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Nudge or Puppet? Decision-Making, Ethics, and Leadership in the Information Age

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Abstract

In the past two decades, algorithm-based information technology has provided great convenience and a strong theoretical foundation for organizational leadership decision-making, since the analysis of contextual information from data analysis and mathematical models enhances decision-makers' judgments. However, improper use and insufficient understanding of information technology also bring negative results throughout the practical application. To eliminate adverse effects, organization leader requires rigorous ethical demands. A case study for IBM and literature review constituted the paper's methodology, analyzed through the East-West decision theory, the duality of information technology, and the ancient Chinese ethics. Also, the leadership ethics and the adaptive leadership theory established the theoretical basis for the argument, and the interpretation of *ethics* based on ancient Chinese from Yin and Yang theory set an alternative for organizational leaders to make optimal decisions.

Keywords: Decision-Making, Information Technology, Adaptive Leadership, Ethics.

Nudge or Puppet? Decision-Making, Ethics, and Leadership in the Information Age

A seemingly simple puzzle has appeared several times on my master's courses to remind the students that rational analysis is vital for judgment and decision making in achieving effective leadership. Try to answer it with the intuition:

"A bat and ball cost $1.10.

The bat costs one dollar more than the ball.

How much does the ball cost?" (Kahneman, 2013, p. 44)

When the puzzle jumped out for the first time, I wrote a binary equation on the edge of the notebook and got the answer in a few seconds. However, when the classmates reported the answer of "10 cents", I panicked and re-examined whether my equation was wrong because my answer was "five cents." Surprisingly, "five cents" is correct. It was irrelevant to the stereotype "Asians are good at math." Instead, I astonished the people's thinking pattern could change through training. Without my software engineering study in college, I probably would have blurted out "10 cents". To study about information technology such as algorithms and mathematical models has completely changed my original thinking paradigm and decision-making model.

After the deliberate training to use logic and rationality for analysis and judgment, I made better decisions than before. Later, I became more obsessed with rational thinking in work practice. As a leader, I used to expect our team could decide in a rational, objective and accurate way like a computer while avoiding emotional judgment and thinking as much as possible.

Such expectation seemed sensible. Decision-Making is a process that individuals filter the known information, find the correlation, and predict the unknown consequence or give the solution. At the organizational level, leadership has always been an essential part of the process

since they act. Moreover, rationality and logical thinking are conducive to information filtering and looking for intrinsic connections. Information technology achieves ideal rational analysis and judgment through algorithm and mathematic model. It also boosts decision-making's efficiency owing to the high-performance information processing capabilities. Therefore, information technology is not only an assistant but also become an ideology that has impacted the leader's decision-making models.

However, expecting human beings to decide like a machine is too idealistic to practice. Adam Smith's theory of economic man explicated why being rational is difficult. The economic man is "an imaginary individual created in classical economics and conceived of as behaving rationally, regularly, and predictably in their economic activities with motives that are egoistic, acquisitive, and short-term in outlook" (Economic Man, 2019). It is the best representative of the absolute rational decision-maker. The opposite of the economic man is the social man, which is characterized by limited rationality, lack of self-control and herd mentality. Most people, including me, of course, are all social man. To think and analyze by only instinct will inevitably bring uncertain factors and undermine the decision's efficiency. Therefore, utilizing machine and information technology appears to be the solution for people, especially organizational leaders, to make better decisions.

However, with the advent of the information age, new challenges and dilemmas befall us. The primary one that attracted widespread attention is the ethical controversy between the information technology's application and optimal decision-making.

This paper attempts to illustrate the correlation among information technology, leadership, ethics, and decision-making using lenses of decision theory, adaptive leadership theory, and Chinese classical philosophy. The paper also uses a case study for IBM to support the

hypothesis that whether algorithm-based information technology is a nudge or a puppet for optimal decision-making is depending on the ethical realization of the leaders at the practical level.

Statement of Problem

The development and popularization of information technology provide a safer and more convenient living environment for us than ever before. It also empowers organizational leaders to make better decisions. In general, the positive impact of technology far exceeds the negative impact. However, when we unlocked more powerful technology, we have lost some reverence as well. Even if technology opens a new world and brings development to humankind, we should still be careful and cautious (Satell, 2013).

In the movie *Captain America: The Winter Soldier*, the villain leader Hydra attempted to use Zola's algorithm to predict dissidents and eliminate them. Steve Rogers asked how to achieve, and Agent Sitwell[1] gave the following answer: "The 21 century is a digital book. Zola taught Hydra how to read it. Your bank records, medical histories, voting patterns, e-mails, phone calls, your SAT scores. Zola's algorithm evaluates people's past to predict their future" (Russo & Russo , 2014). Through data analysis, the reference information given by statistics or mathematical models can help the leaders overcome the limitations of "social man" to analyze the past, judge the present, and predict the future rationally. However, information technology's application brings a wide range of controversial ethical dilemmas.

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[1] Although this line comes from a superhero/sci-fiction movie, I suggest that he presented the power of the algorithm in the 21st century in the most understandable way.

Unbiased Technology?

The first dilemma comes from science's essence that information technology is unbiased and unethical. It has no sense of good or evil. Algorithms and mathematical models, as a branch of the natural sciences, typically represent the duality of science. It shows its dark side when misused. "After all, it did not involve prejudiced humans digging through reams of paper, just machines processing cold numbers" (O'Neil, 2016, p. 3). They use numbers to reveal the truth, and they can guarantee authenticity rather than fairness and justice. Therefore, when information technology assists leaders to decide the actual results of the numbers are likely to lead leaders to jeopardize consequences without ethical awareness. After all, *objective* and *ethical* are never synonymous.

Unethical Leaders

The second dilemma comes from the information technology's improper uses. They sometimes involve organizational leaders' unethical decisions, and sometimes are unconscious decisions made from leaders who underestimate the hazards of technology. Although algorithms and mathematical models are unbiased and humans develop them, when the organization leader interferes with the developer at the stage of technological research and development and implant personal prejudice, misunderstanding, and preference in the system, the system loses its impartiality. Also, in specific large organizations like government or IT company, their leaders have the privilege to use cutting-edge information technology. It is possible that some of them prefer to manipulate these technologies to influence public opinion and consolidate individual interests. Reported cases of improper use of information technology have undermined social justice, eroded public interests, and compromised democracy. In this case, information technology is not a safeguard for the better interests of the public, but an accomplice for a group.

When organizations use information technology to optimize decision-making, how to ensure the ethical supervision and regulation of leaders is an important issue that has caused general debate nowadays.

In the context of decision-making and leadership in the information age, the two dilemmas mentioned above point to the core of the dispute around leadership ethics. Then perhaps the potential solution should start from the perspective of leadership and ethics.

Statement of Purpose

This paper attempts to testify the proper application of information technology enhance organizational leaders to make optimal decisions while the adaptive leadership and leadership ethics sustaining such enhancement. Through the case study for IBM, this paper tries to confirm the following statements can be applied well in practice and bring positive outcomes: Algorithm-based information technology and organizational leadership decision-making should be mutually nudging, rather than unethical manipulation and abuse.

Significance of the Study

First, this paper combines Chinese classical philosophy as a theoretical basis to discuss the deeper meaning of ethics. It emphasizes the concept of ethics also needs the adaptability to change and discusses the ethics' guiding significance in leadership and decision-making.

Secondly, this paper verifies the adaptive leadership theory provides a solution to the controversial dilemma involving leadership ethics. In the past, changing ideas often was a sign of weakness or lack of conviction, but in the information age, this should be a strength to improve decision-making. Adaptable leaders embrace new approaches when necessary, and their ability to adapt enables them to confront challenges (Premuzic, Wade, & Jordan, 2018). Many of the doubts and negative evaluations facing the issue of leadership and decision-making in the

information age can be further improved through the combination of adaptive leadership theory and leadership ethics. At the same time, the adaptive leadership theory and leadership ethics mutually reinforce each other.

Finally, this paper attempts to combine the different philosophical views and theories of the East and the West to explain the emerging problems challenging the world today in the context of globalization. This attempt also proves that while we explore the unknown world, reflecting the wisdom of predecessors always brings inspiration for innovation.

Rationale

I got a report on my personality in a workshop from the leadership studies program. An intriguing conclusion was my natural personality and my adaptive personality were diagonally distributed in the coordinates. It means my natural thinking way and adaptive thinking way were in the opposite state. I used to be a very emotional, impulsive and sentimental person, and I am fighting my weak self-control till today. However, as I grew up, I recognized the importance of rational thinking. So, I have strengthened my rationality and logic and changed my original thinking system. The many difficulties and challenges I encountered in my work led to the conflict between the Nature Me and the Adaptive Me, which made me once want to bury the emotional part of my brain, and insisted on using computer algorithms or mathematical models to replace the workforce for decision-making. However, the suppression brought about the counterproductive effect: when communicating with others, the judgment and decision-making model ignored the irrational part of human nature brought much frustration to my work and life. The study and research in leadership studies program during the past two years has fundamentally made me recognize I must learn to find a balance between rationality and sensibility. At least when it comes to leadership and decision making, the two are indispensable.

