through chatbots
- In the sales department: to forecast sales thanks to the insights collected
- In the IT operations departments: to anticipate IT system error before it occurs

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.
Lirika LATIFI

1

- In the research and development department: to help understanding the industry in a more effective and strategical way
- In the human resources department: to improve efficiency and help making better decision with the analyze of data. (Forbes, 2020).

From recruitment to talent management, the human resources (HR) department has numerous numbers of tasks. David Ulricht, considered as a leader in HR, designed a model, used by big companies around the world, to ensure that the roles, responsibilities, and duties are clear to every HR employee, and which intend to simplify work process. To do so, the model's designer separated HR in four main sections illustrated in the image below.

**Figure 1 - David Ulrich Model of HR Roles**
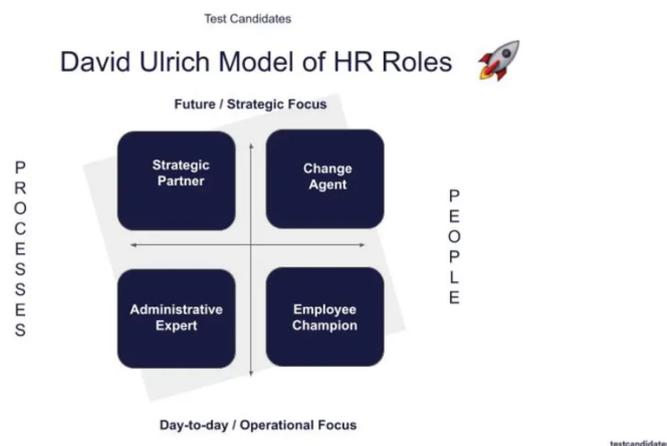
- Strategic partner: assist in the management of the workforce's development and progress, as well as examining and improving systems and procedures to reach clients' needs and wants more effectively.
- Administrative Expert: in charge of expenses, the personnel and the "overall delivery of business-as-usual output" (2021)
- Change Agent: maintain and improve the culture of the company, from a personal and professional perspective, when needed, and work with line managers to lead and encourage change for a better place to work.
- Employee Champion: consider the employees' importance at work and assist them to speak up and ensure that they feel heard and valued.

In other words, HR department has the role of creating a cohesive and well-functioning team structure, defining each department and every role in it, ensuring the organization attains its highest efficiency and operates competitively, and measuring performance to

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The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                              2

improve on a constant basis. (TestCandidates 2021) Therefore, this department plays a crucial role in a company. Hence, the right use of tools and good practices can help to achieve the goal more effectively and efficiently. When a company has more than 30 to 50 employees, it becomes difficult to collect information about employees and to keep track of their performances. As a result, human resources departments use a software named Human Resources Information System, HRIS, which is an HR system that allows to collect and store data on the employees in the firm. (AIHR 2016) Its functionality is grouped in four main groups, such as the payroll management, the management of leave, absences from work and working time, administrative management of staff, and finally, the human management. This tool simplifies the work in the human resources department, as repetitive tasks are automated. Thus, employees can focus on more important tasks and, therefore efficiency will increase.

With the arrival of artificial intelligence, a new way of using data has arisen. AI is the ability of machines and computer systems to simulate and perform tasks usually associated with human intelligence. (Britannica) With HRIS the collection and stockage of data were simplified, but with the arrival of artificial intelligence, these data can be analyzed, interpreted, and used in a more accurate way, according to the requirement and goals of the company. A very well-known example is the use of AI for recruiting solutions. To recruit candidates, managers must read many resumes efficiently and fairly which is a challenge and time consuming. With artificial intelligence tool, this step is done automatically, as it uses data collected from the resumes and standardizes the matching between the requirement of the job and the experience, skills, and knowledge of the different candidates in a more efficient and effective manner.  (Forbes 2021) Many HRIS suppliers exists in the market, but some who are well-known, nowadays, are Workday, Oracle, SAP, Ultimate software, and Ceridian and more. All of them provides similar product but focus on differentiate human resources tasks *(*AIHR 2016).

To be functional, data on employees are collected. The data can be categorized in three major group: private data, personal data, and sensitive personal data. The first one is sensitive, personally identifiable data, such as usernames, credit/debit card information, etc. Under the general data protection regulation (GDPR), the data becomes personal when "the information can lead to the identification of a particular person". Also, any data consisting of more sensitive subjects, such as racial, ethnicity, political opinions, religion, etc. enters to the last group mentioned. (European commission). As information collected may be sensitive, it is important to generate rules and laws concerning the use of the

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                                    3

data to minimize the risk of misusing them. The evolution of technology is on an exponential slope, which is why it is difficult to keep the laws consistent. The European union are proposing a draft of regulation to prevent the danger of AI systems, which includes "human oversight, transparency, cybersecurity, risk management, data quality, monitoring, and reporting obligations." (McKinsey & Company 2021) These are very important to take into consideration, as ethical issues may occur depending on how and why data are used. To come back to the previous example of the recruitment, we can mention the famous amazon case which happened in 2018. Amazon used an AI recruitment tool to select candidates according to their criteria. However, they dropped their project because it was biased against woman. In fact, the AI system learned from historical data it was fed, and as mainly men were engaged in previous years, the system interpreted that, as a criterion of selection. (Business Insider 2018) This concrete case is an example of an ethical issue a manager must face.

According to Larousse dictionary, ethics is "a set of moral principles that underlie a person's conduct". Similarly, Digital ethics is a set of values that guide and justify our choices and behaviors in the development and use of digital tools. To be transparent, coherent, explicit with the use of employee's data is crucial, especially for the manager in the human resources department, whose tasks concerns every employee in the firm. Nowadays, artificial intelligence offers more precision, accuracy, automatization, efficiency, optimization, and simplification of research. It is becoming necessary for small, medium, and big firm as its advantages are numerous and it allows organization to be more competitive in the industry. To implement it in the human resources department, managers need to understand what AI can do. Knowing the mechanism of the systems and the effect it might have on employee is an important aspect, as data will be collected. Moreover, a manager should be able to explain what kind of data is collected and the reason it is used to be fair and transparent towards the workers. (Elearning industry 2018) In addition, having employees well informed might help to engage them, as they will understand the system better and will not fear of ethical issues. As Gallup's report demonstrates, there is a strong relationship between engagement of the employee and the performance in the firm. (Gallup 2020) Managers need to remove employees' fear of being discriminated, of the misused of their private and personal data, and of biased information. Therefore, the concept of ethics in artificial intelligence must be understood by managers in human department resources to make a good use of the AI- systems which are mainly created to obtain better results.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                          4

Following this line of thoughts, the current study continues as follows: There will be a complete literature review on the topic of human resources information system HRIS, artificial intelligence, ethics and its principles, and a review on various research. Following that, we will go through the current study's hypothesis, before going into the method employed to reply to them. A concrete description of the data gathering tools and process, the participants, the statistical analysis will be given. Finally, we will present and analyze the results obtained for this study, before completing this research by a discussion and the conclusion section.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                                    5

# 2. Literature review

## 2.1 Artificial Intelligence

### 2.1.1  The notion of artificial intelligence

Artificial intelligence (AI) is a concept that has been studied since Alan Turing's discovery on the limitless memory of computing machines. (Britannica 2022). Since the 19's, researchers made huge advancement on technology, with the creation of robots carrying out simple tasks, or the apparition of chatbot. With time, computing and storage capacity were better understood, therefore researchers and developers could make a better use of artificial intelligence in general. (Webinar 2020) The word "artificial intelligence" (AI) was published for the first time by students in Dartmouth College in 1955. Even if, scientific have acquired a good knowledge of Artificial Intelligence (AI)'s capacity and his benefits in our daily life, researchers were studying this concept long time ago. Nowadays, Artificial Intelligence (AI) is defined as machines that can simulate human intelligence by rationalizing and providing solutions to achieve a specific purpose. It contents several subsets which includes machine learning, robotics, natural language processing, expert system, speech recognition, vision, and planning. For this research, machine learning is the most interesting one, as it is the part of artificial intelligence that explains the ability of AI to automatically learn through algorithm. In fact, algorithm will learn through the collection and analysis of different datasets, but it can also be trained with the commands received by the users of the system. (Javapoint) To improve accuracy of its prediction and recommendations, the AI uses data to identify the variables contained and assess their impact on the algorithm. Thus, by furnishing a wrong set of data to the algorithm, there is a possibility that the algorithm does not learn properly, which will impact its performances directly. The distinction between a good and a bad AI's algorithm is determined on the quality of the data. Therefore, a relevant algorithm must be provided with the right amount of data, that are highly qualitative and constantly up to date. Data selected must be cleaned, organized and representative. Adjusting the dataset is necessary to make incremental improvement and have a compatible algorithm. (Le big data 2021)

In other words, artificial intelligence's (AI) performances improve with experiences and training with qualitative data. It enables machines to reason, help for planning process, decision making and problem solving, by acting according to the situation or by making recommendations. Thus, it can be applied in a wide range of fields such as medicine,

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                 6

transportation, aviation, finance, heavy industries, telecommunication, and others. (ISJER 2013)

## 2.1.2 The use of Artificial Intelligence

In our daily life, we use artificial intelligence sometimes without noticing it. With internet and social media, a huge amount of data is available. As a results, according to our research on websites or the product we buy online, artificial intelligence can understand our interest, needs, and wants, and subsequently, make recommendations about products or services. This is a way for businesses to increase their sales, as they can seize the opportunity to brand their product or services on social media and reach their target customers. (Forbes 2021) Also, AI is used for automatic translation on website or to prevent against the cyber threats by analyzing and recognizing previous attacks. (Pigro 2017). On one hand, some authors value the adoption of AI. They argue by highlighting the increase of security on website, phones, applications. For instance, according to Apple, there is a 0,0001 % of bypassing the system of FaceID on phones. (2017) Another argument is the way machine learning simplifies our research by connecting the dots of our historical research on website or social media. Everything is interconnected. Therefore, suggestions are more precise and useful. In general, Artificial intelligence helps us in many aspects. (Forbes, 2019).

However, some authors claims that artificial intelligence may be invasive and sometimes used for the wrong purposes. For instance, during the presidential election in the United States in 2016, artificial intelligence was used to manipulate the society and to propagate disinformation. Another example is the face recognition technology used in China and other countries to invade people's privacy. This is considered worrisome public surveillance by many civil liberties organizations. (Forbes 2020). These examples illustrate the statement of Elon Musk made in 2014 on Twitter: "Artificial intelligence may be more dangerous than nukes". The latter, who himself invested in AI development companies to have a follow-up, shares the opinion of the authors and researchers who believe that AI could be harmful, if it falls in the wrong arms or, if it is not used for the wrong purpose. (CBS news 2014) Furthermore, in addition to our personal routine, artificial intelligence (AI) is also present in our professional life.

Nowadays, firms' businesses rely on Business Intelligence (BI) tools to detect and extract useful information from massive volumes of data. In fact, this technology-driven process is used by executives, managers, and other end-users to make better business choices, as it analyzes and provides helpful data. Business Intelligence belonged mainly to IT,

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                              7

but have become during the previous years, useful to any company. The goal of BI is to gather, collect, report, and analyze data more efficiently. Using BI helps employees to search, merge, query data to get the information they need. **(**Oracle France) It also makes data more understandable and is used for the creation of spreadsheets, performance metrics, dashboards, charts, graphs, and other visualizations.

The arrival of artificial intelligence (AI) in business added a new aspect to Business Intelligence (BI). BI is used to organize and visualize the huge volumes of data acquired. As a complement to BI, AI extract insights from the data they examine, and assist human operators to make business decision, as it translates the insight into real-world business choices. (Toptal 2018) The additional features that AI brings to BI are that it automates routine tasks, increases quality, facilitates the use and interaction with data, because it can show the most relevant information by navigating through large data sets and relating the information with the inquiry. This capacity of analyzing data and getting the full picture, allows AI to predict potential outcomes and to provide or recommend solutions to the end-users. (IBM 2018) Although Business intelligence and artificial intelligence are distinct, the two technologies are considered as complementary. ¨

One of McKinsey's Global Survey reveals that an increase of 5% of businesses adopted artificial intelligence (56%) in at least one function in 2021 in comparison with 2020. (2021**)** From Start-up companies to international ones, artificial intelligence can be a source of innovation in production. Every department in a company can benefit from it, as it can simplify complex and repetitive tasks, enhance the efficiency of processes, analyze data, optimize marketing campaign, help to reach target more easily, and enhance customer service with virtual assistance, chatbots, etc. (Ministère de l'economie des finances et de le souveraineté industrielle et numérique 2021) According to a study of Accenture in 2016, the worldwide productivity could raise up to 40% with the assistance of AI. **(**Microsoft 2017) Also, with the increase in data availability and the exponential growth in the power of processing of AI, businesses are captivated and adopt AI in their company.

Additionally, the adoption of AI impact positively the revenue. As respondents of the McKinsey's Global Survey mentioned above, their revenue in service operations, manufacturing, human resources and marketing and sales department raise since they adopted artificial intelligence (AI) (2021). With the adoption of AI, new strategic goals are designed in businesses, thus the business model and system of a company changes. An article of Harvard Business Review states that one challenge is the ability to

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                                              8

overcome barriers to transformation. (2021) Thus, managers and leaders must understand the capabilities of AI and perceive clearly its real added value to business. (Forbes 2021) Subsequently, an innovative culture can be established, which will impact on employees' willingness to use new technology. (Puplun 2019) According to a study of Oracle, 65% of workers feel comfortable of having a robot co-worker and 64% workers would even entrust a robot more than a manager. Thus, relationship between people and technology at work is changing with the implementation of artificial intelligence. (2022)

## 2.2 Human resources information system (HRIS)

### 2.2.1 The notion of human resources information system (HRIS)

The human resources department must acquire data from inside and outside the organization. To get more organized and have automated tasks, organizations adopted information system. In general, this new method helps managers to have data of the employees centralized in one system and thus, they can find documents, or any information needed more easily which is a gain of time for the managers. Also, as data are numerical, they are saved and combined with the implementation of automation in different processes and in data filling. Errors occur less, and it is easier for the manager to have a follow-up of employees. (Holded 2021) The function of HRIS can be grouped in four main categories:

- Payroll management: This part is about producing a pay slip by collecting the number of working hours, absence, bonuses, overtime etc.
- The management of leave, absence and working time
- Administrative management of staff, such as editing employment contracts, the management of notes expenses, etc.
- Human resources management, which is the collection of data related to the careers of the employee.

(NOVRH 2021)

The human resources management includes recruiting, selection, training, and talent management. Its information system allows to improve efficiency in the recruiting and selection process, to reduce training costs by implementing e-learning, to reduce biases in appraisals by having data from the full evaluation period, and many benefits are provided by the systems. (HRIS 2021)

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                    9

As mentioned HRIS has many advantages and one of them consists of giving more time to managers to focus on other important tasks and, also to facilitate the collect of insights on employees and stock them in the system which simplify their access. On the other hand, choosing and implementing the right HRIS is a decision that must be taken consciously according to the necessities of the organization. In fact, managers should take into consideration the budget of the firm, as the system will generate some costs to install and to maintain it. Also, training to use and understand the system may also be useful and necessary. Secondly, security aspect must be taken into consideration, as important and sensible data might be collected and stored within the organization. Moreover, employees might accept more easily to give their personal and private data to the firm if security measures are applied.  (CHRON 2019)

### 2.2.2  From HRIS to the arrival of AI in HR systems

Although HRIS is effective, the arrival of artificial intelligence has changed positively the system. By adapting the software with the new technological features, improvement on analysis, reports and prediction about the future are made. Also, chatbot with automated answers is a tool that becomes more present in companies, as it allows employees to receive feedback at any moment. At the same time, it allows managers and employees of human resources to focus on their main objectives and the mission of the company, rather than mobilizing to answer their employees' regular questions. (LinkedIn 2021)

Many companies offer a combination of Human resources information system and artificial intelligence. In fact, many alternatives exist, and different classification according to their reliability and ease of use were made. However, the ones on the different top list are often ADP Workforce now, Oracle, Worday HCM, SAP Success factors.  All of them have important benefits, some even more depending on the industry it is used for, but they have some limitations as well. Comparing them and choosing carefully, can provide the firm a competitive advantage. (Selecthub 2020).

Selecting and implementing the right software is the first important step. Even more nowadays, as the tasks of the human resources department are becoming more and more diversified. The second step is to understand the functionality of artificial intelligence. In the recruitment and talent acquisition, AI strengthen the screening process of the candidates as well as the arrangement of the interviews. Also, AI makes accessible new starter documentation, shared work areas, highlights the company policies, which is helpful for new employees during the onboarding process. Additionally,

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                    10

according to the position of the employee in the organization and the career path, AI can adapt to the need of the employee. Consequently, learning and development are personalized for each employee, which increases their knowledge and help them to develop their skills continuously. Also, as add-on to talent acquisition, talent management entails the procedures of maintaining high-quality personnel, while also enhancing their abilities and motivating them. By assessing employee's data such as compensation and incentive, duration in position, performance scores and comparing these to general attrition rates, algorithm help to predict the chance of a person leaving. Thus, HR and managers are aware of possible problems before they occur and may intervene accordingly. (SAGE 2021) It is hard to deny that artificial intelligence increases efficiency, as tasks are automated, experiences of people within the company are enhanced and algorithms that are pre-installed help the manager to make real-time decision by collecting and analyzing inputs collected regularly.

Although benefits of implementing AI are known, the numerous parameters of the machine learning make it difficult to understand the algorithm and the decision-making process. Some researchers mention some negative effects that may occur from AI with the selection of biased data or the misuse of algorithms. (Future of life 2019) Prediction about organization workforce is made, as well as analyses of time consumption at work and productivity of the employees. These insights are valuable for the manager, as it helps to make better decision accordingly. (CSMWire 2020) However, data must be collected, which implies private, personal, and sensible data of the employees. Therefore, it is important that employees feel secured and understand the purpose of AI. A need for human interaction between managers and employees is necessary and should be maintain, even though chatbot, application, feedbacks, news, shared document are provided with the application of AI. (HR Strategy 2021) Along with the human connection, a proper communication and purpose is a way to make employees feel at ease and trust technology. (CSMWire 2020)

To sum up, AI has many advantages for the human resources tasks. However, managers should be able to understand and share their knowledge with their employees to avoid any misconception and allow a smooth digital transformation in the human resource department. Also, as data are used in algorithm, there is a risk of being biased, incorrect and therefore negatively impact employees. Thus, managers should be able to justify and explains any decisions deriving from AI. (Reworked 2021)

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                    11

## 2.3 Digital ethics

### 2.3.1 The notion of digital ethics

According to Larousse and Cambridge dictionary, ethics is a set of moral principles and beliefs that guide and control our behavior. (2022) Encyclopedia Britannica develop a little bit more the concept and states that it is a philosophical study of what is morally good or wrong, and it involves "any system or code of moral rules, principles, or values." (2022). Similarly, digital ethics refers to a set of moral values that guide us to make conscious decisions and justify our behavior in the development and use of digital tools. (Klewel 2021) In this domain, regulations and laws are necessary to coordinate, regulate the technological advances, as well as resolving conflicts. However, digital ethics goes beyond the legal boundaries, as it is not only an accompaniment but an added value in the company. In fact, advanced technology can provide a strategic advantage, but it must be used in a responsible manner. Thus, digital ethics is important and allow companies to differentiate themselves by handling data and new technologies correctly. (Deloitte 2020)

It is difficult to define clearly what are the values of digital ethics. The European Commission ensure that AI improvements are beneficial for businesses and at the same time protect people's safety and fundamental rights, by focusing on the excellence in AI and trustworthy AI. (EU commission 2019) On 2018, the first draft of guidelines for trustworthy AI was published by the EU Commission, which not only included laws and regulations to respect, but also ethical principles and values grouped in the following seven categories: (2019)

- Human agency and oversight: AI is used to have more precise and accurate information to make the right decision. However, algorithm is developed by humans, and it is crucial to have a control on it. Therefore, human must be in command during the processes and have an oversight from the development of AI to the use of it, passing by the implementation of AI in the businesses.
- Technical Robustness and safety: to prevent any harm or any error, AI systems must be secure, robust and have a backup plan in case unexpected issues happen.
- Privacy and data governance: along with the respect for privacy and data protection, data governance processes must be in place to ensure that data are accessible legitimately and used justly.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                           12

- Transparency: the capabilities and limitations of AI system must be known. Any decisions made from AI should be explainable to the stakeholder concerned, as they have to be aware of the manner data are used and that it is related to AI systems.