Chinese classical philosophy has primarily shaped my existing ideology. I believe the core values of my family generated from the combination of Confucianism and Taoism, so the principles, methods, and beliefs are all generated from here. I deeply inherited them, especially when I came to the United States and communicated with people of different cultural backgrounds, I have never seen these beliefs and mindsets engraved in the depths of my soul. Therefore, when I studied Western philosophical theories, I cannot help but comparing the two, considering their similarities and differences, and integrating both to become my intellectual property.

My research in leadership studies shows that Eastern and Western cultures have tried to reach the same goal in different ways since ancient times. Despite cultural differences, as human beings, we explore the unknown together and strive to lead a better life. We try to learn how to love and be loved. Together we look for value and meaning as human beings. The pursuit of the meaning of matter itself is eternal in time and space. Therefore, the combination of the two will be an excellent position to inspire innovative leadership theory.

Therefore, at the end of my study, I hope I can combine my practice with the theory I learned, connect my past, present, and future, and use a form of a research project to commemorate the adaptive change that occurs in my ideology.

Literature Review

Leadership and Decision-Making Model

Ancient Chinese military decision theory. According to historical books and myths, since the middle of the Neolithic Age, China has experienced several complicated wars (李[Li], 2008). Based on these wars as a practical experience, Chinese military theories had matured a long time ago, among which *Sun Tzu's the Art of War*[2] is most famous.

Sun Tzu's Art of War was born in the Warring States period. It recorded many easy-to-understand but practical decision-making guides, which provided the technical instructions for the policymakers or the leaders of the country. Through the analysis of historical events and the observation of the objective world, *Sun Tzu's Art of War* gave a series of specific decision-making suggestions. The general analyzes the operational situation by observing the weather and terrain; by observing and assessing the behavioral habits of the sergeants, the monarch knows whether they can lead the army. Most of the Chinese classical philosophy embodied with practical rationalism, including *Sun Tzu's Art of War*, which made it not only applicable to the decision analysis for national organizations, but also applicable to individual decision-making training.

Although from the perspective of modern science, some of the suggestions are crude, lack systematic quantitative analysis and look mysterious, they still could show how leaders in ancient time collected and used information in decision-making. Until now, *Sun Tzu's Art of War* has been still functional and accessible in many cases such as modern politics, military,

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[2] Since I have not found an ideal English version, the content of Sun Tzu's Art of War cited in this article was translated all by myself.

commercial, and non-profit sectors. Its idea also inspired some Modern Western management and leadership studies.

Leadership and decision-making. "Decision presupposes a decider and a choice among alternatives with a reference to some goal" (Allison & Zelikow, 1999, p. 16). Decision makers are often leaders in the organization or leadership groups. *Sun Tzu's Art of War* primarily emphasized the significance of leadership in the decision-making process:

The general is the assistant of the monarch. When the aid is right, the country will be stable; if there are mistakes, the country will inevitably decline. …There are three aspects of the damage caused by the monarch to the army: the monarch does not know that the army cannot advance, but commands them to move forward or does not know that the army cannot retreat but orders them to retreat. It is called restraining the army; the monarch does not understand the military affairs but interferes with the military administration. Then, the sergeant will be confused; if the monarch does not know the political game in the army but participates in the military command, then the soldiers will doubt. If the generals and the soldiers are both confused and doubtful, the catastrophe that the princes took the opportunity to attack will come. It is to lose the victory from chaos (孙[Sun], 2017).

At the beginning of the book, the author proposed: War is the top priority of the country. It is the key to the survival of the people, and the way to determine the survival of the country. It must be carefully investigated and studied (孙[Sun], 2017). The monarch decides whether to launch a war, or the general decides how to deploy military forces, plays a vital role in the fate of a country and the people's livelihood, and affects international peace and justice. Thus, the leader's decision-making process is the core of this military theory.

Rational analysis model. During the Warring States period, it was an essential ritual that using divination to predict the outcome of the war and paying attention to the god's opinion from divination before a battle start. However, Sun Tzu (5th century BC) partially denied such an approach. Instead, he emphasized the objective rationality of human judgment.

The monarch should avoid waging war under sudden anger, and the general should avoid fighting against the enemy with personal grievances. Only when it corresponds to national interests can they act. Anger can be appeased, grievances can dissipate, but the country will no longer exist once it is destroyed, and people will no longer live once they die. Therefore, a wise monarch must be cautious about the war issue, and a good commander must be vigilant against the war. It is the key to national stability (孙[Sun], 2017).

Sun Tzu (5th century BC) believed that during military decision-making, leaders must have absolute objectivity and rationality. All judgments should come from practical interests, rather than any emotions and any god's opinion. They should not replace or influence judgment and planning (李[Li], 2008).

Information, technology and decision making. *Sun Tzu's Art of War* emphasized the critical role that mastering information plays in the decision-making process. The information here covers a vast range. The leaders need to be familiar with essential information such as seasons, climate, and weather changes; they also need to be familiar with warfare information such as battlefield terrain and human resources. In addition to maintaining rationality and controlling over information, proper use of technical means is also important for leaders to make decisions and complete tasks.

Only knowing our military can attack but not knowing the enemy are not embattled, the probability of winning is only half. Only knowing the enemy are embattled but does not know

our army cannot attack, the winning possibility is only half as well; knowing the enemy are embattled and knowing our army can attack, without knowing the terrain is not suitable for us, and winning possibility is still only half. Therefore, the generals who genuinely understand the military strategy are acting with a clear purpose and the measures taken are endless and flexible. To understand the enemy and ourselves, we will be unbeaten. If we understand the external environment and internal human resources, we will be able to win forever (孙[Sun], 2017).

It is worth noting that the information warfare in ancient times often had a camouflage of divination. The ancient Chinese divination was the accumulation and summarization of the experience and objective phenomena by the ancients through simple analogy and induction, and then formed the mysterious metaphysical theories for future generations. The theories served to consolidate the rules' authority by using information asymmetry to convince the people that the god empowered them to dominance. Zhuge Liang, an outstanding political strategist in the three kingdoms period in China, had a famous victory that is *Borrowing the East Wind* through divination. Did Zhuge Liang *borrow* east wind from the gods' power? No, the fact was he borrowed the name of divination to observe the weather and the terrain, thus judging the situation of the enemy, defeating the enemy by natural forces at a specific time, which won himself an excellent reputation and loyal followers.

Conclusion. Sun Tzu (5th century BC) concluded in the chapter of "Attack by Stratagem" in *Sun Tzu's Art of War*: Therefore, the best military strategy is to win the enemy by strategy. The secondary one is to win the enemy by diplomatic means. The ordinary one is to defeat the other side on the battlefield by launching a war. The worst strategy is to attack civilians. …Leaders who are both familiar with the enemy and themselves is unconquerable in every battle; leaders who are familiar with themselves but not enemy, the chance of victory is

half; and leaders who neither knows the enemy nor knows themselves will be defeated in every battle (孙[Sun], 2017).

In general, *Sun Tzu's Art of War*'s decision theory emphasized that leadership is one of the crucial factors influencing optimal decisions. In all organizations, leaders require to analyze the most comprehensive information. With rational analyzing skills and the adaptability to continuous self-correcting, leaders make more accurate judgments and decisions under uncertainty, and It is conducive to organizational development. From modern leadership theory's perspective, Sun Tzu's expectations of organizational leadership acquire the qualities of adaptive leadership.

The essence of decision. When we turn attention from ancient Eastern philosophy to the Modern Western theory, we find in the west organizational behavior analysis is an indispensable part of leadership studies and decision-making theory. In the book *Essence of Decision: Explaining the Cuban Missile Crisis*, the author, Allison Graham used three conceptual models—rational actor model (model I), organizational behavior model (model II), and governmental political model (model III) to analyze the decision-making process of the U.S. government during the Cuban missile crisis. The analysis targets of the three models ranged from individuals to general organizations to governments, and they analyzed the same situation at three different levels. Although the discussion of the models aimed at national and governmental behaviors, the thorough analysis of the decision-making process of individual actors and collective actors made their theory applicable to a wide range of organizational leadership decision-making analysis.

Rational analysis in decision-making is the basis. The model I considers the organization as a unified actor. Explaining international relations by analyzing the purpose and benefit calculations of the country or government is an iconic approach to this model. Rationality

requires such model to be consistent, which means the purpose of the actor and the action should be consistent, and the principle of the chosen optimal solution should be consistent. In other words, the rationality means the behavior is consistent with a specific goal in a given situation (Allison & Zelikow, 1999). Like the rational decision theory proposed in *Sun Tzu's Art of War*, both the ancient Eastern military strategists and the western modern political scientists agree on the importance of rationality and objectivity in the decision-making process.

In modern decision theory, the rational decision problem is reduced to a set of multiple-choice questions, and each option represents an alternative to a particular result. The agent sorts all results based on efficiency and then choose the optimal choice. The "economic man" defined in modern decision theory and game theory makes the optimal choice in a clearly defined context of strict restrictions (Allison & Zelikow, 1999).

Leadership decision-making needs to fully consider organizational behavior analysis. Model II does not regard organizations (such as a government) as a single actor but as a collection of loosely assembled sub-groups that are relatively independent. Organizations have their unique attributes that determine the complex impact of organizational behavior on leadership and decision making, rather than merely logical reasoning and analysis as Model I.

Organizational behavior has inertia because the existing organization and its routines and programs constrain its next behavior. The organization is neither a person nor a group of technical equipment. This characteristic of the organization is analogous to a computer that only the combination of hardware and software can exert its powerful performance. It is also inevitable that such a combination will limit the next attempt of the organization (Allison & Zelikow, 1999).

Due to the similarity of the operating principles, we analogize the working mechanism within the organization into a computer. It provides a framework that the organizational decision-making process can imitate the information processing in computers for optimization and self-upgrading, which is the standard operating procedures within the organization.

The organization sets rules, norms or conventions for operation and repetitive evaluation. Organizations tend to offer options stably and consecutively. Consequently, the range of alternatives is severely limited, and success is more likely to comply with relevant rules merely. It is too complicated for organizations to consider an uncertain future when acting. Thus, the selection process of the organization is based on short-term feedback (Allison & Zelikow, 1999).

Allison (1999) believed that when the organizations are processing information, it is the sub-groups' consequences that are proposing various options and evaluating the options. When these sub-groups act following the rules, it represents the organization is acting. Therefore, in model II, organizations' behavior is the result of various sub-groups' operation based on standard behavior patterns, rather than a result of careful selection.

Assigning individual properties to groups is unwise. "Individuals are rational, but a group is not, since it may not even have transitively ordered preferences" (Allison & Zelikow, 1999, p. 271). Thus, when leaders decide or analyze some established decisions, it is necessary to fully consider the characteristics and differences of organizational behaviors and individual behaviors.

Information technology helps to enhance the effectiveness of multi-participates decision-making models. Allison (1999) interpreted model III as a complex stage that various actors perform various games on it. In addition to the core within the organization (especially the government), various parts of society, such as the executive branch, media or non-governmental organizations, and the public, are also involved. These peripheral components continue to

influence the government or organizational decisions or actions and constitute a decision-making environment. Model III focuses on the analysis of people who participate in game interaction, whether they are inside or outside the organization.

Multi-participation decisions often mean better analysis of information about the situation. Increasing the number of participants can be brainstorming. By taking thorough consideration of all parties' interests and goals into the analysis, the decision makers avoid many apparent shortcomings. However, too much information and analysis impair decisions too, such as slowing down the decision-making cycle or increasing internal consumption. Moreover, as the number of participants increases, decision-makers must consider more different interests.

The economics gives a theory to alleviate the concern mentioned above: As far as the decision-making process is concerned, the decision maker is the principal, and the agent is the participant who provides advice or assistance in the decision-making process of the principal, i.e., the decision maker. In most complex decision-making processes, the interests, information, and expertise of an agent fail to transfer to a principal entirely. Even if there is only one person who makes the final decision, those agents are active participants. The agents influence others to pay attention to specific interests in decision making and make them look legitimate. Therefore, in most complex decisions, the agents get involved in the game, and they do not just act faithfully on behalf of their principles (Allison & Zelikow, 1999).

For example, in the relationship between the doctor and the patient, the patient is the principal, and the doctor is the agent. In terms of disease diagnosis and treatment information, there is information inequality between the two, and the interests of both parties are divergent. For the patient, curing the disease and reducing the pain as much as possible, or reducing economic investment is their principal interest appeal; but the doctor may want to increase the

extra income by selling drugs, or try to treat the patient as a medical research object. Accordingly, the information provided by the doctor may be inconsistent with the patient's interests. However, an information technology product replaces the doctor someday, such as artificial intelligence, then the algorithm can be set to provide a diagnosis without the pursuit of interest, and then the agent (artificial intelligence) can maintain the interests of the principle (patient) and make the appropriate decision.

Although the analysis of organizational behavior indicates the identity of individuals in an organization is irrelevant to collective action, organizations must consider how to suppress and eliminate these individual traits that impact on the organization when designing specialized practices. Therefore, some economists have suggested establishing more advanced and sophisticated procedures to make all information shared without cost or to converge the agent's dominant interests with the principles. It may help to curb the negative consequences of this problem in decision making (Allison & Zelikow, 1999).

When organizational leaders need to decide how they should choose a model to analyze a situation or decision, Allison (1999) suggested that by using different conceptual lenses, the decision analysts will understand the different causal problems that are highlighted by these models, thus improving the interpretations of the past, revealing a significant misunderstanding of the present, and clarifying those alternatives that may shape the future. Also, due to the complexity and depth of the analysis object， the information demanded by model II and model III exceed that needed by model I (Allison & Zelikow, 1999).

Nudge theory. In addition to initiating a judgment or a decision, organizational leaders are often responsible for guiding others to make decisions. They create nudges by changing the choice system without restricting the freedom of choice, helping people who are real and easy to

make mistakes to make better decisions. The nudge theory not only optimizes the decision-making model of the organization leader but more importantly, it also indicates another role of the organizational leader, that is, the "choice architect" (Thaler & Sunstein, 2009, p. 96).

Organizational leaders are the choice architects. Because of the peculiar position and authority, leaders in organizations such as governments or large corporations have possessed more resources and conditions that the general public lack. Therefore, when making full use of these resources to make self-benefit decisions, they should also be responsible for optimizing the choice architectures in real life to help the public make better decisions.

How to nudge the public, i.e., to succeed in guiding the public making the right choice without intruding their freedom of choice? A concept called "Libertarian Paternalism" (Thaler & Sunstein, 2009, p. 4) provides clues.

Choice architects should encourage people to do what they want freely rather than what they reluctant. If a proposal or policy intends to influence the way that people are making a choice and benefit them, then it is *paternalistic*. When using *libertarian* to describe *paternalistic*, it emphasizes the defend to liberty. The libertarian paternalistic highlights the efforts of choice architects, which could influence people's behavior and make them live healthier, wealthier and happier (Thaler & Sunstein, 2009).

However, in real life, there are many obstacles to human nature that prevent the public from making the right choices. Unless everyone can keep an economic man's mind all the time and have an ample knowledge base like an encyclopedia, there will be no unwise choice.

A Binary Choice is much easier than a multiple-choice since people make choices depends on the complexity of the options. When people are dealing with simple options, they tend to analyze and weigh all the options. Whereas, when the scope of the options expands, the

information people need to consider and weigh significantly increased. If there is no rational judgment and professional knowledge, the decision will be tricky (Thaler & Sunstein, 2009).

Information technology improves choice architecture. What needs to be highlighted here is that the emergence of modern computer and Internet technology enhances the user-friendliness of choice architecture, making it easier to choose, e.g., Amazon's "You may also like..." or Netflix's "Because you have seen… (then recommend a new movie)." An algorithm nudges such recommendation called "Collaborative Filtering" (Thaler & Sunstein, 2009, p. 98).

The function of collaborative filtering is to diminish the complexity of the choice architecture. If people know what others with similar preferences will choose, then they will be more confident when selecting unfamiliar products. For many people, Collaborative Filtering simplifies the analysis and trade-offs of all options (Thaler & Sunstein, 2009).

The responsibility of the choice architect is not to replace the public to choose, because it deprives them of their freedom of choice. "Structuring choice sometimes means helping people to learn, so they can later make better choices on their own" (Thaler & Sunstein, 2009, p. 99). In addition to considering personal goals and interests, when they design the choice architecture, organizational leaders should always keep in mind the benefits of the public.

Technology is A Double-edged Sword

The bright side of information technology. Before discussing information technology, it is necessary to clarify its concept. Information technology was defined as consisting of several related parts: First, represented by high-speed computers, information technology processes large amounts of information rapidly. Besides, represented by techniques like mathematical programming or methodologies like operations research, information technology focus on the practical application of statistics and mathematical methods in decision-making. Finally, represented by artificial intelligence, information technology simulates higher order thinking through computer programs (Leavitt & Whisler, 1958).