- Diversity, non-discrimination, and fairness: behind any algorithm or machine learning systems hide human beings, who can have preconceived notion and ideas that may impact unconsciously decisions and results. Therefore, to avoid discrimination or unfair biased, it is important to have diversity among the group designing, using and working with AI system. Besides, AI system should be accessible to all, regardless of the ethnicity or disability.


- Societal and environmental well-being: AI systems should benefit everyone in and out a company and have a good societal impact. Also, the question of environment should be considered.

- Accountability: As many people can have access to AI systems and/or private data, it is important to define a responsible and accountable person for the outcome of the AI systems.

These categories are guidelines of digital ethics that are publicly published and recognized and, thus, should be the basic principles when talking about artificial intelligence and digital ethics.

### 2.3.2 How digital ethics impact HR management

To use prediction models and have information about their employees, managers use predictive models, or different kind of technological tools which require collection of employee's data. The ethical line between what is acceptable to collect about employees or not has to be clearly define. According to Brian Kropp, group vice president and HR practice leader at Gartner, human resource (HR) is the department that should act on this matter and implement policies on ethics and transparency. Still according to him, HR leaders are capable to take into consideration the new technological aspect and the innovative opportunity to obtain more insight on employees. (2021) On the opposite, the general counsel or compliance division would miss the potential of AI by focusing mainly on the risks and, the IT would concentrate much more on technology. Thus, HR should make decision to avoid any ethical infractions. (SHRM 2019) In that sense, Emmanuelle Bons, Vice president in transformation and change management practice at Infosys, claims that Human Resources Department will be at the forefront of easing AI deployment by anticipating the consequences on humans. She also adds that AI affects

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                        13

managers just as much as it affects employees. However, managers' role will be to facilitate the adoption of digital transformation and provide a meaning to their personnel. (2022)

The advancement of technology in companies raises question on ethics and challenges the values and beliefs of HR managers. They must determine the good and bad scenarios that might come along with the use of technology. As Anjali Lai, senior analyst at Forrester Research, mentions AI can provide and destroy values. (SHRM 2019) Ethics are global, which means that employer and employees' behavior should coincide with the company's standards. However, AI is impacting human existence and, consequently challenging organizations. Ethical standards must be redefined with the help of HR professionals, as they are considered as the "conscience" of the organization. (The raise of HR) In other words, HR professionals play a key role in defining ethical standards with the collaboration of leaders, by sharing the principles across the organization and ensuring that employees understand and apply these values. (HBR 2019)

Decisions about promotion, selection, recruitment, performance, payment, and rewards are driven with the analysis, recommendation, and results of AI tools. Technology and data are transforming the practice, procedure, and processes in HR department. Moreover, digital transformation of business is increasing and continuously accelerate. Therefore, HR professionals must acquire new knowledge about AI and the function of the different AI systems. Subsequently, a better understanding will help managers define what kind of data is necessary, and how to make a good use of it. (The rise of HR) AI systems are, above all, tools that aid managers to take more correct decision and to get some predictions about employees in the firm. It is the role of managers to define the limit and act ethically.

The famous example is the Amazon case that automated their recruiting system with artificial intelligence. They trained their algorithm with data from the ten previous years. As the company was mostly composed with men, the algorithm learned that preferring man to woman was a criterion of the recruitment. Amazon did finally not use their machines as it was discriminatory towards women. (Reuteurs 2018) However, this famous example of biased data is a good illustration of the danger to use badly data. Thus, supervising algorithm is extremely important and are necessary to avoid unfair and unequal decision-making, which relates to digital ethics. (Incenteev 2022)

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                     14

### 2.3.3  How digital ethics is treated and what are the tool used

A Set of defined rules for Digital Ethics is not defined, therefore every organization needs to develop their own framework according to their organization.  (Deloitte 2019) Organization like IBM and Microsoft have defined their own AI principles illustrated with the image below: (Josh Bersin 2018)

**Figure 2 – Microsoft's Principles of AI**
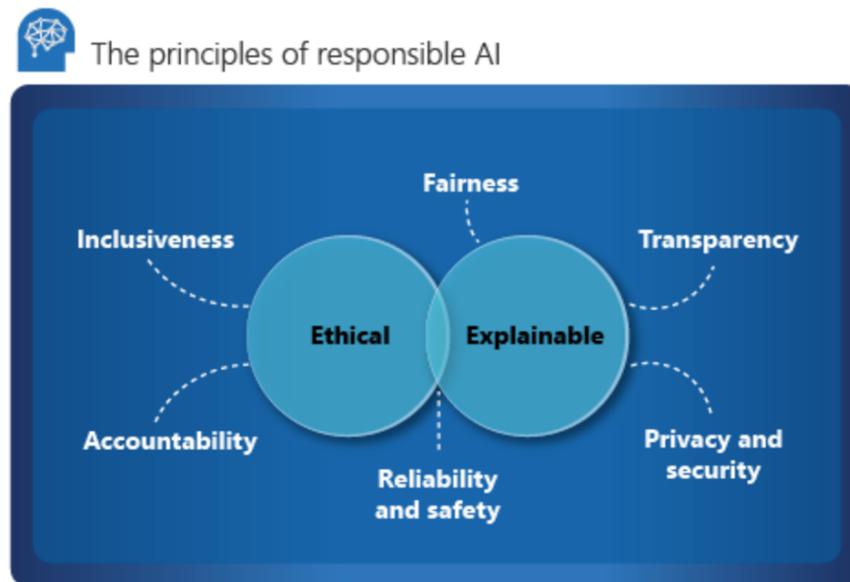
Microsoft AI's principles are similar to the ethical principles of EU commission mentioned in part 3.1. Although EU commissioner included seven distinguished groups, Microsoft included them in two main categories which are corelated: ethics and explanation. In fact, human is implicated in the building of algorithm by providing data from employees and the firm to the algorithm. The ethical question is not only about selecting the data, but also about selecting the rightful data to manipulate it, without compromising any employee's integrity or being discriminatory. The data chosen to train the HR systems reflects the decision making of HR managers, which must be explainable to anyone. (Vimeo 2019) Therefore, having a clear set of principles may guide managers and clearly integrate ethical value to the company.

The company ActivTrack offers tools that provides managers specific insights to keep track with the productivity of employees. More specifically, information, such as the activities that employee undertakes on internet, or the weekly work habits of an employee, are data collected in the systems. Advantages of such tools mentioned are

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                    15

that managers obtain insights about the performance and the motivation of their employees. Thus, it can help them avoiding or getting out from a burnout, or even encourage them to adopt healthy habits. (ActivTrack) On the other hand, some advances that it can be too intrusive for employees and create a feeling of insecurity. (SHRM 2019) Although the primary use of AI tools is to be helpful and practical, HR managers should think on the positive and negative effect these can have on employees. Being confident with technology and accepting to give personal and private data is one thing but, feeling secured and being sure that it will have a mutual benefice for the HR managers and employees is the most difficult part. Therefore, understanding digital ethics is as important as believing on the benefits of AI for the company before implementing it. To adopt a good digital transformation within the company, Emmanuel Vivier, co-founder and principal analyst of HUB institute, believes that all members of the organization should be included during the process. He gives the example of TF1 group that has devised, with the help of HUB institute, a 3-days training program which include all the employees of the company. The purpose was to promote the digital transformation through a collaborative, impactful and enthusiastic workshops for collaborators and managers. (hubintstitute 2017) This example illustrates mainly the digital transformation. However, the concept of including every employee of the company to adapt to the changes can be applied to digital ethics. Emmanuelle Brons shares similar thoughts and adds, during a podcast of Incenteev, that having more diverse team possible is more beneficial, because it will decrease discrimination and biases, and encourage equity and fairness. (2022).