Information technology has already impacted on middle and senior management in the organization. On the one hand, information technology moves the boundary between strategy and performance upward. The operational rules governing daily decisions program more work, form a standard operational process, and reduce anomalies. On the other hand, large industrial organizations are re-centralizing, and senior managers are primarily responsible for innovation, planning, and other creative functions. (Leavitt & Whisler, 1958).

Algorithm-based information technology, as a branch of the natural sciences, is inherently capable of ultra-high performance that humans fail to replicate, such as the objectivity, rationality, precision, and high-speed. People always expect the machine is attaining general human intelligence. More precisely, people try to facilitate machine common sense and productive learning and reasoning ability. Furthermore, people are looking forward to seeing the machine can plan to meet the challenges of complex information processing now and future. (Bostrom, 2014).

Algorithm supports decision-making. Combined with the essence of decision-making, the optimal decision is born from the theoretical optimal information processing, analysis, and prediction. Machines or information technology seem to be our best helper when limited rationality and our inability restrain us from containing insults and thus fail to make the most rational judgments and decisions.

> Behind the razzle-dazzle of machine learning and creative problem solving thus lies a set of mathematically well-specified tradeoffs. The idea is that of the perfect Bayesian agent, one that makes probabilistically optimal use of available information. This ideal is unattainable because it is too computationally demanding to be implemented in any physical computer. Accordingly, one can view artificial intelligence as a quest to find shortcuts: ways of tractably approximating the Bayesian ideal by sacrificing some optimality or generality while preserving enough to get high performance in the actual domains of interest (Bostrom, 2014, p. 11).

In theory, algorithm-based information technology can make optimal decisions to replace the workforce. The workforce here includes an organizational leader and the general public. It also echoes the nudge theory, which is Internet companies using algorithms to provide users a more efficient and personalized choice architecture.

Information technology redefines organizational management and leadership. While providing a viable alternative for rational decision-making, information technology represented by artificial intelligence has begun to upend organizational management and leadership. Between 2014 and 2015, the Accenture Institute for High-Performance surveyed 1,770 frontline, mid-level, and executives from 14 countries. It was mainly about the potential impact of artificial

intelligence on their work, their perception of current tasks and skills, and the future of their positions.

From a technical challenge lens, AI releases the organizational manager from internal coordination of administrative tasks within the organization by automating the standard operating procedures. Although it is challenging to automate human's judgment, intelligent machines significantly improve organizational decision-making by assisting decisional data. 78% of the managers surveyed believe they will trust the intelligent system for making business decisions in the future.

From the adaptive challenge lens, however, people also realize the results of artificial intelligence mining of the data are only the result of objective analysis. Optimal decision-making often requires managers to use their organizational history and cultural knowledge, as well as empathy and moral reflection to provide insight, which AI is unable to achieve. It mirrors the essence of human judgment: "the application of experience and expertise to critical business decisions and practices" (Kolbjørnsrud, Amico, & Robert, 2016). Also, after AI has liberated all levels of leaders from the tedious administrative work, they have more time and energy to carry out creative thinking and experimentation to strengthen organizational innovation. Furthermore, the survey pointed out in the AI era, the soft skills of leaders are more important than before. Organizational managers' social skills for networking, coaching, and collaboration will also contribute to their growth and achievement (Kolbjørnsrud, Amico, & Robert, 2016).

The report argues that although artificial intelligence proves its actions are cheaper, more efficient, and more just than humans, however, it should not be the manager's concerns. It means the manager's work will change, and they need to pay more attention to tasks that only humans

can do. The change and progress in consciousness further confirm that information technology is transforming organizational leadership and their decisions in a positive way.

The dark side of information technology. The algorithm-based information technology has provided a strong theoretical basis for human decision-making in the past. The reference information given through data analysis and statistics seems to push people to evolve from social man to economic man and make better decisions, but challenges emerge as well.

Crisis due to the nature of the algorithm itself. We initially thought to rely on mathematical tools and algorithms could make better decisions more rational, objective, and efficient, but they are incapable of judging human values. The essence of algorithms and mathematical models evinces their indifference to virtue. They lack the human-specific cognitive ability for good and evil. Therefore, the scientific rationality is also inhuman, and under certain conditions, it sacrifices fairness and justice.

Algorithms and mathematical models have studied all aspects of people's lives, always predicting their credits, and used the results to assess whether they have the potential to become criminals in addition to their respective social roles. The mathematical models rely on the built-in logic, define what they handle and then justify the output with their definition. These models continue to self-consolidate and develop. Sometimes they are destructive.

Since mathematical models are designed to evaluate extensive information, they are good at handling vast amounts of data, and processing costs are low, which is indeed their advantage. However, the privileged class tends to handle problems one on one and benefit from personal input, while machines and data manipulate the public. The unconscious use of data by the algorithm distinguishes the group and separates the privileged class from the middle class and

the poor class. It is an unbiased algorithm that creates injustice and undermines democracy without intention (O'Neil, 2016).

Human beings have an ideology, empathy, and subjectively close to goodness. The term *fairness* is not neutral. Therefore, in many cases, a significant decision requires a certain degree of humanity and ethical values.

Crisis due to organizational leadership decisions. In September 1996, then-President Bill Clinton signed a marriage protection law that violated the gay couples' right two months before the re-election campaign for the votes of several conservative states. Conversely, soon IBM announced the provision of health insurance benefits for their homosexual employees and their spouses. Since other technology companies competed for talents at the time, most of them provided specific benefits to gay couples. IBM spokespersons also admitted that the move was mainly to attract talents and facilitate business competition. This incident showed whether the enterprises would choose to correct when they knew their human resources algorithms are wrong, largely depended on the interests of enterprises.

> Gay rights benefited in many ways from market forces. There was a highly educated and increasingly vocal gay and lesbian talent pool that companies were eager to engage. So they optimized their models to attract them. But they did this with the focus on the bottom line. Fairness, in most cases, was a by-product (O'Neil, 2016, p. 202).

Although higher levels of fairness and justice are undoubtedly conducive to enhancing the overall interests of society, as well as organizational business leaders can choose to correct errors in their HR algorithms, but individual companies fail to derive real benefits from them in short-term. Most of them still consider mathematic models to be a handy tool. Thus, using

similar attitudes and methods to correct the dark side of the algorithm to society is still challenging.

Give algorithm ethics. When comprehensively considering algorithm-based information technology to influence the decision-making and leadership of organizational leaders, improper use of these technologies also leads to a series of severe consequences.

There is no doubt that the heart of the matter has been linked to leadership ethics. Algorithms or mathematical models as a science, have no moral concept, and therefore whether they are used ethically or not depends on the leader who makes the decision.

> Big Data processes codify the past. They do not invent the future. Doing that requires moral imagination, and that's something only humans can provide. We have to explicitly embed better values into our algorithms, creating Big Data models that follow our ethical lead. Sometimes that will mean putting fairness ahead of profit (O'Neil, 2016, p. 202).

Existing theories and researches have reflected when the organizational leaders or decision makers have higher moral consciousness, and they can be more responsible for social justice and fairness in this era.

Leadership Ethics

"This is one of the characteristics of good leadership— doing what you think is right, even when this means leading and not following the crowd" (Manning & Stroud, 2008, p. 3) When organizational leaders are making judgments and decisions about the emerging technologies' utilization and future development, how to decide right and how to define *right* depend on their leadership ethics.

"For Aristotle, the essential attribute of humans was rationality, whereas for Confucius the essential attribute was the capacity for morality where this is fleshed out in terms of relationships grounded in compassion and respect" (Manning & Stroud, 2008, p. 94). When a person is morally correct, we call it ethical. Regarding leadership ethics, modern Western leadership studies have given many mature interpretations. However, here we may try to find a new lens from China's oldest literature to analyze the concept: how people acquire *ethics*?

The origin of ancient Chinese *ethics*. The English word *ethics* corresponds to modern Mandarin as *道德*. The term can be traced back to the Taoism masterpiece *Tao(道) Te(德) Ching(经)*.

In ancient Chinese, *Tao*(道) was initially intended to be *the road*, and it was defined as *norm* and *guideline* later. At the same time, *Tao* is also an important concept that means *natural law* in Chinese classical philosophy. Confucianism, Taoism, Legalism, and Buddhism all discussed and interpreted this concept. The original meaning of *Te(德)* is also related to walking, which means *climbing up the mountain*. Its extension is to follow the law of the *Tao* to develop the product of its fundamental change, i.e., to gain and obtain. After several transformations, *Te* in modern Chinese means virtue, personality or inner strength;

In ancient Chinese, *Tao* and *Te* are two concepts, and the combination of words means non-stop moving forward and gaining something. My understanding of the change on the term *Tao Te/ethics* is people gained truth during continuous learning, thus forming a common social rule that was universally accepted by the public. Then it in line with the modern meaning of *ethics*: the study of moral standards and how they affect conduct. This view is consistent with the definition in Xunzi's essay "An Exhortation to Learning": Not until someone learns to the end of

the truth, norm and self- regulation, then they can reach the peak of ethics[3] (荀[Xun], trans. 2014).

The concept of *Tao* from Taoism indicates the contradictory opposites in the movement are transformed into each other (李[Li], 2008); This interpretation gives the term *ethics* a feature that may only exist in Chinese philosophy: *Ethics* is always in a state of change. The change is both adaptive to changes in external conditions and its inherent duality.

The ancient Chinese of *ethics* means continuous exploration and non-stop learning to the objective world. Therefore, leaders should first pursue the realization of ethics by continuously learning, adapting and changing. Then they can maintain ethical dynamics and making correct decisions.

Leadership ethics in Yin and Yang framework. *The I Ching* (the Book of Changes) is the primary of all the Chinese classics. It has been the foundation of Chinese philosophy since ancient times. It was initially a book of divination, and it used a set of symbolic systems with the Yin and Yang framework to describe the ultimate forms of nature. It includes *always changing*, *not changing*, and *simply changing*. This framework represents the cosmology and methodology of Chinese classical culture. First, things are always changing, following the orbit of gestation, development, summit, and decline; secondly, the fact that things are *always changing* is never changed; finally, the principle of the above mentioned two changing forms is quite simple, so people can learn, master, and utilize them. The interpretation of the hexagrams in the content has much practical significance and reference value, and it still brings inspiration to our daily life.

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[3] Source text: 故学至乎礼而止矣，夫是之谓道德之极。

The seventh hexagram of *the I Ching* analyzed the military and the situation of war. Based on this theory, we interpret its unique leadership theory and moral value from Yin and Yang framework:

Shih/ THE ARMY: The army needs perseverance and a strong man. Good fortune without blame4 (孔[Confucius], trans. 1977, p. 32).

This description analyzes a series of factors that a leader (the monarch and the general) uses to judge and determine the actions of military divisions. The term *perseverance and strong* is not accurate, because the original meaning is closer to a man with justice. Wang Bi, a philosopher of the Han Dynasty, commented it was a sin to launch a war, so there was no appreciation; but if the leader fought for justice, then there was good fortune without blame, and they could convince people to join the army being united and acting in unison. Leading such an army to crusade the injustice would be able to win and become the master. It clearly stated that leadership decisions must be in line with social justice and public interest (王[Wang], 2011).

The chapter also makes recommendations for the general's candidate. Only people who have the courage, talent and ethical can be the general to attract stable and have loyal followers, and they also could win the trust of the monarch. Even if they lead followers to do things that endanger their life and harmful to the world (e.g., war), the followers will obey them, and the public would also recognize the actions.

Su Shi, a great philosopher of the Northern Song Dynasty, used a metaphor of medicinal herbs and acupuncture to indicate the view that although the medicinal herbs are partially toxic,

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[4] Source text: 《师》：贞，丈人吉，无咎。

acupuncture pierces the skin and causes pain, but the goal is to cure the disease. Then seemingly harmful actions eventually gain the public advocacy and bring good results (苏[Su], 2019).

Six in the fourth place means the army retreats. No blame[5] (孔[Confucius], trans. 1977, p. 34).

It explains that a subprime force stayed for days without launching an attack. Although it did not win a battle, it saved the strength and was not damaged. The effect was far better than the reckless attack, so it was also no fault. Ethical leaders analyze the situation based on existing information, to accurately judge the gap between the two sides, and not to rashly attack for personal honor. It is the right decision that is consistent with the public interest. The public interest here includes both the followers, the people, and the objects of their service.

Six at the top means: The great prince issues commands, founds states, vests families with fiefs. Inferior people should not be employed[6] (孔[Confucius], trans. 1977, p. 35).

The last description explains that the reward must be commensurate with military merit. The monarch should bestow property and power to those who have both talent and political integrity. As for the talented but immoral people, they are untrustworthy so the monarch should not empower them. Su Shi commented that in the war, strict disciplined military regulation is a necessary condition for the military to win (苏[Su], 2019). However, sometimes the victory on the battlefield may come from unexpected strategies, which are often useful because they cannot be easily predicted. Ethical and unethical people have different purposes for adopting unpredictable strategies. Although they may bring similar results, leaders must be cautious when

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[5] Source text: 六四，师左次，无咎。
[6] Source text: 上六，大君有命，开国承家，小人勿用。

selecting talents, because people who are unruly out of their desires may also ignore the law for their desires. Throughout the history, those who have been given real power by relying on the sinister tactics are often the initiators of the next turmoil, because, for them, acting is not based on ethics but self-interest.

The theory emphases on both ethical requirements and talent are necessary qualities for leaders in the decision-making process. Although in some extreme cases, unscrupulous victory occurs, but in a broader context, ethical violations are always condemned and denied.

From the changing theory of Yin and Yang, what does not change in the concept of *ethics* is that its definition comes from whether it conforms to the public interest and social justice; what always changes is that the ethical standard is not a constant concept or theorem because it has adaptability. What simply changes are that the need to update at times only depending on the public interest and social justice. Therefore, ethical leaders both adhere to individual principles and adapt themselves to the times and specific circumstances to achieve being ethical.

Methodology

This paper used a qualitative method that combines plenty of literature review and a case study for IBM. The interpretation of existing research formed a few merging themes that consist of the conclusion. The leadership theories applied in the paper are the adaptive leadership theory and a Naturalistic view from Confucianism. Besides, the Yin and Yang framework offered some ideological inspiration.

Personal Leadership Theory

The adaptive leadership theory. The unique phenomena of the information age, such as technological advancement, globalization, and cultural integration, bring uncertainty and instability to the decision-making in various levels of organizations. Therefore, organizational leaders want to make optimal decisions in such an environment requires strong analytical skills and the ability to adapt to change.

The adaptive leadership is a leadership model introduced by Ronald Heifetz and Marty Linsky. Heifetz defined it as an act of a group to deal with tough challenges and then succeed (Corporate Finance Institute, 2019). The term *adaptive* means the ability to adapt to the quality of new conditions or to modify for new purposes.

Heifetz believed the essence of leadership is to influence change. Organizational leaders with this ability can be sensitive to all kinds of complex challenges no matter they are adaptive or technical. Adaptive leaders recognize addressing these challenges requires more than organizational change, but also the profound changes in values, attitudes, and behaviors of individuals within the organization (Heifetz, Grashow, & Linsky, 2009). Under these conditions, relying solely on technology to solve technical challenges is not enough, and adaptive leadership can drive these changes. They determine a new direction of flourishing, and self-adaptation based on these changes at any time. Also, Heifetz assumed that leadership is a function rather than a formal authority. The adaptive leadership is a call to action that could make a significant difference whenever it is needed (Shively, 2019).

Based on the above analysis of the organizational behavior's features, once the internal norms of the organization are formed, it is difficult to change. The organizational change may only occur in responding to cataclysm. Meanwhile, learning also emerges gradually. However,

organizational change and learning are influenced by existing organizational capabilities and procedures. The organizations depend on a particular path that their inertia and the transaction costs of making changes are considerable, thus severely limiting their choice for future development (Allison & Zelikow, 1999). The restriction also directly affects the decisions of the organization's leaders, further affecting the prosperity and development of the organization.

In many cases, the timeliness of organizational leadership decisions is noteworthy. The information age has accelerated everything in the world, including the responding speed and the decision-making cycle of organizational leadership. Take the Cuban Missile Crisis as an example. At the time, the Kennedy Administration could spend a week developing a cautious and sensible strategy. If a similar situation is put into the present, due to the dual pressure from the media and information technology, a U.S. president will be required to make decisions in the shortest possible time, but this is also likely to be a decision that is less considered (Allison & Zelikow, 1999). Given this situation, I assume the adaptive leadership becomes increasingly crucial for organizational leaders to make decisions in the present and the future.

Xunzi's naturalistic view of the law of nature. When organizational leaders confront the constant development of emerging robust science and technology, it is also a thought-provoking question that which attitude or position should they choose to treat science and technology, and how to utilize science and technology to make decision-making optimization. Xunzi's naturalistic view provides a remarkable perspective to measure the dynamic balance between human and nature.