Having guidelines and encouraging diversity are general advice to be digitally ethical. Additionally, some tools are also proposed for any persons who collect, use and share private, personal and sensible data within a company: Data Ethics Canvas, which consists of 15 sections that provides a framework for developing ethical guidelines. Each section leads to different ethical questions the user must answer to. Thus, using this tool at every stage of the project, starting from the collect of data to the analysis, allows the managers to think ethically and make decisions accordingly. (data ethics canvas 2019) The different sections are shown below:

**Figure 3: Data Ethics Canvas**

Similarly, another tool with several sections that leads to different question exists: Digital Ethics compass. As you can see on the image, this tool contains more sections, but the concept is to explore the different section in each stage of the project, and to use it as an ethical checklist. (toolkit)

**Figure 4: Digital Ethics Compass**

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The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland
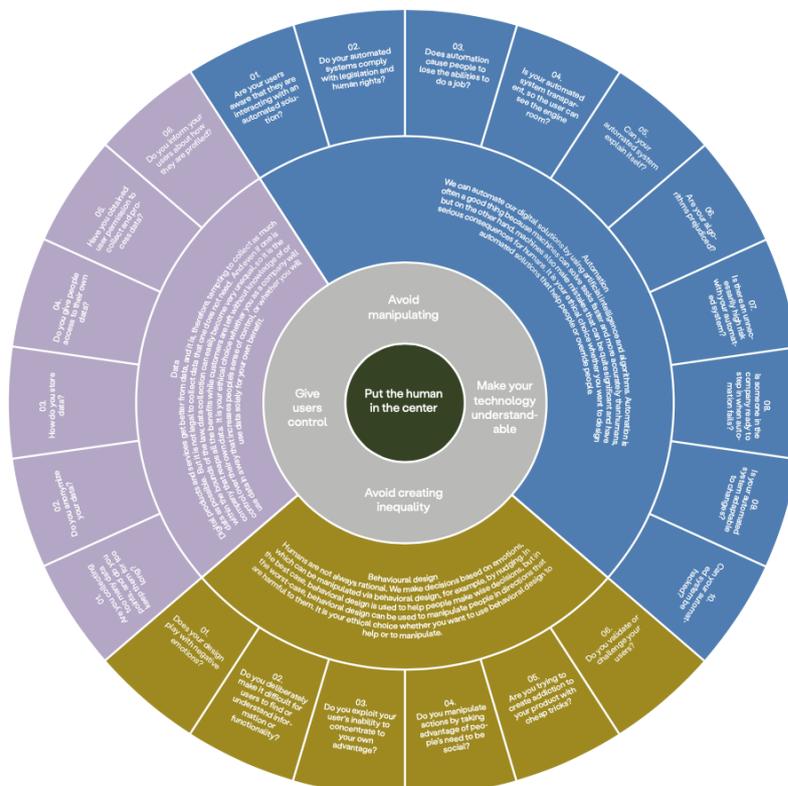
## 2.3.4 Research and Gap

As mentioned in the previous section, artificial intelligence (AI) has changed the business environment. As many benefits are known, many companies adopted it. However, some divergences exists and the adoption of AI in companies do not appear to be unanimously accepted yet. Despite the insecurity that some people may have towards technology, according to McKinsey survey of 2020, we can see an increase of 6% of company adopting AI in at least one function in comparison to 2019. Using machine learnings is a great aid for many tasks, namely recruiting, selecting, predicting employee's behavior, talent management, making accurate decision, and more. (IBM 2018) Also, in a financial aspect, McKinsey survey, showed that by adopting AI, costs decrease by more than 10% in HR for most of the respondents who implemented AI in the department. (2020). On the other hand, risks are not negligible. Continuing with McKinsey survey, cybersecurity, regulatory compliance, explainability, personal/individual privacy are the most considerate AI risks of the respondents. Some of the solutions mentioned are to regularly monitor their systems, tests the outcomes, have documented data flows and other example. (2020). We perceive that a Human control over AI is mandatory for a proper functioning. Therefore, understanding how the machine learning are developed, the data required to enhance the algorithm and make a good use of it, is crucial. Managers have the responsibility of ensuring that AI and data usage complies with digital ethics. This must be reflected in the way managers and employees think about AI applications, starting with their conception. AI solutions must be fair and unbiased. (IBM 2018)

In the previous section, we mentioned several tools and methods, such as designing ethical guidelines or using business ethical Canva. These help to make decision that do not negatively impact employees by using unfairly their data. To give an example, having data of an employee's performance can be beneficial for him, as it can lead to a promotion. However, the data used for this matter must be known by the employee and used correctly without any negative impact. As an illustration, let us consider that one of the data used for the promotion example is the age of the employee. Firstly, we could think that it will not have a negative impact if there are no competition for the job position. On the opposite, if AI algorithm proposes two qualified employees, young and senior, for the job position, using the age as a criterion in the algorithm might negatively impact the senior employee. Therefore, using data ethics canvas can help to avoid this kind of unethical decisions. Discriminatory and unfair algorithm have been defined by international companies, such as the example of amazon's recruiting algorithm that has been abandoned. With this kind of concrete example and the interest in data security,

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                    18

concerns of digital ethics have increased through the years. Consequently, researchers and business scientist propose tools, procedures, and guidelines to accompany managers. These tools are created after the implementation and creation of algorithm. Moreover, it does not guarantee that ethics will be respected, as it still the manager who takes the final decision with or without applying the tools. Although, they have more knowledge on digital ethics and technology, managers can still unconsciously be biased themselves and make inappropriate decisions by convicting themselves that what they do is right. Therefore, the question about trusting more machine or human's decision may be asked.

Although awareness on digital ethics is increasing and several solutions are emerging, it appears that the solutions do not include the manufacturing of algorithm. In other words, as algorithms are developed by humans, another perspective to include digital ethics, would be to create algorithm ethically by design. It means to add digital ethics as a component of the algorithm. To do so, understanding the functioning of machine learnings very well is important. Thus, knowledge on the subject is as crucial as really understanding the notion of digital ethics. This leads to another point, which is the importance to have a responsible team who is capable of both understanding and explaining AI and ensuring that digital ethics is respected.

Authors often mentions human resources, because the department is related with the managers and employees of the company. Another point is that AI is often combined with human resources information systems (HRIS), so HR professionals are concerned with machine learnings and data. Despite the importance of HR in organization, the vision of AI can seem different according to the department. IT professionals have probably as much interest in this area as HR and could even be more able to provide explanation on the use of data in the algorithm. Hence, the focus on HR is understandable, but cooperation among departments is another aspect that is worth considering.

Although the notion of AI and data has been studied largely, digital ethics is a concept that sometimes does not seem to be really understood. Implementing AI in businesses is one aspect, ensuring that humans make good use of it is another. Many major AI research institutes are located in Switzerland. Thus, collaboration between research institutes and powerful industry operators results to an efficient transfer of technology to the market. The interest of the Swiss government in AI inspire commitment in this

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                          19

domain, and their engagement on ethical issues influences the society to work on this issue. (Swiss cognitive 2021) This is the reason why, researching and investigating in Switzerland is very interesting. Also, AI is present in several industry in the country, such as healthcare & science, consulting services, recruitment & HR, retail and solutions, entertainment and other. Different perspectives on AI and ethics can be perceived according to the different industries and their use of AI systems. This research will focus on addressing the following assertions:

The understanding of artificial intelligence (AI) and digital ethics among managers
The behavior adopted by managers facing digital ethics.

# 3. Methodology

## 3.1 Participant

To obtain information and perspectives for our subject, different managers working in the human resources department in different companies within Switzerland have been reached out. Companies of different industries were contacted mainly via email, but also via text messages and phone calls. Due to their quantities of work, the high amount of emails this department get and, the fast-paced routine of managers, it was difficult to reach them out or to obtain an answer. Therefore, I took advantage of my personal contact from work and school, who used their own network and professional platforms, such as LinkedIn, to get more data. Thus, the simple random sampling method was used, as we wanted to obtain inside from different industries. Also, a manager, who has worked in the human resources department as an employee and got promoted as a manager, accepted to be interviewed, so that more specific and open questions could be asked.

The number of participants targeted were of 15 managers, as it would provide a sufficient amount of data for our analysis. Finally, the final sample size comprised of 27 managers.

## 3.2  Data collection tools: Qualtrics

To prepare our survey and before sharing it via emails, professional platforms, and also private messages, we used the application Qualtrics. The tool is intuitive and very practical, as it is very easy to understand it, to use it and to make some modifications even though the survey was already shared. Results can be exported into an excel file, which is easier to visualize, manipulate and analyzed.  The questions were asked in a specific order and some of the questions only appeared to the respondents according to the previous answers. Most of the questions were with multiple choice answers, and a few of them was open question as more descriptive answers were needed. Also, an interview was done with a manager from the resource human department in an international company. The interview was a way to obtain more specificities, details, and a different perspective on the matter.

## 3.3  Confidentiality and transparency

Confidentiality and transparency were respected throughout the conduct of this research. To respect these two principles, the purpose of this project was explained to every

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                          21

participant of the survey and the interviewee. The first page of the survey consists of an explanation of the project followed by a confirmation of the consent of the participants. Without the approval of the respondent, the questionary could not be accomplished. Furthermore, the email was provided to be able to answer to any queries anyone could have before or after doing the survey. Any questions of the survey could be omitted, and the participants were free to stop the survey at any moment, if they did not want to complete it entirely for any reasons.

Moreover, participants are informed before giving their consent that their answer will be treated anonymously and used for a good purpose. Same for the respondent of the interview, its answers were treated only for the purpose of this project, and the name of the company in which the respondent works, as well as the name of the person will not be provided.

## 3.4 Procedures

The first step was to find contacts of human resources departments in different companies within Switzerland. Once founded, the survey was sent through messages or mainly via emails. The emails were sent directly to the manager, if the contact was provided, or via the general email of the company, which decreased the probability of getting an answer. Professional platforms were not used very much. All the potential respondents were informed of the purpose of this project and provided with the direct link to the survey. After obtaining their consent on the first page of the survey, the respondent filled-up the survey, by providing first anonymous and general information about their current company and their experience as managers in it. Then, general, and more specific questions about the use of artificial intelligence in the human resources systems, their manipulation of data and ethics within their company. Once uploaded, the results of the survey gave inside on the importance of ethics and the way the arrival or the adoption of artificial intelligence in the HR systems impacted it.