Xunzi is another representative of Confucian school after Confucius and Mencius. Xunzi's theory suggests that the inevitability of nature does not depend on the preference of human beings. The natural law will not change only because of people's emotions or will, and it

is utterly indifferent to the distinction between good and evil. There is no rationality, will, good and evil of the natural law. Therefore, human beings should learn to harness the natural law to serve themselves, not superstitious about their authority or waiting for their gifts.

Xunzi emphasized the individual initiative of human when confronted with nature. Algorithm-Based information technology is a process in which humans use their invented language system to communicate with the objective existence of natural science. It is the manifestation of the relationship between human and nature. Unlike the theory of controlling or conquering the nature caused by the Western industrial revolution, Xunzi argued human beings could have a full understanding of the objective world though learning, to use it well and cooperate with it.

Xunzi also emphasized that people can survive in nature only through working hard. Therefore, constant learning is the primary focus of Xunzi's philosophy. The first chapter of Confucius' *the Analects* is about what is learning, while the first chapter of Xunzi is "An Exhortation to Learning" (荀[Xun], trans. 2014). Unlike *the Analects*, which emphasizes personal cultivation, the exhortation of Xunzi links learning and practice together, so that the action of learning has an externalization effect. Xunzi used to say:

> "I once spent the whole day pondering, but it was not as good as a moment's worth of learning. I once stood on my toes to look far away, but it was not as good as the broad view from a high place. If you climb to a high place and wave, you have not lengthened your arms, but you can be seen from further away. If you shout from upwind, you have not made your voice stronger, but you can be heard more clearly. One who makes use of a chariot and horses has not thereby improved his feet, but he can now go a

> thousand *li*[7]. One who makes use of a boat and oars has not thereby become able to swim, but he can now cross rivers and streams. The gentleman is exceptional not by birth, but rather by being good at making use of things" (荀[Xun], trans. 2014, pp. 1-2).

Xunzi believed that human beings should maintain a rational and unbiased attitude when dealing with nature. Being humble enough, initiative learning, making full use of nature, then people will develop better. To be good at using external strength and to create things to achieve goals is always the embodiment of human intelligence. In our time, information technology is the boat and oars of crossing a river or the horse that carries us thousands of miles away.

Here is the formation logic of Xunzi's naturalistic view. To maintain their survival and development, human beings must be unified to fight and coexist with nature as a group. Then the codes of conduct within the organization have been created. The original purpose of the codes was to share resources and eliminate internal struggles. It generated the normative order established by the group for the existence and continuation. The order is restraining, transforming, and governing people's humanity and desire. Therefore, to preserve such social normative order (external) and natural desires (internal), it is necessary for people to learn and practice (李[Li], 2008). Finally, learning how to properly use external strength enables us to learn better, and we are always on the way.

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[7] A Chinese measurement of distance, equivalent to roughly one-third of a mile (荀[Xun], trans. 2014, p. 8).

Case Study: IBM Kenexa Employee Assessments Solution

Case introduction. For a non-profit educational institution that provides a superior educational experience for schools, the recruitment of teachers becomes a challenge due to the limited resources of the school district. IBM Kenexa employee assessments measure the traits, skills, and cultural adaptability of the candidates in this process to help Texas schools find top teachers.

Background. The Region 10 Education Service Center is a Texas-based non-profit educational institution dedicated to helping regional school districts, charter schools, and many private schools provide an exceptional educational experience. Their mission is "to be a trusted, student-focused partner that serves the learning community through responsive, innovative educational solutions" (Region 10 Education Service Center, 2019). For this institution, hiring teaching staff has been often the priority. For their clients, cyclical external factors such as economic recession and skill shortage mean that recruiting faculty is often a top priority. However, because of the limitation of resources, recruitment is a daunting challenge. (IBM, 2019).To help Texas school districts attract the skills they need to deliver a quality learning experience, Region 10 hopes to let them cost-effectively select top candidates.

Alternatives

The original plan for Region 10. Region 10 had recognized the value of the employee assessment system because it can help the school district determine the best candidates. To help their clients find the talents they need, Region 10 offered an online service called the Teacher Job Network. Through the portal, applicants from both inside and outside the state could upload their qualifications. School districts that register for the service could search the database to find applicants with the required skills.

However, the online service relied on the out-of-the-box assessment platform of the Teacher Job Network. Some difficulties always appeared in practical applications, e.g., the cost of the assessment platform was relatively high for many clients. Besides, Region 10 as providers of assessments were unable to customize the assessment questions, especially those who were inappropriate to limit the assessment scores' accuracy. The inconvenience of cost-based and adaptive upgrades to clients' needs prompted Region 10 to seek a cost-effective, customized solution to enhance assessment services and extend its benefits to more clients.

The teacher assessment system in the past. Using personnel assessment in the education system to examine and evaluate teacher performance, IBM is not the first practitioner. However, the lessons of the previous event let us see some serious problems.

In 2007, to reform schools with inadequate teaching quality, Washington DC developed a teacher evaluation tool called IMPACT, based on the principle that "the students weren't learning enough because their teachers weren't doing a good job" (O'Neil, 2016, p. 4). Teachers who have poor evaluation results under the assessment were all expelled.

A fifth-grade public school teacher named Sarah Wysocki was dismissed after receiving a shallow score under the IMPACT assessment, even the principals and parents have highly recognized her teaching experience and achievements. Through Wysocki's appeal to her assessment score, we learned the development, definition, data sampling, and algorithm selection of this assessment system were controversial and uncertain in almost every aspect. Trying to generalize human behavior, performance, and potential into an algorithm or model was not an easy task. It was more complicated to calculate the impact of a teacher to a student in an academic year.

Furthermore, a statistical system that relies on the algorithm to take effect requires a feedback path to ensure the system is aware of the error when the system goes wrong. Statisticians continue to use error training models to make them more intelligent. Without error feedback, the big data model will continue to output erroneous results, and no one improves it.

Behind the tragedy of many teachers like Wysocki, it is the organizational leaders who misused the technology, relied solely on system's results to make decisions, and infringed the teachers' interests by their inaction and avoidance after receiving feedback. Public schools that have lost excellent teacher resources were victims of another level (O'Neil, 2016).

Proposed solution. IBM Kenexa Employee Assessment enabled the decision makers of Region 10 to use analytics-driven techniques to measure the characteristics, skills and cultural adaptability of the candidates on their Teacher Job Network and to predict their job performance. The development team also asked the clients for detailed information to understand specific needs. They improved the assessment system of adapting to the specific needs of the clients.

Region 10's collaboration with IBM and the districts identified approximately 200 identifiable factors that developers narrowed down to eight features of the most reliable predictive performance, including motivation, willingness to learn, multitasking, optimism, and situational judgment. By summarizing the applicant's scores for these eight characteristics, Region 10 classified the certifiers in the talent database as A, B, and C performers, providing customers with deeper candidate insights. The assessment system also provided online tests that applicants need to conduct to help district leaders make better judgments and decisions.

An essential aspect of the assessment system became effective was the flexibility and intelligence through its highly efficient internal algorithms. The assessment questions are

versatile, and each multiple-choice question has multiple possible answers, which allows the school's recruiters to understand the candidate's personality well.

By utilizing assessment questions tailored to the unique requirements and specifications of their school district, Region 10 improved the accuracy of its talent scores.

> "We are seeing that our assessment scores are extremely reliable predictors of employee performance," explains Roberts[8]. "Sometimes, schools take the decision to hire a candidate that IBM Kenexa predicted would perform poorly in a certain area. When we compared the scores of teachers whose contracts were not renewed with the traits they scored poorly on, we saw a clear correlation between the low scores and reasons for not having their contracts renewed." (IBM, 2019)

The application of IBM Kenexa is suitable for the school district to identify and hire the best performing applicants, while also helping to narrow the skills gap and ensure high-quality coverage throughout the course. In the end, the number of schools using assessment services increased by 27%, promoting the development of the school district and driving business growth.

Through IBM Kenexa employee assessments to provide insights into candidates in their Teacher Job Network, Region 10 is achieving its goal of helping smaller regions deliver the skills needed for quality teaching year after year. The Region 10's leaders who use this technology recognize the positive outcomes from the IBM Kenexa that providing the district with the insights needed to make smarter hiring decisions and further developing high-quality learning experiences across the region.

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[8] Sandy Roberts, Teacher Job Network Application Manager, Region 10 Education Service Center

Comments. With the IMPACT system as a counterexample, IBM Kenexa employee assessments have many excellent treatments in algorithms and system design. The developers communicate with clients, understand their needs and learn from the expertise in the field. So, they could form useful feedback to ensure the adaptability and comprehensiveness of the whole system, which was the parts missing in the IMPACT system. In addition to the technological advancement and comprehensiveness, IBM's Corporate Culture, their clear understanding of technical duality, and industrial ethics of the leadership team all contribute to the whole organization to make the right decisions.