To add more developed answers to the response we obtain with the survey, we contacted a manager and realized an interview. The question asked were similar to the survey, except that concrete example were provided and the questions were open to allow the respondent express freely.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                   22

## 3.5  Statistical analysis

All data were analyzed by transforming the qualitative answers into numerical ones. Then by using an excel file and an application STATA, statistical table were made to visualize the link relation between the different aspect and to analyze the data using probabilities. Thus, conditional probabilities were mainly done, as well as a tree diagram.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                          23

# 4. Results

## 4.1 Industry diversity

To ensure that the sample used for this research is representative and diversified, we wanted companies from different industry to answer to it. Thus, we used the random technique for this sample. As illustrated in figure 5, we had answers from HR managers working in 17 different industries. The two most represented industries are the service and civil service industry both with 21% which represent 4/19 responses.

**Figure 5: Industry score**
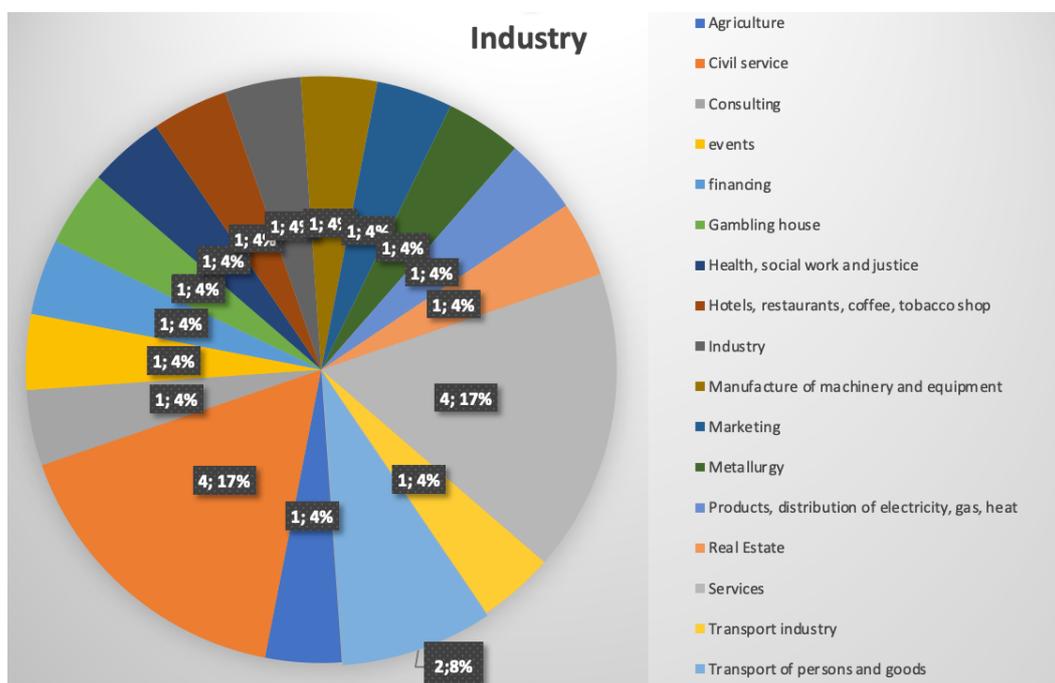


## 4.2 Usage of HRIS and AI in company

After requiring information about the industry, we wanted to know if the respondents use Human Resources Information Systems (HRIS) in their company and if any applications of Artificial intelligence (AI) with HR data are underway in their company. Table 1 shows the answers.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                    24

**Table 1: Conditional probabilities on usage of HRIS and AI's application**

| | | A: Use HRIS in company | | | |
|---|---|---|---|---|---|
| | Answer | A1: yes | A2: no | I dont know | Total B |
| **B: Knowledge of AI's application** | B1: yes | 4 | 1 | 0 | 5 |
| | B2: no | 3 | 4 | 1 | 8 |
| | I dont know | 5 | 1 | 0 | 6 |
| | Total A | 12 | 6 | 1 | **19** |

| | | | |
|---|---|---|---|
| P(A1) | 12/19 = **63%** | P(B1) | 5/19 = **26%** |
| P(B1/A1) | 4/12 = **33%** | P(B1/A2) | 1/6 = **17%** |
| P(B2/A1) | 3/12 = **25%** | P(B2/A2) | 4/6 = **67%** |

Table 1 demonstrates that in this sample the use of HRIS $P(A_1)$=63% is more common than the application of AI $P(B_1)$=26%. Additionally, we can say that the probability of using AI is higher when HRIS is already used in the company $P(B_1/A_1)$ =33% compared to the companies that don't use HRIS $P(B_1/A_2)$ =17%. Although the percentage of not having AI, while HRIS is already being use is only 8% lower $P(B_2/A_1)$ =25%. This can be explained by the fact, that 5 over 12 respondents "do not know" if AI systems are being used in their company. We can also compare the number of "I don't know" answers in the knowledge of AI's application (5 answers) versus the use of HRIS in their company (1 answer).

## 4.3 Artificial Intelligence and usage of Data

The second part of the survey was to analyze the confidence that managers have toward the artificial intelligence systems and its recommendations.

First, to know if they entrust AI systems, we asked them if they believed to the recommendations AI systems provide them to help in making decision. According to the results, we made a tree diagram shown in figure 6 below.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI       25

**Figure 6: Statistical tree diagram on recommendation of AI's system**

Do the IT applications used in your company make HR recommendations to you, e. g. for selecting or recruiting potential candidates, allocating tasks to employees, promoting an employee, etc.?

| Yes | No | I don't know |
|-----|-----|------|
| 5/19 | 9/19 | 5/19 |
| 0,26% | 0,47% | 0,26% |
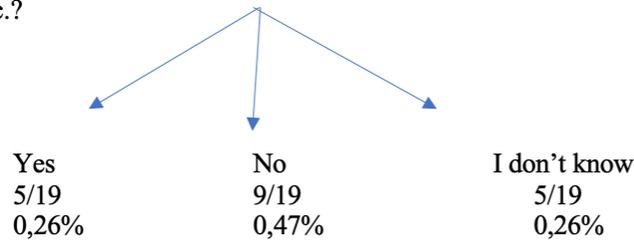
Do you trust the recommendations that artificial intelligence systems offer you?

| Yes | No | I don't know |
|-----|-----|------|
| 2/5 =0,4% | 1/5=0,2 | 2/5 = 0,4% |
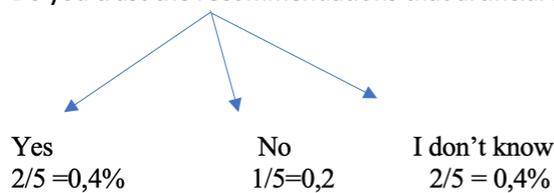
For the first question, we did not expect to have more than 5 positive answers, as in table 1, we had a total of 5 companies having AI systems. Therefore, by having 5/5 positive answers in the first question, we could assume that AI system generally provides recommendations to the managers.

The second question was only asked to the ones who replied "yes" in the first one. It is now interesting to see that among the managers who answered yes in the first question, only two of them trust the recommendations. Other two do not know and the last one of them answered negatively. Thus, to understand better their answers, we asked them if the recommendations were followed by an explanation of the system. The results provided in table 2 below demonstrate that the ones who trust the recommendation of AI, receive recommendation along with the explanation $P(B_1/A_1)$ =100%. Those who answered negatively or replied "I don't know" to the question about trust, do not get explanation with the AI's recommendation $P(B_1/A_2)$ =0% and $P(B_1/A_3)$ =0%.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                           26

**Table 2: Conditional probabilities on recommendation and explanation's trust**

| | | A: Trust recommendation | | | |
|---|---|---|---|---|---|
| | Answer | A1: yes | A2: no | A3: dont know | Total AI |
| **B: Explanation provided** | B1: yes | 2 | 0 | 0 | 2 |
| | B2: no | 0 | 1 | 1 | 2 |
| | B3: I dont know | 0 | 1 | 0 | 1 |
| | Total HRIS | 2 | 2 | 1 | **5** |
| | P(B1/A1) | 2/2 = **100%** | P(B1/A3) | 0/1 = **0%** | |
| | P(B1/A2) | 0/2 = **0%** | | | |

Also, to go further, we asked managers who do not obtain explanation, if they think it would be useful to have one, answers shown in Figure 7.

**Figure 7: Recommendation with explanations' usefulness**

| Q25 | Q26 |
|---|---|
| Are the HR-type recommendations of IT systems accompanied by explanations? | Do you think it would be useful to get an explanation of the HR-type recommendations that IT systems offer you? |
| I don't know | |
| No | Yes |
| No | Yes |

As we perceive in figure 7, the ones who do not trust AI's recommendation, share the idea that it is preferable to also obtain explanation. According to the results, we can say that if AI's recommendation is provided with explanation, managers tend to believe more in it, as they would have justifications as well.

This topic was also mentioned during the interview of a manager working in the HR department (see transcript annexed). According to the respondent A, Artificial intelligence's system are a very useful tool, as it helps to anticipate employees' behavior and recommend changes to improve their results. The respondent A added that AI is necessary to have more insight and additional information, but human is more reliable. Despite the commentary on the AI's recommendations, the interviewee did not seem to trust AI's system completely.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                          27

Secondly, questions about the use of data were asked. With the results in figure 8, we can compare the percentage of managers informing their employees about the use of their data, which is represented by the first column from the left with 68,4%, and the ones who constantly do so. The second column represent the number of managers who reinform their employees, if those data collected were reused for another purpose. The difference is 68,4% - 63% = 5,4% approximately. Interestingly, not all managers inform their employees, and some of them who do it the first time, do not necessarily do it again.