The overall ethical awareness of IBM. As a giant in research, development, and use of cutting-edge information technology, IBM has always been at the forefront of the industry in terms of leadership ethics in utilization. IBM published the *Daily Artificial Intelligence Ethics: A Practical Guide for Designers and Developers* in 2018, a document that represented the beginning of a dialogue defining the daily ethics of artificial intelligence. This guide claims "Ethics must be embedded into the design and development process from the very beginning of AI creation" (IBM, 2018, p. 6).

Artificial intelligence technology is rapidly evolving in terms of capabilities and impacts. As the artificial intelligence systems' designer and developer, understanding the ethical considerations at work is fundamental. If improve the capabilities of intelligent systems with technology as the center, but lack the full consideration of human needs, ethical controversies will emerge. Only Artificial intelligence that is designed and developed relying on social values and ethical principles is human-oriented artificial intelligence.

IBM believes, as AI's capabilities are increasing, to understand and to develop the ethical focus of the information technology is the shared responsibility of practitioners because they provide the deliberate framework for building and using AI systems to build ethical foundations.

Organizational leaders require to know responsible innovation is the philosophical foundation for the artificial intelligence's development, and organizations must use technology to achieve the dual goals of profit and social benefits. Organizations should also actively promote ethical business design, such as intelligent systems embedded in ethics that improves organizational policies and behaviors. Based on the full understanding of information technology, the proper use of them nudges people to decide better. Finally, the significance of general data protection regulations and data on building and maintaining AI systems should also be of concern to organizational leaders.

Artificial intelligence designers and developers help to reduce prejudice and deprivation of citizenship by practicing in these ethical foci. Artificial intelligence systems must remain flexible enough to maintain and improve as they discover and fix ethical challenges (IBM, 2018).

Theoretical research in practice. Specific to the daily work, in the human resources analysis section, whether it is the employee assessment system provided for clients, or the human resources analysis strategy within the organization, IBM emphasizes the concept of combining technology with people-oriented leadership ethics.

A report released by the IBM Smarter Workforce Institute, *Evaluating Assessments in the Age of Big Data and A*I, pointed out the methods of assessing job seekers and talent management employees are undergoing rapid changes. Most of the changes are technically driven by the development of machine learning and artificial intelligence. These methods are fast, more convincing with their quantitative assessment, more attractive to candidates, and represent a

remarkable evolution beyond the 20th-century approach. However, no matter how compelling these new methods are, practitioners should not forget that they are selective tests. Therefore, they need to meet strict standards related to group differences, biases, and standards of reliability and effectiveness (Guenole & Feinzig, 2018).

In another IBM report, the idea that the future of human resources is analytical is put forward, and the combination of information technology and ethics is increasingly crucial in the future trend. Besides, the report also suggests the issue of how organizational leaders decide to use data information in the human resource analysis belongs to the field of analytical ethics. New analytical capabilities are revolutionizing the human resources arena. Data and evidence-based approaches are replacing intuition and experience as the preferred decision-making model in the HR department. Behavioral science theory and research point out what information a human resources department should measure an employee. Information technology platforms now store large amounts of relevant human resources information and provide sophisticated analysis. Open standards allow methodological experts to link different data sources to generate more accurate employee behavior predictions (Guenole, Feinzig, & Green, 2018).

Limitations

This paper has several limitations. First, the argumentation process does not use a quantitative method, thus lacking objective data to support the main viewpoints. Secondly, the reference documents selected in the paper are one-sided. I failed to fully cite and analyze all the current research results of the issue. Third, due to time and resource constraints, I failed to go deep into an organization for observation and analysis. Instead, I did a document analysis of the cases and multiple reports that IBM had completed and finally concluded. In the future, it will be my strengthened research section. Finally, the limitations of the article also come from the

information gap in the literature understanding and translating process. I translated the Chinese classical literature cited in the paper from ancient Chinese to modern Chinese, and then to English. Besides, the accurate interpretations of some ancient texts are still controversial in the academic, which also leads to information loss during writing.

Interpretation

Information and Rationality Are the Foundation of Decision-Making

Based on the analysis, the ancient Chinese decision-making theory believed the leader's rational attitude guarantees the efficiency of decisions such as strategic planning, situation judgment, and tactics adoption. The decision-making theory of *Sun Tzu's Art of War* emphasized on rational analysis has advanced materialist values and is partly consistent with the point of the rational actor model in *Essence of Decision.*

In the discussion of the internal connection of information, technology, and decision-making, Sun Tzu (5th century BC) underlined leaders must observe, understand, and analyze various real-life phenomena while emphasizing experience and combining theory with practice. It is also affirmed in the Western contemporary military theory.

> The commander or decision-maker may know a good deal about how the war started and the basic conditions existing at the outbreak; or information may become available specifying these reasonably well, even though this information was not known before the war's outbreak. From this point forward, even though he is completely cut off from all information external to his organization and forces, and perhaps even from much of that, he may still have enough of an idea or events and their timetable, at least in outline, and a sufficient judgment of what the other side is trying to accomplish (through

> knowledge of its logistics, doctrines, and other constraints) to "play" both sides hypothetically by of events dead reckoning (Kahn, 1965, p. 212).

The highlight point is that a balanced symbiotic relationship lies between the analysis of realistic phenomena and the consideration on experience. They both are indispensable. Because if the leaders only pay attention to the phenomenon analysis in the decision-making process and ignore the reflection of the experience, the judgment will lack the theoretical foundation. On the contrary, if they rely too much on personal experience or theoretical basis and lacks analysis of the actual situation, the judgment will lack flexibility and challenging to adapt to the changing external conditions.

There is an idiom in China called *Talking about stratagems on paper*, or *the armchair strategy*. The allusion came from the battle of Chang Ping, which was the earliest, largest and most complete annihilation war in ancient Chinese military history. The army of State Zhao led by General Zhao Kuo was defeated by the army of State Qin led by General Bai Qi, also known as the God of War in Chinese history. The reason for General Zhao's command failure was pathetic. This young general had read the military books since childhood and was proficient in various theoretical strategies. However, he failed to judge the actual battlefield accurately according to the situation. The rigid command of the army following the guidelines on the military book eventually led to a crushing defeat, which in turn led to the demise of the State Zhao[9]. This historical event proved the significance of the integration of theory and practice, also the integration of learning and adaptivity.

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[9] According to the ancient historical research and analysis in recent years, some scholars believe that the battle of Chang Ping is an extremely complex one. Many reasons caused the failure of the State Zhao, and it is inequitable only to blame General Zhao.

The disparity between Chinese classical decision theory and modern Western decision theory comes from the difference between collectivism and individualism. The Chinese culture has been known for its collectivism and the pursuit of collective harmony since ancient times. Therefore, in the Chinese classic literature of many schools, the initiators of specific viewpoints and the objects to be studied are often regarded as a collective with unified thoughts and consciousness. The monarch or the general who frequently appear in the literature are not individuals but represent a group of people with the same identity and attributes. Because of such cultural tradition and mental model, some Chinese theories, unlike Western theories, lack the specific discussion about the unique attributes and uncertainties brought about by individual differences within the organization. Therefore, the problem's analysis of the internal behavior of the organization, the development of the Western theory may be complete than the Eastern.

To understand and predict human behavior, we must consider the fact that humans have only limited rationality. The deficiency of limited rationality on human decision-making ability is difficult to identify or predict (Allison & Zelikow, 1999). However, only relying on the rational actor model to analyze the organizational behavior and leadership decisions, limitations occur in the actual operation. With the expansion of decision-making range and the diversity of influencing factors, the uncertainty will increase. Model I can only make righteous judgments and predictions on the macro-level, but the accuracy of analyzing and predicting the specific details will decrease. Uncertainty is one of the compelling reasons that undermine the prediction of future developments and decision-making's efficiency. The human participation, whether as an individual or a collective, amplifies uncertainty for various reasons. Therefore, when organizing leaders are deciding or analyzing some established decisions, it is necessary to consider the differences in organizational behaviors and individual behaviors.

The three analytical models complement each other. The model I provide us a macro-framework that focuses on the analysis of the context of the organization; Model II focuses on the internal organization and analyzes those organizational norms that provide information, options, and actions for decision making. Model III focuses on analyzing individuals who are closely related to the decision-making process both inside and outside the organization, such as the agents and principals. It is a clear perspective from the outside to the inside and from the individual to the collective.

Although bringing in organizational behavior model and government political model in decision-making leads to more sophisticated analysis and higher requirements for the quantity and reliability of the information, they boost the analysis closer to the facts, form accurate interpretation and enhance the decision's efficiency.