**Figure 8: Histogram about shared information**
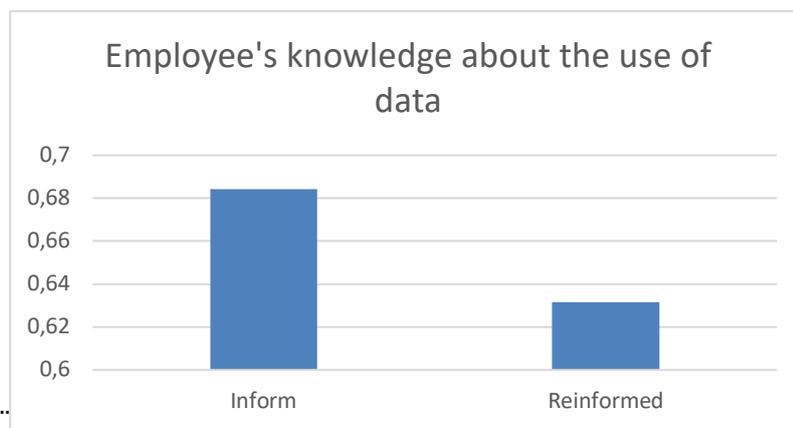


Similarly to the majority of the survey's participants, the respondent A of the interview confirmed that employees of the firm are informed about the utility of data collection, which is mainly for evaluation and evolution of employees in the department. We went further on this matter, as we discussed about sharing the personal data of employees with other managers. Indeed, the respondent believes that data must remain confidential and not be accessible to every manager. However, they can be shared if the employee changes the department or in the case of cross-management.

## 4.4  Consideration about ethics

Furthermore, another aspect we wanted to consider with this research is the perception of ethics in general and within the company. The majority believes that, in their company, ethics is more considerate $P(B_1)$ = 74% compared to the consideration of ethics in general $P(A_1)$ = 37%. It is interesting to see this large difference. Also, in the second line $P(B_2)$ of figure 6, we can see that managers who do not think ethics is sufficiently considered in their company, also think that it is not considered in general. Thus, they do not believe that ethics is sufficiently considered at all, $P(B_2 \cap A_1)$ =0, $P(B_2 \cap A_2)$ =3,

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                28

$P(B_2 \cap A_3)$ =0. On the opposite, if we do not consider the manager who do not know about ethics' consideration in its company, every manager who believes ethics is sufficiently considerate in general, believe it is in their company as well $P(B_1/A_1)$=6/6 = 100%.

**Figure 9: Conditional probabilities on the consideration of ethics**

| | Answer | A1: yes | A2: no | I dont know | Total B |
|---|---|---|---|---|---|
| | | **A: Ethics's sufficiently considered in general** | | | |
| **B: Ethics sufficiently considerated in the company** | B1: yes | 6 | 8 | 0 | 14 |
| | B2: no | 0 | 3 | 0 | 3 |
| | I dont know | 1 | 0 | 1 | 2 |
| | Total A | 7 | 11 | 1 | 19 |

P(A1)  7/19=**37%**  P(A2)  11/19=**58%**

P(B1)  14/19=**74%**  P(B2)  3/19=**16%**

P(B1/A1)  6/7=**86%**  P(B1/A2)  8/11=**73%**

P(B2/A1)  0/7=**0%**  P(B2/A2)  3/3=**100%**

P(A1/B1)  6/7=**86%**

Also, the Figure 10 bellow provide the results of managers who believe that ethics is important in their company and the use of decision-making tools.

**Figure 10: Conditional probabilities about decision-making tools and ethics' consideration**

| | Answer | A1: yes | A2: no | I dont know | Total B |
|---|---|---|---|---|---|
| | | **A: Use of ethical decision-making tools** | | | |
| **B: Ethics sufficiently considerated in the company** | B1: yes | 8 | 6 | 0 | 14 |
| | B2: no | 0 | 2 | 1 | 3 |
| | I dont know | 0 | 0 | 2 | 2 |
| | Total A | 8 | 8 | 3 | 19 |

P(A1)  8/19 = **42%**  P(A2)  8/19 = **42%**

P(B1)  14/19 = **73%**  P(B2)  3/19 = **16%**

P(B1/A1)  8/8 =**100%**  P(B1/A2)  6/8 = **75%**

With figure 10 we can claim that by knowing that ethical decision-making tools are used in the company, ethics is considered sufficient in the company as $P(B_1/A_1)$=100%. On

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                29

the other hand, we cannot conclude that the ethical decision-making tools are the only aspect considered for ethical consideration. As we can see in the figure 10, even some managers who do not use ethical tools, believe that in their company the subject matters, although it is not at a 100% $P(B_1/A_2)=75\%$.

To have some insights, we also asked managers to mention what kind of ethical tool they use or know, and the following were mentioned:

- Try to avoid as much as possible bias
- Competence and brains
- Tool named ETHICS
- Charters to sign (interviewee A)
- Certifications (interviewee A)
- Formation (interviewee A)

We obtained three different results, one is about having the capacities and being aware of what is being done, the second one is a model that manager can use to avoid making unethical decision, and last one is about avoiding biases. Also, the respondent A mentioned certification and charter, which provide ethical qualification to the manager. By interpreting the ideas, we may split the answers in three categories: tool, behavior, and qualifications. Indeed, the first two ideas are more about knowledge and behavior a manager should have to be ethically correct. The idea of charts and certifications could be documents that may be used as a guarantee of the manager's understanding and ethical behavior. The tool ETHICS is the only proposition mentioned, that could be used as a tool during the use of AI's systems and collection of data.

Also, the discussion on this matter during the interview lead us to the importance of transparency, empathy, and a constant support from managers towards their employees. In other words, according to the respondent A, to be ethically correct is having the right behavior towards employees and provide them with all the necessary information and explanation. Therefore, including formation about the topic of ethic and digital ethic would be a good idea, as it would arouse the interest of people.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                    30

## 4.5 Artificial intelligence and ethics

Lastly, we asked the respondents their opinion about the arrival of artificial intelligence and its potential negative impact on ethics, and about their thoughts on the results that an ethical HR data processing's implementation can have on employees' engagement. For these two questions, the respondents who responded "I do not know" are not taken into account.

**Figure 11: Histogram of AI's impact on ethics and ethic's impact on engagement.**
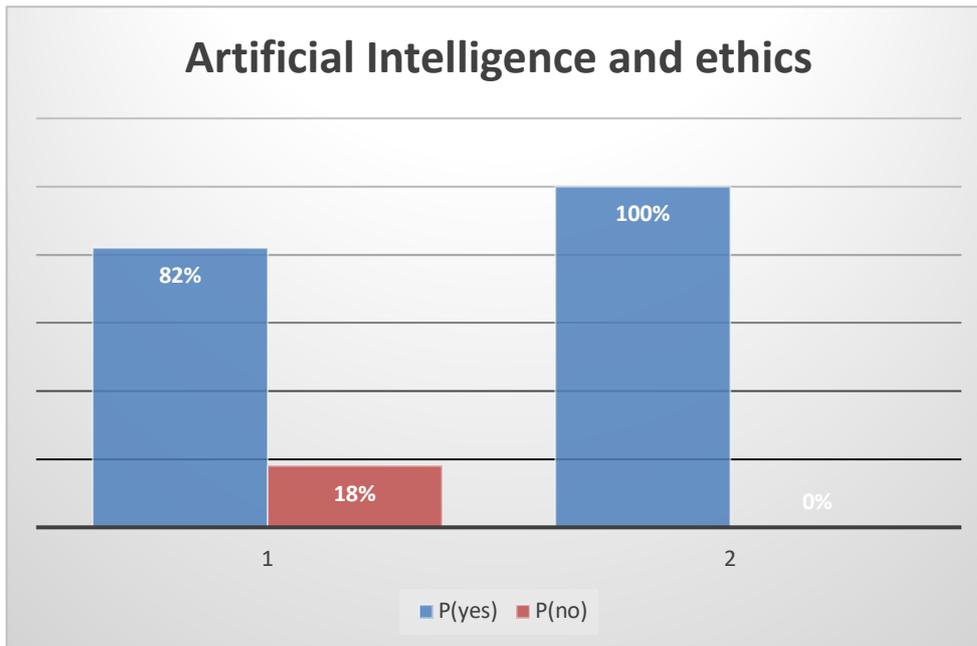


The columns on the left illustrate that the majority believe the arrival of AI can cause ethical problems. The column on the right represents a strong belief that using ethical HR data process may increase engagement of employees in the firm. Yet, it is interesting to mention that despite the believe of the good impact on engagement, only 42% of respondents do not use ethical tools (result in figure 10 $P(A_2)$).

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                              31

# 5. Discussion

## 5.1 Discussion of the results

The results in table 1 demonstrates that managers using HRIS might not know if application of Artificial Intelligence (AI) is currently in process in their company. We could interpret this result by saying that implementing AI in their system might not be decided by HR managers. Although, it is important to select the right AI system according to the objectives and the necessities of the firm, especially with the numerous suppliers providing HR information system combined with Artificial Intelligence, HR managers might not be informed enough on this matter to give their opinion. (Selecthub 2019). Moreover, as budget, the consequences on the firm, the configuration, the strategic objectives, and other important aspect should be taken in consideration, this decision is certainly up to the strategic apex of the company.

On the other hand, the question was specified on the use of AI's application or experimentation on HR data, which should be data HR professionals have access to, and with which they often work (SHRM 2005). Another interpretation which seems to be more adequate is that they might not distinct clearly the AI application with Human Resources information system.  AI is common in our daily life, sometimes human do not even realize that artificial intelligence is included in some applications. (HBR 2019) Similarly, AI applied on human resources system, or any application related to HR data may be something considered usual. Thus, supposition that HR department do not have sufficient knowledge about Artificial Intelligence (AI) in their company could be assumed. Perhaps, the respondents did not want to answer to the question, because either they did not know, or they were not sure. In both cases, it seems that there is a lack of concern on AI's application from HR department, which could be due to a lack of knowledge and understanding in this topic. As mentioned in the literature review, some authors claim that acquiring knowledge about AI and the functioning of the different AI's system should be important for HR professionals. That is because having more knowledge, means knowing which dataset is needed and understanding how to properly use it. (2021) Moreover, Human resources have numerous tasks that are mainly related to human. They make the link between managers and subordinate.  Personal, private, and sensible data from the employees are collected, stocked, and used by HR systems and shared with managers to help them make better decision concerning employees. Therefore, Human Resources are the center of the organization. (The rise of HR 2021)

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                             32

Consequently, adopting Artificial Intelligence concerns HR departments. They will help to implement it in the company by creating a new digital culture. To do so, HR department must acquire enough information to be able to transfer this knowledge or necessary documents to the employees.

Additionally, as we can see in the results in figure 11, there is a high percentage of participants who believe that the arrival of AI can cause ethical problems. This can also be related to the importance of understanding the technological advances. In fact, digital ethics are guidelines and principles that help managers and any users of AI system to behave correctly with the data used as inputs and outputs. (Klewel, 2021) Thus, understanding what data to use and how they are used within the system depend on the comprehension of HR professionals. By increasing awareness on the matter, it can have positive repercussion on employees, as it may increase the feeling of security. Ensuring that employees feel secured facilitated the transmission of data and provides confidence while using new systems.

By gathering all this information, we understand that even though the choice of applying artificial intelligence in HR data may not belong directly to the HR managers, it is important to consider that adding this kind of technology include introduction of a new topic that should be mastered by HR professionals, as it includes usage of delicate and private inputs. Information and sharing knowledge are key to understand and adopt the concept and be able to rely on the system. Therefore, the best supplier is not the only choice to be considered, but also how to incorporate a secured feeling about digital in the company. Many authors consider that HR department should be the one to use AI's system, as it relates directly to humans. However, the question about HR manager's expertise on technology arises. Humans are behind the creation of algorithm, the sorting of data to feed the algorithm, and the decision-making process. Thus, biased, discriminations, errors can occur often and in every step of the process. This is the reason why digital ethics is primordial when it comes to AI's system.

Figuring out what are the main criteria that lead to unethical behavior is difficult, but we could consider that sharing knowledge, capacity, skills, and empathy may help to avoid it. Thus, having a diversified team who decide about guidelines and principles the company must follow should be consider. IBM and Microsoft developed their own guidelines, as it should be done in every company, because it ensures that ethics is truly considered in the company. Also results in table 11 goes in that sense, as it demonstrates that managers believes that ethics are more considered within their company (74%) rather than in general (37%), and 73% of the participants who do not believe that is it considerate enough in general, believes

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                                              33

that in their company it is. Thus, developing a guideline for the company by also respecting the general digital ethics published might be a good way to adopt a culture of trust and digital. Managers from HR will probably be more focused on the human aspect, IT manager will have more knowledge on the technological functionality, and operating manager will have more experiences in the field and consequently be able to define some criteria and provide information about the business in general. This is an example of a diversified team that include managers with different background, skills, and capacities that they can share to assure that different facets are taken in consideration. Also, having managers from different department might increase the interest of employees in artificial intelligence, as their direct manager would be able to provide them direct information, communicate on the topic with their team and ensure that misunderstanding and mistrust do not appear. Consequently, the feeling of security and trust might facilitate the collection of data, as it may increase the willingness of employee to give them. Moreover, relating to the results in figure 11 showing a strong belief of managers thinking that using ethical HR data process increase engagement, developing good ethical principles by the team could be the way to start engaging employees. In other words, diversity in the team could be a good start to firstly ensure that a good understanding of the artificial intelligence and the importance of the dataset, and secondly to have a strong guidelines and principles agreed and followed by HR managers and other managers that work with AI's system as well, which might have positive impacts on employee's engagement. This bring us to another aspect, which is the ethical behavior of managers.

It is interesting to see in figure 8 that we do not reach the 100% of managers informing their employees about the use of their data (68,4%). Although ethics is a topic well known nowadays, informing employees do not seem to be integrated. It is then not surprising to see an even lower percentage (63%) of managers reinforming their employees if the previous data collected were reused for another purpose. Comparing these results to the ethical guidelines of Microsoft, IBM or even the general digital ethical principles given by EU commission, transparency is, among other value, the word that appear each time. Employee should know what the data are used for, as it can affect them, if they are misused by HR managers. Without the consent of employees, HR managers would not be able to have them and use them to make more accurate decision. We know that AI algorithm perform better if a good quality and quantity of data is provided constantly, consequently HR managers can rely more on the recommendation and proposition of the algorithm. Employees, who do not make the final decision, should understand them

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                          34

by having justification from managers. However, it would be difficult to believe their justification on their final decision if the managers are not transparent from the beginning.

At the same time, in table 2, we could see that managers who obtain justification along with the recommendation of the algorithm tend to trust the recommendation more. In comparison, the one who are not confident about the recommendation do not get explanation and think it would be better to have some. We could take this as an argument for the importance to understand how algorithm are developed and data are used to increase the performance of algorithm. Indeed, by knowing that, managers would maybe entrust the system even more. Despite the necessity of knowledge, these results could also be an argument to justify the need to be transparent and able to explain decisions to employees. Robots provides answers depending on their input and the way the algorithm is constructed. All of that is done by humans. However, when algorithm is well trained, it is a process that can be trusted as it is automated. Oracle's study showed that 64% workers would even entrust a robot more than a manager. (2019) This feeling might be, because of the lack of clear explanation and transparency of managers, which is kind of contradictory as the managers themselves need explanation from a robot to entrust it.

This lack of trust might be because humans create, teach, and use algorithms. Examples of bad algorithm are well known, such as the Amazon's recruitment algorithm. Thus, it is important to remember that human is behind algorithm and that Artificial intelligence is a tool used to help and not make decision instead of humans. The way we use output, coming from it, should be guided by principles related to digital ethics. The way guidelines should be decided are mentioned above, but the way we use these guidelines are another point. Figure 10 demonstrate that all managers (100%) believe that using ethical decision-making tools implies that digital ethics are sufficiently considerate in the firm. The tools known are Data Ethics Canvas, the tool ETHICS that can be used during all the processes, as their goal is to make the manager think about the consequences and the impact, his actions may have on the firm and the employee. Another perspective is to increase awareness and to arouse interest would be formations, followed by certifications. These tools are practical to ensure that at least HR managers are conscious and will try not to be biased. However, supervision is always needed, not only over algorithm, but also over HR managers behavior. Unconscious biases, discrimination, misuse of input and output can happen fast, as humans are not perfect. For instance, Activtrack proposing tools to track their employee's activity may be good to have information about their performances or anticipate a potential burnout. To respond to that, managers could give less work to the person sensible to a burnout, which he would justify by

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                    35

a technique of prevention. However, the employee in question could feel discrimination and loose his motivation for work, because of this decision.

Thus, it would be less risky to have a second opinion on this kind of important decisions. A list of important subjects, such as health of employees, promotion, bonuses, rewards, etc. could be made. By making a list of important decisions, HR managers, who make the final decision, could ask for a second opinion to ensure that it is ethical. Along with the idea of prioritizing the importance of HR decisions, it would be interesting to give this responsibility to a chief ethics officer, also known under chief trust officer. In general, chief ethics officer is responsible for developing codes of ethics, providing employees with training programs and assuring that it complies with government regulations. (Forbes 2019). Therefore, this person should have sufficient experience and expertise related on ethics. Having a job position in the company with this job description might be an extra assurance that ethical decision is made while implementing AI, using data to correctly teach algorithm, and considering output with good morals.

These tools were design after the development of algorithm. It would be interesting to find a way to build up algorithm with ethics by design. As it is complicated to fully understand how an algorithm is created, this way of doing might be more difficult and costly. The ideal solution would be to implement the questions of tools like Data Ethics within the algorithm to warn the user of the algorithm when the data is not appropriate and biased or when it seems that the dataset leads to discrimination. Another aspect, more feasible, would be to ensure that the supplier of AI's system have themselves a chief ethics officer following every step of the processes. The one providing the systems might be more focused on technology and the benefits to firms, rather than on the impacts it may have on culture in the firm, on managers and employees.

## 5.2 Limitations

Ethics is usually a term that is known, although sometimes the true understanding of the meaning may vary. However, the definition of digital ethic is not always understood by employees and people in general. Technology is constantly evolving and its usefulness in business is attracting considerable interest. Although the number of companies using Artificial Intelligence is increasing, it is not used by every companies yet. Moreover, digital ethics starting to be more and more addresses, is not yet known to everyone. Therefore, the answers obtain were not always related to the experience of the

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                                 36

participants, but on their thoughts and beliefs on the matter. It would have been ideal to get more answers from HR's managers with more experience on the matter. Also, the difficulty of the data collection is that the survey was conducted in the Human Resources department, it was difficult to contact the company, especially the larger firms which probably uses AI in their company. Additionally, ethics and the use of data is a delicate subject. Thus, managers may be more reluctant to answers to questions related to this. Some of the answers had to be deleted as the survey was not completed at a 100%. To contact HR departments and obtain answers was challenging, but it would have been great to obtain even more participants and managers accepting interview to obtain more details and a personal perspective.

## 5.3 Future research and implications for practice

This research is analyzing the concept of digital ethics related to the adoption of Artificial Intelligence in HR systems with a focus in Switzerland, where AI is an important concept and adopted by several companies. Firstly, it would be interesting to conduct a study with a broader geographical area. It would be a way to differentiate the impact of AI according to the different countries or industries localized in different regions.

The study was focused on the implementation inside the company and how the behavior of manager should be. Manipulating data that are private, personal, and sensible from employees must be considered with great attention, as a misused of dataset, or a wrong and biased dataset can lead to wrong decision-making. Finding of this research demonstrated that a potential correlation between a culture that highlight transparency, indiscriminatory behavior, fair treatment of data, empathy, respect, etc. and engagement may exist. In other words, an ethical behavior from managers could lead to an increase in engagement of the employees. Thus, it would be interesting to compare companies using ethical tools and the ones who do not and correlate this information with engagement. It has already been proven by Gallup's research that an increase in engagement, increases performance of employees. With the digital transformation within companies, digital ethics will be more considered, thus adopting ethical tools may become an added value to attract employees.