In conclusion, both Eastern and Western theories and models emphasize the value of information and rationality in decision-making. Therefore, it is crucial to use algorithm-based information technology to process large-scale information and optimize decision-making processes.

Information Technology Nudging Decision-Making Under the Supervision of Leadership Ethics

By learning information technology, we recognize in the context of the rapid development of science and technology today, the proper use of information technology undoubtedly offsets many loopholes and uncertainties in decision-making, helping organizational leaders who used to rely solely on subjective experience and judgment in the past. Combined with the discussion of multi-participant decision-making, once the principal's interests are divergent from the agent, organizational leaders can consider using information technology to

make the machine an agent. In this way, since the machine follows the principal's interests through a preset algorithm, the influence from the dissimilar interests between the agent and the principal can be curbed in theory.

When the organization leaders decide to influence the publics' opinion by choice architecture, whether their behavior is a nudge or manipulation, depending on the purpose of the intervention. To lead the public to be healthier, wealthier and happier, and to maintain the right of the public to choose freely, then the intervention is a nudge. The literature review confirms the information technology promote leaders to optimize their choice architecture and refine nudge.

Besides, artificial intelligence or mathematical models are capable of large-scale processing information, analyzing and judging complex situations accurately. Their performances are far above humans, which is the main driving force for humans to spare no effort to develop these new technologies. It is indisputably that algorithm-based information technology promotes organizational leaders to make optimal decisions.

Sun Tzu's Art of War explained the policymakers should understand the resources they possess, recognize their pros and cons, and be able to take advantage of strengths while avoiding weaknesses. It reminds contemporary leaders to be fully aware of the duality of information technology when using it as a tool to assist decision-making. Policymakers should not give up on the further development and utilization of such useful tool only because of the concerns to its harm, but they must be vigilant against the potential threats and implement leadership as much as possible to eliminate the damage of the dark side.

The leader's attitude and understanding of the dark side identify the solutions for the ethical dilemma. When a precise outcome from an algorithm that was initially used to simplify a complex problem conflicts with fairness or the public interest, do we sacrifice the accuracy of the

model in order to pursue the social equity? I agree with the affirmative answer to this question. “If we’re going to be equal before the law, or treated equally as voters, we cannot stand for systems drop us into different castes and treat us differently” (O'Neil, 2016, p. 210).

In the case study, the IMPACT assessment tool sounds the alarm. First, the project manager and programmers of the evaluation system failed to understand the nature of education or the evaluation criteria of the teacher; thus, logical loopholes caused by ignorance emerged, but no one noticed during the program development. Furthermore, no relevant leaders were willing to stand up and engage in in-depth communication with the teachers to improve the unreasonable part of the algorithm. Secondly, the leaders of the government education departments who made decisions based on the results of this assessment did not try to understand the mathematical principles and algorithms of the system. The deviations and mistakes in the process have been neglected, but the leaders thoughtlessly insisted the assessment could clearly explain the problem, reduce the human deviation, and more reflect the fairness.

The inappropriate use of algorithm-based information technology and relevant products by organizational leaders in decision-making has led to the emergence of inequities. The professional quality and ethics of the organization leadership should be questioned. Did they consider the decision for the benefit of the public?

Also, in the organizations who are possessing technical resources, the values and desires of leaders influence decision-making, which in turn affects the ethics and justice of technology in application. Leaders put specific requirements on machines and algorithms to collect certain data, and data scientists are asked to give their bosses the default answers they want. The use of algorithms unethically, serving the unequal manipulation of power and prejudice, poses an ethical risk to a contemporary society that relies on algorithms.

In this context, organizational leaders, engineers, and data scientists count as members of technical application decision makers because they determine how to use the algorithm or what kind of algorithm is used. After the market crash of 2008, two financial engineers, Emanuel Derman, and Paul Wilmott drafted the Hippocrates oath of information technology:

- I will remember that I didn't make the world, and it doesn't satisfy my equations.
- Though I will use models boldly to estimate value, I will not be overly impressed by mathematics.
- I will never sacrifice reality for elegance without explaining why I have done so.
- Nor will I give the people who use my model false comfort about its accuracy. Instead, I will make explicit its assumptions and oversights.
- I understand that my work may have enormous effects on society and the economy, many of them beyond my comprehension (O'Neil, 2016, p. 205).

Such initiatives are at least a wake-up call for the use of algorithm-based information technology in terms of values and self-discipline. Meanwhile, we also see the humble attitude of these two engineers standing in front of nature, the science and the technology.

Ethics and Adaptive Leadership

From the interpretation of the War hexagram in *the I Ching*, we know under the framework of Yin and Yang everything has two sides. War is a bad thing for the public, but considering the external environment, if a war is waged for justice, then bad thing becomes good thing. Organizational leaders primarily need to clarify and recognize the duality of everything, so that they can comprehensively and thoroughly analyze and judge the situation; any unilateral analysis and judgment may cause decision errors.

Although it is hard to define a decision is absolute ethical because the standards are changeable, ethical leaders are still capable of judging the justice of action and making the right decisions for their adaptability to the changing world.

Reflected from the Yin and Yang theory and the interpretation of Confucianism and Taoism, the ethics have the features of adaptive self-renewal according to the external change. Unfortunately, modern people seem to forget the ancient Chinese *ethics*' adaptability. When people following the old routines, they ignore the critical inheritance and reflection of the true meaning of ethics. Re-presenting the definition of *ethics* in Chinese classical philosophy helps people better recognize ethics and generate a new awareness of them. As organizational leaders, when pursuing the self-ethical realization, they should always remember the initial intention of ethics: obtaining truth in the process of continuous learning.

I appreciated IBM's ethical guidelines fully reflecting its superior ethical awareness. The engineers who drafted the guide had an open mind towards science and ethics. They clearly stated at the beginning and end of the guide:

> This is an ongoing project: we welcome and encourage feedback so the guide can develop and mature over time. We hope it contributes to the dialogue and debate about the implications of these technologies for humanity and allows designers and developers to embed ethics into the AI solutions they work on (IBM, 2018, p. 32).

The statement reflects the adaptive leadership and moral qualities of these IT organization leaders. First, they have a distinct understanding of the science and technology used in their hands and treat the technology with a learning attitude. Secondly, they maintain an open mind and realize that the maintenance of ethics needs to be continuously updated and absorbed

from outside opinions in order to mature over time; Finally, they apply this adaptability to their behavior and the technology in their hands.

Leaders with a clear understanding of technology take advantage of evolving new technologies to address the technical challenges of organizational change. At the same time, because they are aware of the ethical responsibilities of decision makers, as well as the importance of values and ideas for change, so they also undertake adaptive challenges. These are the abilities and awareness that adaptive leadership expects.

Like the two engineers who drafted the Hippocrates oath of information technology, *Everyday Ethics for Artificial Intelligence* shows to achieve sustainable growth and prosperity, organizational leaders and decision-making teams should stay humble in the face of information technology. Admitting egoistic ignorance and incompetence is a prerequisite for maintaining a state of constant learning.

Everyone recognizes it is our enduring appeal as a human being to maintain ethics. However, people, especially organizational leaders, should also realize the word *ethics* or *ethical* is no longer a term that is printed on books, or an static adjective that describes human attributes. They should be a continuous verb that means everyone goes on the road of pursuing truth by everlasting learning.

The ancient changing theory and modern practice both revealed the importance of a leader's ability to adapt to change in maintaining ethical standards and making optimal decisions. As a result, there proves to be a strong correlation between ethics and adaptive leadership.

Conclusion

In the context of the information age, the appropriate application of information technology helps organizational leaders to make optimal decisions, which requires adaptive leadership and leadership ethics to maintain its efficiency.

The interaction of algorithm-based information technology and decision-making should promote mutual development. In this equilibrium, first, leadership ethics guarantee the organizational leaders will always satisfy the public interest and social justice when deciding with information technology. Second, the adaptive leadership theory provides specific and compelling action guidance and standards of conduct for achieving the purpose. Finally, the changing theory based on the Yin and Yang framework enlightened ideological inspiration for maintaining adaptability and ethics.

The alternative definition of *ethics* in this paper led to the deduction of my conclusion. Through learning, organizational leaders are curious and humble, ensuring they continue to strengthen their self-learning and exploration. The exploration enables them to better understand the objective world and advanced scientific technology in sustainable development. A correct recognition of technology keeps organizational leaders sensitive to the duality of technology, so they can judge how to not only make good use of technology but also avoid the harm caused by the dark side of technology. An accurate judgment allows leaders to know what is right, and they can always make decisions that benefit the public. Then it is the ethical leadership. Once the organizational leaders' behaviors and ideologies are ethical, they can always make optimal decisions, which will not only promote the healthy development of the organization but also promote the social justice and the progress of human society.

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