Beside the impact inside the company, it would be interesting to make research on the digital ethics principle being different between companies within the same country, and in a more international perspective. In other words, doing business with other companies, suppliers, distributors, etc. signify a possible to share data among them. But a cultural differences or different perception of ethics may cause different practices and use of these data. It would be interesting to research how this difference may impact the behavior of managers and the relationship he has with other businesses. General Digital ethics standards have been

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                    37

established by the EU commission, but as seen in the section above, every company will have its own guidelines, thus differences on the treatment of data might arise another issue and affect businesses.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                           38

# 6. Conclusion

The objective of this research was to analyze the impact of ethical issue derived from artificial intelligence in HR systems have on manager. Based on the results obtained, we could highlight the importance of understanding the concept of artificial intelligence and digital ethics, the behavior HR managers should follow and the necessities to lead, inform and insure employees.

Firstly, to anticipate any misuse of data or AI's system, the first step should be to understand it. Thus, acquiring knowledge about artificial intelligence, its benefices, digital ethics, the way algorithm are developed and the importance of qualitative and quantitative data to obtain accurate and unbiased recommendations, is extremely important. By doing so, HR managers would be able to understand the importance of using appropriate data as input and to make correct decision with outputs given from the algorithm. To promote learning and reduce non-compliance with digital ethics and governmental regulations, a diversified group in every company should create ethical guidelines, that should be followed by managers to make decision. Knowledge will be shared among managers, but also directly with employees via their direct managers. Although, HR department is the department that would help to create a digital and ethical culture, as their tasks are mainly related to the employees of the company, other managers being involve in the design of principle might increase the trust employees will have towards AI systems and HR managers' decision.

Secondly, tools that manager may consider ensuring that their application of data and their decision is ethically correct are mentioned. For instance, Formation, certifications, Data ethics tools is a model that make managers think about the consequences and impacts a decision can have.  The tools are helpful and used mainly after the development of the algorithm. It would be interesting to develop algorithm with ethics by design. In other words, as humans are implicated in the design of the algorithm, the selection and sorting of dataset used to develop the algorithm, and in the decision-making, an idea would be to add a system within the algorithm that can detect ethical issues. As the difficulty of completely understanding the mechanism of algorithm, this method might take time to implement and costly. Therefore, another proposition would be to have a chief ethics officer who ensure that every step during the entire process complies with digital ethics.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                    39

This research was conducted in Switzerland, where an interest for Artificial Intelligence (AI) exists. The analysis was done according to different industry, but no comparison was made. The goal was to understand the impact within the company, among employees and managers of the same firm. Going further and researching the impact of the difference ethical guidelines between different companies may have on businesses could be undertaken. As the availability of data is increasing and sharing them is not difficult, businesses may take the opportunity to collect more data and have more information about their customers and clients. But would the digital ethical divergences create a barrier to sharing data and doing business with other companies?

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                           40

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Lirika LATIFI                                                                                                              41

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The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                          42

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Lirika LATIFI                                                                                                          43

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The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                   44

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The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                          45

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The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                            46

# Appendix 1: Questionnaire

**Q1**: In which industry is your company? *open question

- List of industries to be selected
- others

**Q2**: How long have you been working at your current company? *1 answer possible

- < 5 years
- Between 5 and 10 years
- Between 11 and 20 years
- > 20 years

**Q3**: How many years of experience as a manager do you have? *1 answer possible

- < 5 years
- Between 5 and 10 years
- Between 11 and 20 years
- > 20 years
- No answer

**Q4**: Do you use your company's Human Resources Management Information Systems (HRMIS) e.g. SAP, Oracle, Workday, SAGE, etc.? *1 answer possible

-     yes     no     I don't know

**Q5**: Do you know if any experiments or applications of artificial intelligence with HR data are currently underway in your company?  *1 answer possible

-     yes     no     I don't know

**Q6**: Do you think that the use of AI as an aid tool can cause ethical problems? *1 answer possible

-     yes     no     I don't know

**Q7**: In general, do you think that ethics is a subject taken with sufficient importance today in the world of work? *1 answer possible

-     yes     no     I don't know

**Q8**: Within your company, do you think that ethics is a subject taken with sufficient importance today? *1 answer possible

-     yes     no     I don't know

**Q9**: Are employees in your company informed about the objectives of HR data collection? *1 answer possible

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                      47

- yes     no     I don't know

**Q10**: Similarly, if your company has to reuse previously collected data for another reason, will employees be informed? *1 answer possible

- yes     no     I don't know

**Q11**: Do the IT applications used in your company make HR recommendations to you, e.g. for selecting or recruiting potential candidates, allocating tasks to employees, promoting an employee, etc.?  *1 answer possible

- yes     no     I don't know

**Q11.1 (if previous answer is yes)**: Do you trust the recommendations that AI systems offer you? *1 answer possible

- yes     no     I don't know

**Q11.2**: Are the HR-type recommendations of IT systems accompanied by explanations? *1 answer possible

- yes     no     I don't know

**Q11**.3: Do you think it would be useful to get an explanation of the HR-type recommendations that IT systems offer you? *1 answer possible

- yes     no     I don't know

**Q12**: Do you think that the implementation of ethical HR data processing can have a positive impact on employee's engagement? *1 answer possible

- yes     no     I don't know

**Q13**: Do you think your company uses ethical decision-making tools? *1 answer possible

- yes     no     I don't know

**Q14**: What tools do the company uses? *Open question

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland.

Lirika LATIFI                                                                                                          48

# Appendix 2: Transcript of interview

**Q1.** Lors de la sélection des dossiers (Cv, lettre de motivation), quels critères prenez-vous en considération ? âge, expériences, connaissances, etc. *Si possible me les donner dans l'ordre d'importance.*

En principe, je regarde l'expériences, les connaissances et l'âge.

**Q2.** Si vous aviez à disposition, un système informatique permettant de faire le tri et la sélection de dossiers à ta place, est-ce que vous iriez quand même voir les dossiers non sélectionnés par le système ?  Pourquoi ?

Oui pour être certaine qu'il n'y ait pas de loupés

**Q2.2.** De même, est-ce que vous liriez les commentaires du système afin de comprendre la sélection ?

Oui, car il est important de connaître les raisons. Cela permet aussi d'avoir un justificatif pour les feedbacks.

**Q.3.** Est-ce que les managers ont accès à des données de types ressources humaines des employés, tels qu'adresse, âge, numéro de téléphone, le taux d'absence, la date de certification, etc ?

Oui uniquement des employés subordonnés

**Q.3.2.** Quel usage en font les managers de manière générale ?

Suivi pour les évaluations, évolutions,

**Q.3.3** Est- ce que les employés en sont informés ?

oui

**Q.4.** Est-ce que tous les managers ont accès aux différentes données des employés, ou uniquement le manager direct ?

Uniquement le manager direct

**Q.5.** Selon vous, est-ce qu'il est éthique que tous les managers aient accès aux commentaires fait par les autres managers ? pourquoi ?

Oui en cas d'évolution du collaborateur, changement de service, management croisé

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                                49

**Q.6.** Je ne sais pas si c'est toujours d'actualité dans toutes les entreprises, mais les managers « notent » ou « notaient » les employés afin d'octroyer des promotions, selon les mérites. Si vous aviez un algorithme qui permettait de le faire à l'aide des données stockées telles que le taux de travail par jour, le taux d'absences etc. Trouveriez-vous que l'algorithme serait plus fiable que le choix des managers, ou l'inverse ? Pourquoi ?

Pas plus fiable mais en tout cas un complément d'info utile.

**Q.7.** Si un poste à l'interne se libère, et que les managers ou le système informatique proposent les deux potentiels candidats :

L'ordre dans laquelle la liste est proposé est du plus convenable au moins convenable pour le poste

- Une personne ayant travaillée dans différentes unités, donc ayant beaucoup d'expériences et de connaissances.
- Une personne ayant uniquement travaillée dans une unité mais qui a de très bons retours en général

Accepteriez-vous la première personne proposée par le système/manager ? pourquoi ?

 Oui car l'expérience de plusieurs services et toujours un atout

**Q7.1** Si maintenant, le système prend en considération l'âge des candidats :
La personne que vous avez choisi à la question précédente est une personne *senior* (59ans), l'autre a 30 ans.
Choisiriez-vous toujours la première personne proposée par le système/manager ? pourquoi ?

Oui l'âge n'a pas d'importance. Même si je regarde l'âge lors de recrutement, pour une promotion il n'est pas important à mes yeux de regarder l'âge des employés en général.

**Q7.2.** Si la situation était inversée et que le manager de nous choisissait pas, car il vous considèrerait comme « trop senior ». Comment agiteriez-vous ?

- J'attendrais d'obtenir un feedback complet et des explications. Je chercherais à comprendre pourquoi le critère de l'âge est pris en compte

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Lirika LATIFI                                                                                                                                                 50

**Q.8.** Selon vous, comment les managers doivent s'y prendre pour ne pas être discriminatoire ou incorrects éthiquement parlant ?

Être transparent et present

**Q.9.** Connaissez-vous des outils éthiques ?

Ce qui en vient en tête sont des chartes à signer et des certifications

**Q.10.** Pensez-vous que l'empathie des managers est un bon moyen pour prévenir les problèmes éthiques ?

Absolument. Tout manager devrait avoir de l'empathie. C'est à mon avis un atout qui distingue les leaders.

The Impact of Artificial Intelligence base on Human Resources (HR) Systems on Ethical Management: A Case Study focusing in Switzerland

Lirika LATIFI                                                                                                                51